

Subjek : Meat
Tahun 2004-2008 (1.000 judul)

N. Graiver, A. Pinotti, A. Califano, N. Zaritzky, Mathematical modeling of the uptake of curing salts in pork meat, *Journal of Food Engineering*, Volume 95, Issue 4, December 2009, Pages 533-540, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.06.027.

(<http://www.sciencedirect.com/science/article/B6T8J-4WKK1F3-1/2/4ca881808d224d22974d1bda0bde29c>)

Abstract:

A mathematical model was developed in order to represent the uptake of curing salts (NaNO₂, KNO₃, and NaCl) in pork meat pieces with the purpose of determining immersion times and suitable salt concentrations in the brine of wet curing processes. The partial differential equations of mass transfer under unsteady-state conditions were solved numerically, in three-dimensional geometry (finite cylinders), considering the diffusive and also the convective contributions of the different solutes, due to water uptake by the tissue. The variation of the diffusion coefficients of the curing salts with NaCl concentration was also considered. The numerical model was validated using results obtained from experiments of salt diffusion in pork meat cylinders of different diameters immersed in curing brines.

The model was applied to predict the time necessary for an industrial piece of meat to be immersed in brine without exceeding the maximum permitted nitrite value of 200 ppm and the recommendable sodium chloride concentration.

Keywords: Diffusion; Mathematical model; Curing salts; Mass transfer

Birol Kilic, Current trends in traditional Turkish meat products and cuisine, *LWT - Food Science and Technology*, Volume 42, Issue 10, December 2009, Pages 1581-1589, ISSN 0023-6438, DOI: 10.1016/j.lwt.2009.05.016.

(<http://www.sciencedirect.com/science/article/B6WMV-4WC11BK-1/2/e8eb45443697e8afd938f65157a0a49b>)

Abstract:

This study reports on the results of research and technological improvements achieved during the past decade in the field of traditional Turkish meat products having economic value. Traditional Turkish meat products discussed are sucuk (dry, uncooked, cured, and fermented sausage), pastirma (seasoned, air-dried, cured, pressed, and non-fermented beef cut), doner kebab (meat block roasted with slow rotation in front of a vertically positioned heat source), kavurma (a deep fried, diced meat, stored in the solidified animal fat), and cig kofte (raw meat balls). These products are produced and consumed all around the world. Research on these products has been focused on issues such as chemical and microbiological analysis of commercial products, quality and safety improvements, additives, new and/or alternative processing methods, and health. Research results indicate that possible foodborne illnesses and quality problems are major concerns and further research, a broad control system, changes such as adding natural antimicrobial and antioxidants and process modifications are needed to improve safety and quality of these products. Some changes such as intensive poultry contributions to commercial production, safety and quality concerns about traditional meat products are pointed out, as well as the trends in a research and development, technological circumstances are discussed.

Keywords: Turkish meat products; Sucuk; Pastirma; Doner kebab; Kavurma; Cig kofte

Danuta Majewska, Malgorzata Jakubowska, Marek Ligocki, Zofia Tarasewicz, Danuta Szczerbinska, Tadeusz Karamucki, James Sales, Physicochemical characteristics, proximate analysis and mineral composition of ostrich meat as influenced by muscle, *Food Chemistry*,

Volume 117, Issue 2, 15 November 2009, Pages 207-211, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.03.100.

(<http://www.sciencedirect.com/science/article/B6T6R-4W0SK67-4/2/57b64c12fd249047a453612420398724>)

Abstract:

The influence of muscle on the physicochemical characteristics, proximate analysis, and mineral composition of meat from 10 ostriches (10-12 months old), slaughtered according to commercial abattoir procedures, were evaluated. Muscle had no influence ($p > 0.05$) on L*-values (32.5), a*-values (11.9), water-holding capacity (11.9%), final pH (pH₂₄) values (6.07), and ash contents (1.12 g/100 g edible meat). However, intramuscular lipid contents varied ($p < 0.05$) from 0.88 (M. fibularis longus) to 1.44 (M. flexor cruris lateralis) g/100 g edible meat, at a mean value of 1.16 g/100 g edible meat for 10 different muscles. Sodium (34.7 mg/100 g edible meat) and iron (3.14 mg/100 g edible meat) contents, both influenced ($p < 0.05$) by muscle, possessed substantially lower and higher values, respectively, than values reported for beef and chicken.

Keywords: Ostrich meat; Muscle; Physicochemical characteristics; Proximate analysis; Mineral composition

Dereje T. Asefa, Solveig Langsrud, Ragnhild O. Gjerde, Cathrine F. Kure, Maan S. Sidhu, Truls Nesbakken, Ida Skaar, The performance of SAS-super-180 air sampler and settle plates for assessing viable fungal particles in the air of dry-cured meat production facility, Food Control, Volume 20, Issue 11, November 2009, Pages 997-1001, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.11.011.

(<http://www.sciencedirect.com/science/article/B6T6S-4V42J5X-3/2/535dcf6d4d683123eb8ab3c6f993c442>)

Abstract:

Performances of SAS-super-180 air sampler and settle plates were investigated for the assessment of airborne fungal food contamination. Air samples were taken from processing rooms of a dry-cured production facility and outdoors. Fungal colonies and numbers of species were counted and compared. Quantitatively, the air sampler showed higher numbers of species and mean CFU/plate compared to settle plates. Qualitatively, the two methods showed similar dominating fungal genera and species associated with dry-cured meat products. The study showed settle plates could provide important qualitative information for food processing plants where airborne fungi associated with food products are the targets.

Keywords: Air sampling; Dry-cured meat products; Viable fungal colonies

Tom Ross, Sven Rasmussen, John Sumner, Using a quantitative risk assessment to mitigate risk of *Listeria monocytogenes* in ready-to-eat meats in Australia, Food Control, Volume 20, Issue 11, November 2009, Pages 1058-1062, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.01.003.

(<http://www.sciencedirect.com/science/article/B6T6S-4VDY7XX-1/2/2e1f4dea890334eae0c2a3f2258a9782>)

Abstract:

To provide guidance to Australia meat processors a Monte Carlo simulation model that estimates the risk of listeriosis from processed meats in Australia [Ross, T., Rasmussen, S. R., Fazil, A., Paoli, G., & Sumner, J. (accepted for publication). Quantitative risk assessment of *Listeria monocytogenes* in ready-to-eat meats in Australia. International Journal of Food Microbiology] was used to assess the efficacy of alternative strategies proposed to reduce the risk of listeriosis from these products. The structure of the model enabled estimates of levels of *Listeria monocytogenes* throughout the predicted life of the product, and facilitated modelling of the proposed mitigations. Technological and economic constraints relevant to the Australian industry meant that, of the various proposed risk reduction strategies, the use of growth-rate retarding additives, such as salts of organic acids, were identified as the preferred risk mitigation option.

Keywords: Listeriosis; Processed meats; Australia; Quantitative risk assessment; Risk mitigation; Risk reduction; Model

A.M. Herrero, L. de la Hoz, J.A. Ordonez, D. Castejon, M.D. Romero de Avila, M.I. Cambero, Magnetic resonance imaging study of the cold-set gelation of meat systems containing plasma powder, *Food Research International*, Volume 42, Issue 9, November 2009, Pages 1362-1372, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.06.014.

(<http://www.sciencedirect.com/science/article/B6T6V-4WMM7D2-1/2/c5625b175838e5a9d44ac5caf517d800>)

Abstract:

The effect of rehydrated plasma powder addition to meat systems formulated with and without NaCl was evaluated by magnetic resonance imaging (MRI), texture and physico-chemical analysis. Different model systems were elaborated: rehydrated plasma powder (PPW), meat batter (ME) and ME with PPW (MEPPW) with (MEPPW2) and without (MEPPW0) NaCl addition. The effects of PPW addition to ME were different depending on the presence or absence of NaCl. The PPW addition caused high mechanical stability to ME without salt and an increase ($p < 0.05$) of hardness, cohesiveness, springiness and breaking force. The study of the structure of MEPPW0 by MRI showed higher T2 (associated to larger pores), T1 (indicating more water mobility) and apparent diffusion coefficient (ADC) values than those of ME. When salt was added (MEPPW2) there was a decrease of hardness, breaking force, T1 and ADC and an increase of the adhesiveness and T2 with respect to MEPPW0.

Keywords: Meat systems; Plasma powder; Cold-set binding agent; Magnetic resonance imaging (MRI)

J.H. Lee, B. Kouakou, G. Kannan, Influences of dietary regimens on microbial content in gastrointestinal tracts of meat goats, *Livestock Science*, Volume 125, Issues 2-3, November 2009, Pages 249-253, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.05.004.

(<http://www.sciencedirect.com/science/article/B7XNX-4WD1172-3/2/33c9294a78348862d356049677eb7088>)

Abstract:

This experiment was conducted to evaluate the effects of dietary treatments on microbial loads and pH of gastrointestinal tract contents in meat goats, as well as the concentration of volatile fatty acid (VFA) in the rumen. Crossbred (Boer x Spanish) goats ($n = 36$; BW = 17.7 kg) were assigned randomly to one of three experimental diets ($n = 12$ /diet or 3 pens/treatment) for 90 days: alfalfa (*Medicago sativa*) hay alone (AH-diet); 18% CP concentrate alone (C-diet); or, a combined diet (AHC-diet), consisting of the AH-diet for the first 45 days, followed by 45 days of the C-diet. After evisceration, pH values of rumen liquor and colon digesta were immediately measured from each animal, as well as aseptically collected rumen liquor and rectal samples to determine the microbial loads. Collected rumen liquor was also prepared for volatile fatty acid (VFA) contents. Feeding meat goats with alfalfa hay alone had higher ($P < 0.05$) rumen (7.17) and colon (7.10) pH compared with those fed either the concentrate alone or combined-diet. Although the acetate content was high in the AH-fed group (66.3 mM) compared to the AHC-diet group (34.6 mM), no significant differences were found in the total VFA contents in rumen liquor among the goats fed three different dietary regimens. Total plate counts were not significantly different among goats fed the experimental diets in the rumen or rectal samples. *Escherichia coli* counts in the rectal samples were lower ($P < 0.05$) in the AH-diet group (6.43 log₁₀ CFU/g) compared with the C-diet (8.21 log₁₀ CFU/g) or AHC-diet (8.40 log₁₀ CFU/g) groups. However, no significant differences were found in the *E. coli* counts of rumen samples from goats fed the experimental diets. The mean (\pm SEM) rumen *E. coli* counts were 1.38, 1.65, and 2.51 \pm 0.560 log₁₀ CFU/g in the AH-, C-, and AHC-diet groups, respectively. The results indicate that feeding hay alone may decrease the fecal shedding of *E. coli* in meat goats with increasing the rumen and colon pH.

Keywords: Meat goats; Dietary regimens; Concentrate; Alfalfa hay; E. coli

J. Safari, D.E. Mushi, L.A. Mtenga, G.C. Kifaro, L.O. Eik, Effects of concentrate supplementation on carcass and meat quality attributes of feedlot finished Small East African goats, *Livestock Science*, Volume 125, Issues 2-3, November 2009, Pages 266-274, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.05.007.

(<http://www.sciencedirect.com/science/article/B7XNX-4WCT04H-1/2/ce5a93fe0d1092dd9b0c3509a52abcb8>)

Abstract:

Effects of concentrate supplementation on carcass and meat quality of feedlot finished Small East African (SEA) goats were assessed using 23 animals (14.5 months old and 20.1 kg body weight). Goats were subjected to four levels of concentrate supplementation: ad libitum concentrate allowance (T100), 66% of ad libitum concentrate allowance (T66), 33% of ad libitum allowance (T33) and no concentrate (T0). All goats were slaughtered after 90 days of experimental period. The ad libitum concentrate intake attained by the goats was about 370 g DM/d. All concentrate-supplemented goats had similar ($P > 0.05$) total dry matter intake. T100 goats had 31 g and 14 g higher ($P < 0.05$) daily body weight gain than T33 and T66 goats, respectively. T100 and T66 goats were comparable in final live weight and empty body weight but both were heavier ($P < 0.05$) than that of T33 and T0 goats. Hot and cold carcass weights for both T100 and T66 goats were 3 kg heavier ($P < 0.05$) than that of T0 goats. Concentrate-supplemented goats had similar ($P > 0.05$) EUROP scores for carcass fatness. T100 and T66 goats had 6.5 and 3 units higher ($P < 0.05$) scores for conformation than T0 and T33 goats, respectively. Dressing percentage increased with levels of concentrate supplementation in a curvilinear fashion, with highest values in T66 goats. At 6 h post-mortem, muscle pH for concentrate-supplemented animals was significantly lower compared with T0 goats. Carcass fat content was 9% higher ($P < 0.05$) in concentrate-supplemented goats than in their contemporaries. No differences in cooking loss or shear force were observed among treatments, while these variables were affected by the type of muscle. It is concluded that feedlot finishing of SEA had limited effects on meat quality. Finishing SEA goats at 66% of their ad libitum concentrate intake, however, significantly improved weight gains and carcass fatness. Cost-benefit analyses are recommended before embarking on a large scale feedlot finishing of SEA goats.

Keywords: Feedlot; Goats; Carcass characteristics; Chevon quality

Guangxue Wu, Mark Gerard Healy, Xinmin Zhan, Effect of the solid content on anaerobic digestion of meat and bone meal, *Bioresource Technology*, Volume 100, Issue 19, October 2009, Pages 4326-4331, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.04.007.

(<http://www.sciencedirect.com/science/article/B6V24-4W6N2R1-5/2/4d14a5b50998a4193b115346bbbd8eea>)

Abstract:

The effect of the solid content on anaerobic digestion of meat and bone meal (MBM) was investigated in batch reactors at MBM solid contents of 1%, 2%, 5% and 10%. There was no significant difference in the specific methane (CH_4) production potential with respect to the total volatile MBM solids (TVS) applied at these solid contents, which ranged from 351 to 381 ml $\text{CH}_4/\text{g TVS}$. However, the highest CH_4 yield with respect to the removed volatile MBM solids (RVS) was 482 ml $\text{CH}_4/\text{g RVS}$ at the MBM solid content of 5%; the CH_4 yields were 384-448 ml $\text{CH}_4/\text{g RVS}$ at the other MBM solid contents. The lag time of CH_4 production rose with the increase in the solid content. The longer lag time at MBM solid contents of 5% and 10% was due to inhibition caused by high concentrations of volatile fatty acids (VFAs) and free ammonia in the reactors, but the inhibition was reversible. The production of VFAs during the digestion varied with solid contents: at the solid content of 1%, only acetic acid was detected; at 2%, both acetic and propionic acids were detected; and at 5% and 10%, acetic, propionic, butyric and valeric acids were detected. After 93-

day digestion, the volatile MBM solid reduction was 92%, 91%, 79% and 80% at MBM solid contents of 1%, 2%, 5% and 10%, respectively.

Keywords: Anaerobic digestion; Meat and bone meal; Methane production potential; Solid content

Sara Bastida, Francisco J. Sanchez-Muniz, Raul Olivero, Lourdes Perez-Olleros, Baltasar Ruiz-Roso, Francisco Jimenez-Colmenero, Antioxidant activity of Carob fruit extracts in cooked pork meat systems during chilled and frozen storage, *Food Chemistry*, Volume 116, Issue 3, 1 October 2009, Pages 748-754, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.03.034.

(<http://www.sciencedirect.com/science/article/B6T6R-4VV2NPX-4/2/d17ce88bb90bcc1ea49af6d5b382b1ed>)

Abstract:

The purpose of this study was to evaluate the effect of adding condensed tannins in the form of non-purified (Liposterine(R)) or purified (Exxenterol(R)) extracts obtained from Carob fruit to prevent lipid cooked pork meat systems from oxidising during chilling and frozen storage. The antioxidant activity of these extracts was compared with that of [alpha]-tocopherol. Meat lipid alteration was evaluated as thiobarbituric acid reactive substances content (TBARS) and polar material-related triglyceride compounds followed by high-performance size-exclusion chromatography (HPSEC). TBARS levels were lower ($P < 0.05$) in samples containing Liposterine (LM), Exxenterol (EM), and [alpha]-tocopherol (TM) than in control sample (CM) under chilled storage. TBARS formation was similar ($P > 0.05$) for LM and EM but lower ($P < 0.05$) than for TM. Polar material increased several times in all samples, but significantly less in TM and EM than in LM. Thermal oxidation compounds determined by HPSEC were lower ($P < 0.05$) in EM than in LM or TM. The changes in polar material were proportionally smaller after six months frozen storage than after chilled storage, with Exxenterol displaying the highest antioxidant protection. Therefore Carob fruit extracts can be successfully used to reduce fat alteration in cooked pork meat at chilled and frozen temperatures.

Keywords: Meat; Pork; Carob fruit extracts; Exxenterol; Lipid oxidation; Liposterine; TBARS; Polar material

B.G. Mane, S.K. Mendiratta, A.K. Tiwari, Polymerase chain reaction assay for identification of chicken in meat and meat products, *Food Chemistry*, Volume 116, Issue 3, 1 October 2009, Pages 806-810, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.03.030.

(<http://www.sciencedirect.com/science/article/B6T6R-4VV2NPX-3/2/63f4f6394305ce89f4e4ca98089e92d6>)

Abstract:

The aim of this study was to develop polymerase chain reaction (PCR) assay for specific detection of chicken meat using designed primer pair based on mitochondrial D-loop gene for amplification of 442 bp DNA fragments from fresh, processed and autoclaved meat and meat products. The PCR result was further verified by restriction digestion with *HaeIII* and *Sau3AI* enzymes for specific cutting site in amplified DNA fragments. The specificity of assay was cross tested with DNA of cattle, buffalo, sheep, goat, pig, duck, guinea fowl, turkey and quail, where amplification was observed only in chicken without cross reactivity with red meat species. However positive reaction was also observed in quail and turkey. In this study, no adverse effects of cooking and autoclaving were found on amplification of chicken DNA fragments. Thus, the detection limits was found to be less than 1% in admixed meat and meat products. The developed assay was found specific and sensitive for rapid identification of admixed chicken meat and meat products processed under different manufacturing conditions.

Keywords: Chicken meat; Species identification; Processed; Adulteration; PCR

Maria Rojas, Isabel Gonzalez, Violeta Fajardo, Irene Martin, Pablo E. Hernandez, Teresa Garcia, Rosario Martin, Authentication of meats from quail (*Coturnix coturnix*), pheasant (*Phasianus*

colchicus), partridge (*Alectoris* spp.), and guinea fowl (*Numida meleagris*) using polymerase chain reaction targeting specific sequences from the mitochondrial 12S rRNA gene, *Food Control*, Volume 20, Issue 10, October 2009, Pages 896-902, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.12.011.

(<http://www.sciencedirect.com/science/article/B6T6S-4V94WXD-2/2/99e7c9e86166d3fdc907a6bffb123754>)

Abstract:

Polymerase chain reaction (PCR) based on oligonucleotide primers targeting the mitochondrial 12S rRNA gene has been applied to the specific identification of meats from quail (*Coturnix coturnix*), pheasant (*Phasianus colchicus*), partridge (*Alectoris* spp.), and guinea fowl (*Numida meleagris*). The use of specific primer pairs for quail, pheasant, partridge and guinea fowl allowed the selective amplification of the desired avian sequences. The specificity of each primer pair was verified by PCR analysis of DNA from meats of various game and domestic bird and mammalian species. The assay can be useful for the accurate identification of meats from game bird species, avoiding mislabelling or fraudulent species substitution in meat products.

Keywords: Game birds; 12S rRNA gene; Species-specific PCR

Fernanda Galgano, Fabio Favati, Malvina Bonadio, Vitina Lorusso, Patrizia Romano, Role of biogenic amines as index of freshness in beef meat packed with different biopolymeric materials, *Food Research International*, Volume 42, Issue 8, October 2009, Pages 1147-1152, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.05.012.

(<http://www.sciencedirect.com/science/article/B6T6V-4WD1BXB-1/2/428db493cbd9660b24190af678473228>)

Abstract:

The main objectives of this work were to evaluate the chemical and microbiological fresh beef meat quality packed in aerobic atmosphere with biopolymers, to investigate the possible role of biogenic amines (BAs) as indicators of spoilage in fresh beef meat stored at 4 [degree sign]C for 8 days. The results of this research highlighted that for fresh meat packaging it could be possible to replace the PS tray/PVC film system, with an expanded PLA biopolymeric tray heat-sealed with a biopolymeric film, characterized by a negligible environmental impact in comparison with the use of synthetic plastic materials. The storage time differentiated the meat samples on the basis of pH and microbiological characteristics. With regard to BAs, tyramine and cadaverine resulted strongly influenced by the storage time, and to a less extent putrescine and spermidine. Tyramine and cadaverine could be used as spoilage indexes of fresh beef meat chilled and packed in aerobic atmosphere with biopolymers.

Keywords: Biogenic amines; Biopolymers; Cadaverine; Fresh beef meat; Packaging; Shelf-life; Tyramine

P. Frisullo, J. Laverse, R. Marino, M.A. Del Nobile, X-ray computed tomography to study processed meat microstructure, *Journal of Food Engineering*, Volume 94, Issues 3-4, October 2009, Pages 283-289, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.03.020.

(<http://www.sciencedirect.com/science/article/B6T8J-4VYXMD9-1/2/0d35b5e72a38cf0a43de4a44fc2d1d72>)

Abstract:

In this work, the X-ray microtomography (μ CT) technique was used for the analysis of fat microstructure in five different types of Italian salami. Five different types of Italian salami, chosen to exhibit variability in terms of visible structure of fat, were used for this experiment: Milano, Ungherese, Modena, Norcinetto and Napoli. Appropriate quantitative three-dimensional parameters describing the fat structure were calculated, for example, the structure thickness (ST), object structure volume ratio (OSVR) and the percentage object volume (POV). To measure the accuracy of the three-dimensional parameter, POV, the fat content was also determined by the

extraction method [AOAC, 1995. Official Methods of Analysis, 16th ed. AOAC International, Washington, DC]. The results for this study show that μ CT is a suitable technique for the microstructural analysis of fat as it does not only provide an accurate percentage volume of the fat present but can also determine its spatial distribution.

Keywords: Microtomography; Quantitative analysis; Processed meat; Microstructure

Louise Emy Kurozawa, Kil Jin Park, Miriam Dupas Hubinger, Effect of carrier agents on the physicochemical properties of a spray dried chicken meat protein hydrolysate, *Journal of Food Engineering*, Volume 94, Issues 3-4, October 2009, Pages 326-333, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.03.025.

(<http://www.sciencedirect.com/science/article/B6T8J-4W0R0G2-4/2/96049b759ee5dba96212969e2206db54>)

Abstract:

The spray drying of a chicken meat protein hydrolysate was studied in order to evaluate the effect of carrier agents on the physicochemical properties of the powders. The protein hydrolysate was obtained by enzymatic hydrolysis, which was carried out at 52.5 [degree sign]C with a 4.2 g enzyme/100 g protein and a pH value of 8.0. The drying was carried out in a laboratory spray dryer, and maltodextrin and gum Arabic were used as carrier agents at three concentrations. Several physicochemical properties (moisture content, bulk density, distribution and mean diameter particle, hygroscopicity and glass transition temperature) of protein hydrolysate powders were measured. These results indicated that an increasing carrier agent concentration decreased the powder moisture content and bulk density. Mean diameter particle increased with increasing maltodextrin or gum Arabic concentration, which is related to the feed viscosity. The addition of maltodextrin or gum Arabic in the feed solution also contributed significantly to powder stability since powder hygroscopicity decreased and glass transition temperature increased with increasing carrier agent concentration.

Keywords: Glass transition temperature; Gum Arabic; Maltodextrin; Morphology; Powder; Spray dried protein hydrolysate

Sylvie Clerjon, Jean-Louis Damez, Microwave sensing for an objective evaluation of meat ageing, *Journal of Food Engineering*, Volume 94, Issues 3-4, October 2009, Pages 379-389, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.04.004.

(<http://www.sciencedirect.com/science/article/B6T8J-4W38R9V-2/2/d4653f8af600b72fb45904186594a292>)

Abstract:

Monitoring changes in muscle structure during ageing of bovine meat is a major industrial challenge. During ageing, bovine muscle becomes tender through muscle fibre de-structuring, and full control of this process is essential. To improve competitiveness, and to meet consumer quality demand, muscle structure needs to be evaluated in-line. We present here a broadband microwave study (0.3-24 GHz) involving contact reflection coefficient measurements using coaxial and rectangular probes. This study is based on the measurement of dielectric properties of tissues with direction of polarisation parallel and perpendicular to muscle fibre directions, as muscles have anisotropic dielectric properties. Findings show the feasibility of a simple microwave sensor.

Keywords: Microwave; Polarimetry; Anisotropy; Muscle; Structure; Sensor; Meat; Ageing

Jelena Babic, Maria J. Cantalejo, Cristina Arroqui, The effects of freeze-drying process parameters on Broiler chicken breast meat, *LWT - Food Science and Technology*, Volume 42, Issue 8, October 2009, Pages 1325-1334, ISSN 0023-6438, DOI: 10.1016/j.lwt.2009.03.020.

(<http://www.sciencedirect.com/science/article/B6WMV-4W26GGJ-3/2/d5ddddd000e39b5a6f10c01593dba99cc>)

Abstract:

Freeze-dried meat can be stored for unlimited periods retaining the majority of their physical, chemical, biological and sensorial properties as in the fresh state. However, adequate process conditions must be applied to prevent quality problems in the product.

The aim of this work was to study the effect of freeze-drying process parameters on the quality of Broiler chicken breast meat. Therefore, different meat thicknesses, speed of freezing, time of drying phases and pressure were assayed. Physical and sensory analyses were carried out on treated meat samples. Results showed that sample thickness was critical for the determination of process conditions. The study has demonstrated that it is possible to obtain freeze-dried poultry meat that looks and tastes similar to fresh poultry meat when the right process conditions for the sample's thickness are applied.

Keywords: Freeze-drying; Chicken breast meat; Rehydration; Freezing

Nicolai Z. Ballin, Finn K. Vogensen, Anders H. Karlsson, Species determination - Can we detect and quantify meat adulteration?, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 165-174, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4WGK6SW-4/2/9ea42e16f4f6b9c3dcf876ff0cb18e07>)

Abstract:

Proper labelling of meat products is important to help fair-trade, and to enable consumers to make informed choices. However, it has been shown that labelling of species, expressed as weight/weight (w/w), on meat product labels was incorrect in more than 20% of cases. Enforcement of labelling regulations requires reliable analytical methods. Analytical methods are often based on protein or DNA measurements, which are not directly comparable to labelled meat expressed as w/w. This review discusses a wide range of analytical methods with focus on their ability to quantify and their limits of detection (LOD). In particular, problems associated with a correlation from quantitative DNA based results to meat content (w/w) are discussed. The hope is to make researchers aware of the problems of expressing DNA results as meat content (w/w) in order to find better alternatives. One alternative is to express DNA results as genome/genome equivalents.

Keywords: Adulteration; Authentication; Fraud; Meat; Meat products; Real time PCR; Speciation; Species determination

N. Prieto, R. Roehe, P. Lavin, G. Batten, S. Andres, Application of near infrared reflectance spectroscopy to predict meat and meat products quality: A review, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 175-186, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4W7B0M2-4/2/0c950572349957cec1e84d84c1f40e1b>)

Abstract:

Over the past three decades, near infrared reflectance (NIR) spectroscopy has been proved to be one of the most efficient and advanced tools for the estimation of quality attributes in meat and meat products. This review focuses on the use of NIR spectroscopy to predict different meat properties, considering the literature published mainly in the last decade. Firstly, the potential of NIR to predict chemical composition (crude protein, intramuscular fat, moisture/dry matter, ash, gross energy, myoglobin and collagen), technological parameters (pH value; L*, a*, b* colour values; water holding capacity; Warner-Bratzler and slice shear force) and sensory attributes (colour, shape, marbling, odour, flavour, juiciness, tenderness or firmness) are reviewed. Secondly, the usefulness of NIR for classification into meat quality grades is presented and thirdly its potential application in the industry is shown. The review indicates that NIR showed high potential to predict chemical meat properties and to categorize meat into quality classes. In contrast, NIR showed limited ability for estimating technological and sensory attributes, which may be mainly due to the heterogeneity of the meat samples and their preparation, the low precision of

the reference methods and the subjectivity of assessors in taste panels. Hence, future work to standardize sample preparation and increase the accuracy of reference methods is recommended to improve NIR ability to predict those technological and sensory characteristics. In conclusion, the review shows that NIR has a considerable potential to predict simultaneously numerous meat quality criteria.

Keywords: NIR spectroscopy; Meat; Meat products; Quality; Review

O. Skewes, R. Morales, N. Mendoza, F.J.M. Smulders, P. Paulsen, Carcass and meat quality traits of wild boar (*Sus scrofa* s. L.) with $2n = 36$ karyotype compared to those of phenotypically similar crossbreeds ($2n = 37$ and $2n = 38$) raised under the same farming conditions 2: Fatty acid profile and cholesterol, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 195-200, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4W7B0M2-1/2/3a457efa392318000d28ee5099737533>)

Abstract:

The aim of this study was to compare European wild boar (*Sus scrofa*) with chromosomal number $2n = 36$ to phenotypically similar animals with $2n = 37$ and $2n = 38$ chromosomes (crossbreeds) with respect to fatty acid (FA) profile and cholesterol content. According to gender and genetic group ($2n = 36$, $2n = 37$, and $2n = 38$; seven animals each), the FA profile in longissimus dorsi (LD), semimembranosus (SM) muscles, and back fat was measured. Cholesterol content of LD and SM muscles was also analysed. The animals were fed and reared under the same conditions until slaughter at the age of nine months. FA profiles of LD, SM, and back fat were measured by GC and cholesterol with HPTLC. SM muscle of wild boar group ($2n = 36$) showed a higher proportion of PUFAs and lower C16:0 and C18:0 than that of crossbreeds. No differences in the FA profiles of LD and cholesterol content of LD and SM muscles among karyotypes were found.

Keywords: Fatty acids; Cholesterol; Crossbreeds; Wild boar

F. Fernandez-Martin, I. Lopez-Lopez, S. Cofrades, F. Jimenez Colmenero, Influence of adding Sea Spaghetti seaweed and replacing the animal fat with olive oil or a konjac gel on pork meat batter gelation. Potential protein/alginate association, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 209-217, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4W7B0M2-3/2/ac990d563cf8d4a52634959406c7045e>)

Abstract:

Standard and modulated differential scanning calorimetry (DSC, MDSC) and dynamic rheological thermal analysis (DRTA) were used to in situ simulate the batter gelation process. Texture profile analysis (TPA) and conventional quality evaluations were applied to processed products. Sea Spaghetti seaweed addition was highly effective at reinforcing water/oil retention capacity, hardness and elastic modulus in all formulations. Olive oil substituting half pork fat yielded a presumably healthier product with slightly better characteristics than control. A konjac-starch mixed gel replacing 70% of pork fat produced a similar product to control but with nearly 10% more water. DSC revealed the currently unknown phenomenon that Sea Spaghetti alginates apparently prevented thermal denaturation of a considerable protein fraction. MDSC confirmed that this mainly concerned non-reversing effects, and displayed glass transition temperatures in the range of 55-65 [degree sign]C. DRTA and TPA indicated however much stronger alginate-type gels. It is tentatively postulated that salt-soluble proteins associate athermally with seaweed alginates on heating to constitute a separate phase in a thermal composite-gelling process.

Keywords: Pork meat; Sea Spaghetti seaweed; Olive oil; Konjac gel; Protein/alginate association; Mixed gelation; Glass transition; DSC; MDSC; DRTA; TPA

M. Juarez, O. Polvillo, M.D. Gomez, M.J. Alcalde, F. Romero, M. Valera, Breed effect on carcass and meat quality of foals slaughtered at 24 months of age, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 224-228, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4W7RYJ9-1/2/eb0745149397351ebd4437524e9bd360>)

Abstract:

In some areas, horsemeat may be considered as an alternative to beef. And recent studies have shown that it may be positive from a nutritional point of view. However, little research has been done on the effects that influence horse carcass traits and meat quality. Breed effect has been studied by comparing two Spanish local breeds (Burguete and Hispano-Breton) reared following the same traditional production system (24 months old). Some differences between breeds were observed for carcass quality measurements and colour parameters. Proximate composition was generally not affected by breed. Burguete foals had lower SFA and MUFA and higher PUFA than Hispano-Breton ones. PUFA/SFA ratio from both breeds was higher than 0.4 and CLA levels were similar to those found in ruminants.

Keywords: Horse; CLA; Fatty acid; Burguete; Hispano-Breton

K.W. Farag, E. Duggan, D.J. Morgan, D.A. Cronin, J.G. Lyng, A comparison of conventional and radio frequency defrosting of lean beef meats: Effects on water binding characteristics, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 278-284, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4WBK7HG-2/2/016d2a7fce79694b075e32d7562ac6bb>)

Abstract:

The effect of defrosting rate (slow conventional air vs. fast radio frequency (RF) method) on water holding properties of lean beef meat (whole, minced and comminuted) was investigated using a conventional centrifugation method (drip loss), nuclear magnetic resonance relaxometry (NMR) and dielectric spectroscopy. Tempering by radio frequency (RF) or a conventional air method had no subsequent effect (P [greater-or-equal, slanted] 0.05) on drip loss. However, thawing by RF resulted in a significant decrease in drip loss ($P < 0.05$) when compared to air thawing. Micronutrient loss ($\mu\text{g/mL}$ of drip) was also greater in air thawed samples ($P < 0.05$). NMR T2 distributions did not show any marked difference between thawing methods. The dielectric properties of lean beef, measured from 0.01-20 GHz at 5 [degree sign]C, were higher following RF thawing. Increased comminution reduced dielectric values, while fine comminution gave an additional fraction in the NMR T2 distribution. These results provide valuable information on water binding in meat following RF tempering/thawing.

Keywords: Radio frequency; Defrosting; Water binding characteristics; NMR; Dielectric spectroscopy

Sandra Stolzenbach, Jorgen J. Leisner, Derek V. Byrne, Sensory shelf life determination of a processed meat product 'rullepølse' and microbial metabolites as potential indicators, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 285-292, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4WC1191-2/2/1762dce6796a8e2ce71aabca03368366>)

Abstract:

Sensory profiling was performed for a Danish lightly fermented heat-processed cold cut pork product termed 'rullepølse'. Product samples were stored under modified atmosphere (MAP, 30% CO₂/70% N₂) for 0, 28 and 34 days and with subsequent aerobic storage for 4 days (MAP-OPEN) at temperatures of 4 [degree sign]C and 8 [degree sign]C. Microbial growth and metabolism was also measured with a focus on lactic acid bacteria (LAB) and their organic acid metabolites

including lactic acid, acetic acid and [alpha]-ketoisocaproic acid. These acids were examined for sensory shelf life indexing potential for the 'rullepolve'. Storage temperature exerted distinct impacts on the sensory characterised shelf life of 'rullepolve' stored under MAP and MAP-OPEN conditions. The MAP stored 'rullepolve' with subsequent 4 days storage in air (MAP-OPEN) could be stored for at least 28 days at 4 [degree sign]C without a decrease in the sensory quality when opened. Whilst MAP stored 'rullepolve' at 8 [degree sign]C with subsequent open storage (MAP-OPEN), compared to the lower temperature displayed a reduced shelf life of less than 28 days if sensory quality of the 'rullepolve' was to be maintained. The stage of sensory deterioration was correlated with high bacterial counts exceeding 10⁶ CFU g⁻¹. With respect to indexing ability of the examined organic acids none were found to have clear potential for prediction of the sensory deterioration.

Keywords: Sensory; Microbiology; Shelf life; Indexing; Processed meat; Microbial metabolites; Organic acids

M.P. Oury, B. Picard, M. Briand, J.P. Blanquet, R. Dumont, Interrelationships between meat quality traits, texture measurements and physicochemical characteristics of *M. rectus abdominis* from Charolais heifers, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 293-301, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4WC4YHP-1/2/5f0f8c43d03827e4effabb4431f0c3f4>)

Abstract:

Ninety-nine Charolais heifers were used to study the variability of meat quality traits in relation to the physicochemical characteristics of *M. rectus abdominis*. The heifers of the same trade class were slaughtered at 33 months of age (+/-4 months) and 381 kg carcass weight (+/-31 kg). Muscle and bone development scores were evaluated before slaughter. Carcass weight, slaughter age and life average daily gain were recorded. Shear force measurements and meat quality traits were evaluated after 14 days of aging. Some physicochemical characteristics were measured 24 h post-slaughter.

Tenderness was correlated with slaughter age ($r = -0.31$), bone development ($r = -0.22$) and life average daily gain ($r = +0.37$). Tenderness was significantly related to total collagen content ($r = -0.24$), lipid content ($r = +0.27$) and I myosin heavy chain proportion ($r = +0.24$). Juiciness was positively correlated with lipid content ($r = +0.31$) and I myosin heavy chain proportion ($r = +0.20$). Flavor intensity was correlated with lipid content ($r = +0.26$) and mean fiber area ($r = +0.24$). Shear force was correlated with total collagen, lipid and 27K proteasome sub-unit contents. Taking animal characteristics and muscle properties together in a multiple regression analysis increased the explained tenderness variability to 33%. The independent variables listed in order of importance were life average daily gain, total collagen content, bone development, lipid content, I myosin heavy chain isoform proportion, shear force of broiled meat and slaughter age.

Keywords: Beef; Meat; Quality; *M. rectus abdominis*; Heifer; Charolais

M. Juarez, A. Horcada, M.J. Alcalde, M. Valera, O. Polvillo, A. Molina, Meat and fat quality of unweaned lambs as affected by slaughter weight and breed, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 308-313, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4WJG8TC-1/2/0ba110f2356e8ecaef72cfd58b6ed74c>)

Abstract:

Sixty-four male lambs of two Southern Spanish breeds, a dairy breed (Grazalema Merino) and a meat breed (Churra Lebrijana), were used to study the effects of slaughter weight and breed on meat traits and intramuscular and subcutaneous fat composition. Lambs were reared following a traditional production system without weaning and slaughtered when live weight reached 12 kg (suckling) or 20 kg (light). Meat from suckling lambs of both breeds had lower fat and myoglobin

contents, and was more tender and had higher scores for sustained juiciness in the sensory analysis. Fat from light lambs had lower C12:0 and C14:0 levels than fat from suckling lambs. Grazalema Merino meat had higher fat and ash contents, and its fat had higher conjugated linoleic acid content than Churra Lebrijana meat.

Keywords: Weaning; Fatty acid; Grazalema Merino; Churra Lebrijana

E.N. Ponnampalam, D.L. Hopkins, K.L. Butler, F.R. Dunshea, A.J. Sinclair, R.D. Warner, Polyunsaturated fats in meat from Merino, first- and second-cross sheep slaughtered as yearlings, *Meat Science*, Volume 83, Issue 2, October 2009, Pages 314-319, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4WKKTTP-1/2/49167c4075f2b992f8f23fc0160b7772>)

Abstract:

This study examined the level of long chain omega-3 and omega-6 polyunsaturated fats, the ratio of polyunsaturated fat to saturated fat (PUFA/SFA) and the ratio of omega-6 to omega-3 (n-6/n-3) fat in sheep grown under grazing conditions in Australia. The sheep genotypes used were Poll Dorsetgrowth x Border Leicester Merino (PDg x BLM), Poll Dorsetgrowth x Merino (PDg x M), Poll Dorsetmuscling x Merino (PDm x M), Border Leicester x Merino (BL x M) and Merino x Merino (M x M). Loin muscles (*Longissimus lumborum*) collected from 40 ewe and wether sheep slaughtered at 14 months of age were processed for fatty acid determination. After frozen storage, 20 g samples were minced and a 7 g homogenate was processed for muscle lipid extraction using a chloroform:methanol (2:1) procedure. There was an increase in PUFA/SFA as the proportion of Merino genetics increased in the progeny (second-cross < first-cross < Merino), but this was not shown in the n-6/n-3 ratio. The PUFA/SFA trend appeared to be associated with an increase in the level of total polyunsaturated fats, but not a decrease in the level of total saturated fats. The results demonstrate that there is a need to improve the PUFA/SFA content in first- and second-cross animals which are mainly used for meat production in Australia so as to maintain the healthy lipids in meat. Nutritional manipulation through feeding systems or selection of sires for greater heritability of omega-3 fat deposition may be suitable pathways to elevate the ratio of polyunsaturated fatty acids, and in particular omega-3.

Keywords: Omega-3 polyunsaturated fats; Sheep; Genotypes; Lipids in meat; Human health

P.R. Sheard, Improving the sensory and nutritional quality of fresh meat, J.P. Kerry, D. Ledward (Eds.). Woodhead Publishing and CRC Press., *Meat Science*, Volume 83, Issue 2, October 2009, Page 337, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4WGHJS4-1/2/8e4c016c6e8c745ed77da0beb61f2436>)

M. Pineiro, S. Gymnich, S. Knura, C. Pineiro, B. Petersen, Meat juice: An alternative matrix for assessing animal health by measuring acute phase proteins. Correlations of pig-MAP and haptoglobin concentrations in pig meat juice and plasma, *Research in Veterinary Science*, Volume 87, Issue 2, October 2009, Pages 273-276, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2009.03.013.

(<http://www.sciencedirect.com/science/article/B6WWR-4W4BMMK-1/2/534e93c164aedcc0f4e2171c5143d2a6>)

Abstract:

Quantification of acute phase proteins (APPs) in blood can be used for monitoring animal health and welfare on farms, and could be also of interest for the detection of diseased animals during the meat inspection process. However serum or plasma is not always available for end-point analysis at slaughter. Meat juice might provide an adequate, alternative matrix that can be easily obtained for post-mortem analysis at abattoirs. The concentrations of pig Major Acute phase Protein (pig-MAP) and haptoglobin, two of the main APPs in pigs, were determined in

approximately 300 paired samples of plasma and meat juice from the diaphragm (pars costalis), obtained after freezing and thawing the muscle. APPs concentrations in meat juice were closely correlated to those in plasma ($r = 0.695$ for haptoglobin, $r = 0.858$ for pig-MAP, $p < 0.001$). These results open new possibilities for the assessment of animal health in pig production, with implications for food safety and meat quality.

Keywords: Haptoglobin; Pig-MAP; Meat juice; Pig; Health monitoring; Food safety

Raquel Acosta, Andrea Rodriguez-Martin, Alberto Martin, Felix Nunez, Miguel A. Asensio, Selection of antifungal protein-producing molds from dry-cured meat products, *International Journal of Food Microbiology*, Volume 135, Issue 1, 30 September 2009, Pages 39-46, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.07.020.

(<http://www.sciencedirect.com/science/article/B6T7K-4WW2SCW-2/2/17996b02db8da6990e81c096ba6bf664>)

Abstract:

To control unwanted molds in dry-cured meats it is necessary to allow the fungal development essential for the desired characteristics of the final product. Molds producing antifungal proteins could be useful to prevent hazards due to the growth of mycotoxigenic molds. The objective has been to select *Penicillium* spp. that produce antifungal proteins against toxigenic molds. To obtain strains adapted to these products, molds were isolated from dry-cured ham. A first screening with 281 isolates by the radial inhibition assay revealed that 166 were active against some of the toxigenic *P. echinulatum*, *P. commune*, and *Aspergillus niger* used as reference molds. The activity of different extracts from cultured medium was evaluated by a microspectroscopic assay. Molds producing active chloroform extracts were eliminated from further consideration. A total of 16 *Penicillium* isolates were screened for antifungal activity from both cell-free media and the aqueous residues obtained after chloroform extraction. The cell-free media of 10 isolates that produced a strong inhibition of the three reference molds were fractionated by FPLC on a cationic column. For protein purification, the fractions of the three molds that showed high inhibitory activity were further chromatographed on a gel filtration column, and the subfractions containing the highest absorbance peaks were assayed against the most sensitive reference molds. One subfraction each from strains AS51D and RP42C from *Penicillium chrysogenum* confirmed the inhibitory activity against the reference molds. SDS-PAGE revealed a single band from each subfraction, with estimated molecular masses of 37 kDa for AS51D and 9 kDa for RP42C. Although further characterisation is required, both these proteins and the producing strains can be of interest to control unwanted molds on foods.

Keywords: *Penicillium*; Dry-cured ham; Protective culture; Toxigenic mold

Maria Kozova, Pavel Kalac, Tamara Pelikanova, Contents of biologically active polyamines in chicken meat, liver, heart and skin after slaughter and their changes during meat storage and cooking, *Food Chemistry*, Volume 116, Issue 2, 15 September 2009, Pages 419-425, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.02.057.

(<http://www.sciencedirect.com/science/article/B6T6R-4VPD6TR-8/2/f61cbf3539b233a60ea24d7132d7b4ab>)

Abstract:

Dietary polyamines, putrescine, spermidine (SPD) and spermine (SPM), participate in an array of important physiological roles, including tumour growth. Thus, reliable information on polyamine content in foods has been needed. We therefore determined polyamine contents in chilled chicken meat and giblets ($n = 20$) and skin ($n = 10$) 24 h after slaughter. The polyamines were determined, after extraction with perchloric acid, as dansyl derivatives, using an HPLC method. Mean SPD values were 4.8, 10.2, 11.4, 48.7 and 12.1 mg kg⁻¹ and SPM values were 36.8, 38.0, 24.3, 133 and 82.7 mg kg⁻¹ in breast, thigh, skin, liver and heart, respectively. Significant statistical correlations between SPD and SPM contents were observed in breast, thigh, skin and liver,

whereas correlations were insignificant in heart. An increase of SPD and SPM was apparent in breasts and thighs stored at -18 [degree sign]C for 6 months; however, it was significant only for SPM in thighs. The losses of both SPD and SPM were statistically insignificant during storage of aerobically packaged breasts up to 9 days at +2 [degree sign]C. A significant decrease of SPM to about 60% of the initial contents was observed in both vacuum-packaged and in modified atmosphere (20% CO₂ and 80% O₂)-stored breasts on day 21 at +2 [degree sign]C. For both SPD and SPM, roasting, grilling and frying of fresh breasts caused losses of about 40-60% of the initial contents (higher than boiling and stewing). Similarly, losses of SPM, due to roasting of breasts frozen for 3 or 6 months, were higher than those caused by stewing. Putrescine was detected only sporadically and at levels close to the detection limit of 1.0 mg kg⁻¹ (fresh matter).
Keywords: Dietary polyamines; Spermidine; Spermine; Chicken meat; Chicken giblets; Chicken skin; Storage; Cooking

M.J. Nauta, F.J. van der Wal, F.F. Putirulan, J. Post, J. van de Kassteele, N.M. Bolder, Evaluation of the 'testing and scheduling' strategy for control of *Campylobacter* in broiler meat in The Netherlands, *International Journal of Food Microbiology*, Volume 134, Issue 3, 15 September 2009, Pages 216-222, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.06.014.

(<http://www.sciencedirect.com/science/article/B6T7K-4WRD3DT-1/2/fa966cf9634b9ea372e5820d1afb90c1>)

Abstract:

'Testing and scheduling' has been proposed as a strategy for control of *Campylobacter* in broiler meat. By this strategy, flocks with high numbers of *Campylobacter* in fecal samples would be diverted away from fresh meat production at the entrance of the broiler meat processing plant. Risk assessment studies suggest that this would effectively decrease human health risks, if these flocks are responsible for the meat products with the highest *Campylobacter* numbers. To investigate the effect of this control strategy, the numbers of *Campylobacter* were determined in fecal samples from transport containers, and in cecal and breast meat samples from birds in 62 broiler chicken flocks. Results from direct plating and enrichment were combined by a statistical method that allows the inclusion of censored data. As the implementation of 'testing and scheduling' requires a rapid on-site test to detect high numbers of *Campylobacter*, a lateral flow immuno-assay (LFA) was developed and applied to the fecal samples collected from containers. The *Campylobacter* prevalence in broiler flocks in the autumn of 2007 was found to be 85.4% by traditional microbiological methods. *Campylobacter* could be isolated from breast meat samples from 42% of the flocks. There was limited agreement between *Campylobacter* results for the three types of samples and weak correlation between the quantitative results for fecal or cecal samples and meat samples. Agreement between the results of LFA and traditional methods was poor. These findings do not support the implementation of 'testing and scheduling' as a practical control strategy, because of both measurement uncertainties and shortcomings in understanding the dynamics of transmission and survival of *Campylobacter* in the broiler meat processing plant. The limited correlation between *Campylobacter* contamination of cecal samples and breast meat samples, as observed in this study, suggests that cecal samples are no good indicator for human exposure to *Campylobacter*.

Keywords: Broiler chicken meat; *Campylobacter*; Flocks; Carcasses; Control

Carmela Pennacchia, Danilo Ercolini, Francesco Villani, Development of a Real-Time PCR assay for the specific detection of *Brochothrix thermosphacta* in fresh and spoiled raw meat, *International Journal of Food Microbiology*, Volume 134, Issue 3, 15 September 2009, Pages 230-236, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.07.005.

(<http://www.sciencedirect.com/science/article/B6T7K-4WRD3DT-3/2/a686e695b90995ae05a61a2dff4efc91>)

Abstract:

Brochothrix thermosphacta is a psychrotrophic species commonly involved in the spoilage of meat and often recognized as the dominant organism causing off-flavours. The knowledge of the genera/species affecting meat spoilage is necessary to define a successful method for food preservation. The aim of this study was to develop a Real-Time (RTi-) PCR method for the species-specific detection of B. thermosphacta and to evaluate a RTi-PCR approach for its enumeration in fresh and spoiled beef, avoiding the culturing steps. The specificity of the primers designed on the basis of the 16S rRNA gene sequences of B. thermosphacta was tested using the DNA extracted from strains belonging to bacterial species usually associated with meat. The RTi-PCR assay allowed a species-specific detection of B. thermosphacta and no amplification signals were retrieved using DNA from the other species under the conditions used.

Three different standard curves were constructed by using broth culture, a meat extract and meat samples containing different concentrations of B. thermosphacta. The standard using artificially contaminated meat samples was chosen because of its closeness to an authentic contamination case. The standard curve was linear in the range from 2.2×10^2 to 2.3×10^7 CFU/g; the reaction efficiency was 1.11. The RTi-PCR assay was then applied to enumerate B. thermosphacta in 20 fresh and spoiled beef samples and the results were compared to those obtained by plating onto selective medium for B. thermosphacta. A comparison between the two methods reported a general underestimation (from 0.5 to 2 Log CFU/g) of the microbial loads by RTi-PCR. Except for a few cases, the statistical analysis showed significant differences between viable counts and RTi-PCR data.

The identification of B. thermosphacta by the RTi-PCR method developed in this study is certainly simple and fast and can be useful for its reliable detection in meat samples. However, considering the level of underestimation reached in most of the samples analyzed, the RTi-PCR method can be recommended only to approximately predict the contamination level of B. thermosphacta in meat.

Keywords: B. thermosphacta; Meat spoilage; Species-specific detection; Quantitative Real-Time PCR

L. Orru, G. Catillo, F. Napolitano, G. De Matteis, M.C. Scata, F. Signorelli, B. Moioli, Characterization of a SNPs panel for meat traceability in six cattle breeds, Food Control, Volume 20, Issue 9, September 2009, Pages 856-860, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.10.015.

(<http://www.sciencedirect.com/science/article/B6T6S-4TWTW3D-3/2/06e1795ec51801d721841553f6041d23>)

Abstract:

Development of DNA technologies makes today possible implementation of conventional beef traceability systems with molecular methods. In the recent past, microsatellites have been the most used marker for individual assignment, however single nucleotide polymorphisms (SNPs) is now replacing them. With the aim to provide a set of SNPs useful for bovine meat traceability we have tested 63 SNPs for the ability to identify single individuals in six European cattle breeds. Eighteen highly informative SNPs located in different genes, have been selected. By using this panel of SNPs the probability that one individual is incorrectly assigned ranges from 1.39 to 0.07 out of 1 million, depending on the breed.

Keywords: SNPs; Meat traceability; Cattle

Zhen-quan Yang, Xin-an Jiao, Ping Li, Zhi-ming Pan, Jin-lin Huang, Rui-xia Gu, Wei-ming Fang, Guo-xiang Chao, Predictive model of Vibrio parahaemolyticus growth and survival on salmon meat as a function of temperature, Food Microbiology, Volume 26, Issue 6, September 2009, Pages 606-614, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.04.004.

(<http://www.sciencedirect.com/science/article/B6WFP-4W4CWM1-1/2/333049f45efb633c449910939bd4090a>)

Abstract:

The growth and survival curves of a strain of pandemic *Vibrio parahaemolyticus* TGqx01 (serotype O3:K6) on salmon meat at different storage temperatures (range from 0 [degree sign]C to 35 [degree sign]C) were determined. In order to model the growth or inactivation kinetics of this pathogen during storage, the modified Gompertz and Weibull equations were chosen to regress growth and survival curves, respectively, and both equations produced good fit to the observed data (the average R² value equals to 0.990 for modified Gompertz and 0.920 for Weibull equation). The effect of storage temperature on the specific growth rate ([mu]) was modeled by square root type equation, and the relationship between [mu] and lag time ([lambda]) was described by a rule of [mu] x [lambda] = constant. The shape factor (n) and scale factor (b) values of the Weibull equations versus the temperature ([degree sign]C) were plotted and the temperature effects on these parameters were described by two linear empirical equations. The predicted growth and survival curves from the model were compared to real enumeration results, using the correlation coefficient (R²), bias factor (Bf) and accuracy factor (Af), to assess the performance of the established model. The results showed that the overall predictions for *V. parahaemolyticus* TGqx01 growth or inactivation on salmon at tested temperatures agreed well with observed plate counts, and the average R², Bf and Af values were 0.958, 1.019 and 1.035, respectively.

Keywords: Predictive model; *Vibrio parahaemolyticus*; Salmon; Temperature

P. Kouakou, H. Ghalfi, J. Destain, R. Dubois-Dauphin, P. Evrard, P. Thonart, Effects of curing sodium nitrite additive and natural meat fat on growth control of *Listeria monocytogenes* by the bacteriocin-producing *Lactobacillus curvatus* strain CWBI-B28, *Food Microbiology*, Volume 26, Issue 6, September 2009, Pages 623-628, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.04.007.

(<http://www.sciencedirect.com/science/article/B6WFP-4W6XYH9-1/2/fa9c0e00514b4566961ebc05f2a6a9b2>)

Abstract:

In realistic model meat systems, the separate and combined effects of fat content and sodium nitrite on the antilisterial activity of the bacteriocin of *Lactobacillus curvatus* CWBI-B28 were studied. In laboratory fermentations where *Listeria monocytogenes* was co-cultured at 4 [degree sign]C with bacteriocin-producing CWBI-B28 in lean pork meat (fat content: 13%) without added nitrite, a strong antilisterial effect was observed after one week. The effect was maintained for an additional week, after which a slight and very gradual rebound was observed. Both added nitrite (20 ppm) and a high-fat content (43%) were found to antagonise this antilisterial effect, the *Listeria* cfu count reached after six weeks being 200 times as high in high-fat meat with added nitrite than in lean meat without nitrite. This antagonism could not be attributed to slower growth of the bacteriocin-producing strain, since CWBI-B28 grew optimally in fat-rich meat with 20 ppm sodium nitrite. Bacteriocin activity was also measured in the samples. The observed activity levels are discussed in relation to the degree of antilisterial protection conferred.

Keywords: *Lactobacillus*; Bacteriocins; *Listeria monocytogenes*; Pork meat; Biopreservation

S. Rohall, J. Ballintine, J. Vowels, L. Wexler, S. Bianco-Simeral, K. Goto, Who's Your Patty: Sensory Evaluation of Burger Patties Made with Different Types of Meat or Plant-Based Products, *Journal of the American Dietetic Association*, Volume 109, Issue 9, Supplement 1, ADA Food & Nutrition Conference & Expo, September 2009, Page A68, ISSN 0002-8223, DOI: 10.1016/j.jada.2009.06.221.

(<http://www.sciencedirect.com/science/article/B758G-4X25VK2-7V/2/8e8fb305e9e2629e1b976574511e559c>)

D.E. Mushi, J. Safari, L.A. Mtenga, G.C. Kifaro, L.O. Eik, Effects of concentrate levels on fattening performance, carcass and meat quality attributes of Small East African x Norwegian crossbred

goats fed low quality grass hay, *Livestock Science*, Volume 124, Issues 1-3, September 2009, Pages 148-155, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.01.012.

(<http://www.sciencedirect.com/science/article/B7XNX-4VKDH12-1/2/8e8901d9909ff953c2ef00e314644eaf>)

Abstract:

To assess the effects of finishing Small East African x Norwegian crossbred goats with concentrate diets on the fattening performance, carcass and meat quality, 32 castrated crossbred goats (9.5 months old, 17.1 kg BWT) were equally allocated into four levels of concentrate supplementation. The concentrate levels were: Zero access to concentrate (T0), 33% access to ad libitum concentrate allowance (T33), 66% access to ad libitum concentrate allowance (T66) and 100% access to ad libitum concentrate allowance (T100). Each animal had access to ad libitum grass hay. Ad libitum concentrate intake for the goats was 663 g/d, which supported ME intake of 8.7 MJ/head/d. The attained maximum daily gain was 96 g/d. T100 and T66 goats were comparable in slaughter weight but the former had 2 kg heavier ($P < 0.05$) carcasses than the latter. T100 and T66 goats were similar in carcass fatness scores, though both were fatter ($P < 0.05$) than other diet groups. Dressing percentage (DP) was expressed in three different ways. In all but commercial DP, T100 were comparable to T66 goats, but all were higher than the other diet groups. For T0 goats, pH-values remained above 6 even after 24 h post-mortem. Cooking losses increased ($P < 0.05$) with increasing levels of concentrate supplementation. Moreover, among the muscles assessed, *M. rectus abdominis* had the least cooking loss. Warner-Bratzler shear force values of cooked muscles were highest ($P < 0.05$) in *M. gluteobiceps*, followed by *M. vastus lateralis*, while *M. psoas major* and *longissimus dorsi* aged for 6 days had the least values. Finishing Small East African x Norwegian crossbred goats at 66% access to their ad libitum concentrate intake gives optimum carcass and meat quality, and that any increase above this level seems not to improve meat production.

Keywords: Goats; Feedlot-finishing; Carcass yield; Chevon quality

N. Panella-Riera, A. Velarde, A. Dalmau, E. Fabrega, M. Font i Furnols, M. Gispert, J. Soler, J. Tibau, M.A. Oliver, M. Gil, Effect of magnesium sulphate and l-tryptophan and genotype on the feed intake, behaviour and meat quality of pigs, *Livestock Science*, Volume 124, Issues 1-3, September 2009, Pages 277-287, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.02.010.

(<http://www.sciencedirect.com/science/article/B7XNX-4VT17YN-1/2/1751f34cb68ec78ebd276cf0ae018d71>)

Abstract:

Sixty-nine entire male pigs with different halothane genotype (homozygous halothane positive -- nn-, $n = 36$; and homozygous halothane negative -- NN-, $n = 33$) were fed with a supplementation of magnesium sulphate (Mg) and/or l-tryptophan (Trp) in the diet for 5 days before slaughter. Animals were housed individually and were submitted to stressful ante mortem conditions (mixed in the lorry according to treatments and transported 1 h on rough roads). Individual feed intake was recorded during the 5-d treatment. At the abattoir, pig behaviour was assessed in the raceway to the stunning system and during the stunning period by exposure to CO₂. Muscle pH, colour, water holding capacity, texture and cathepsin activities were determined to assess meat quality. The number of pigs with an individual feed intake lower than 2 kg/day was significantly different among diets ($P < 0.05$; Control: 8.7%; Mg&Trp: 43.5%; Trp: 17.4%) and they were considered to have inadequate supplement intake. During the ante mortem period, 15.2% of pigs included in the experiment died, and this percentage decreased to 8.7% in those pigs with a feed intake > 2 kg/day, all of them from the stress-sensitive pigs (nn). In general, no differences were observed in the behaviour of pigs along the corridor leading to the stunning system and inside the CO₂ stunning system. During the stunning procedure, Trp diet showed shorter periods of muscular excitation than control and Mg&Trp diets. The combination of a stressful ante mortem treatment and Mg&Trp supplementation led to carcasses with high incidence of severe skin lesions. Different

meat quality results were found when considering all pigs or considering only those with adequate supplement intake. In this later case, Trp increased pH₄₅ (6.15) vs Control diet (5.96) in the Longissimus thoracis (LT) muscle ($P < 0.05$) and pH at 24 h (Trp: 5.59 vs C: 5.47) led to a higher incidence of dark, firm and exudative (DFD) traits in SM muscle ($P < 0.05$). Genotype affected negatively all the meat quality traits. Seventy-five percent of LT and 60.0% of the SM muscles from nn pigs were classified as pale, soft and exudative (PSE), while none of the NN pigs showed these traits ($P < 0.0001$). No significant differences were found between genotypes on the incidence of DFD meat.

Due to the negative effects observed in the Mg&Trp group in feed intake and carcass quality, the utilization of a mixture of magnesium sulphate and tryptophan is not recommended.

Keywords: Animal behaviour; Feed intake; Halothane gene; Magnesium sulphate; Tryptophan; Meat quality

M. Galian, A. Poto, B. Peinado, Carcass and meat quality traits of the Chato Murciano pig slaughtered at different weights, *Livestock Science*, Volume 124, Issues 1-3, September 2009, Pages 314-320, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.02.012.

(<http://www.sciencedirect.com/science/article/B7XNX-4VXCG7T-3/2/18dc58b5a891d44ff4dd2ef6913d1fa4>)

Abstract:

In order to evaluate the effect of slaughter weight and rearing system on the Chato Murciano pig carcass and meat quality traits, a total of 71 castrated male pigs were used. Forty-one pigs were reared in an outdoor system, divided in one heavy group (CHOHW) with an average live weight of 132.05 kg, and a second group with lower weights (CHOLW, 115.7 kg average). Simultaneously, 30 pigs were reared indoors and divided into one heavy group (CHIHW) with an average live weight of 144.3 kg, and a second group with lower weights (CHILW, 117.6 kg average).

Heavier pigs showed higher values for several carcass parameters (hot carcass weight, carcass length, maximum perimeter of the ham, hand length, leg length, ham length, wrist perimeter) and meat cuts, higher Dorsal Fat Thickness (DFT) and Intramuscular Fat (IMF) levels, but no difference was found in the hot carcass yields (HCY). Differences in the colour parameters and several minerals (Ca, Mg, K and Na) were also due to the different slaughter weights. The rearing system had an influence on the HCY (it is higher in the outdoor system), on many carcass parameters, on meat the ultimate pH (it is higher for animals reared indoors) and on colour (this is variable). It also affected the levels of many minerals with the levels of Mg, P and K being higher for animals reared outdoors, whereas the Fe, Cu and Zn content were higher in the animals reared indoors. DFT and IMF levels were not influenced by the rearing system.

Keywords: Chato Murciano; Carcass; Meat quality; Pig; Rearing system; Slaughter weight

G. Kandeepan, A.S.R. Anjaneyulu, N. Kondaiah, S.K. Mendiratta, V. Lakshmanan, Effect of age and gender on the processing characteristics of buffalo meat, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 10-14, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4VXB919-1/2/ef59e8cd0fde710b74217cfbafb64701>)

Abstract:

Comparison of processing characteristics of meat from young male, spent male and spent female buffaloes was made to find the suitability of the meat for developing ready to eat meat products. Intensively reared young male buffalo meat showed higher moisture, collagen solubility, sarcomere length, myofibrillar fragmentation index and water holding capacity than meat from the other animals. A higher pH, total meat pigments, salt soluble protein, emulsifying capacity and lower collagen solubility were observed in spent male buffalo meat. Spent female buffalo meat had higher fat, total collagen, muscle fibre diameter and shear force value. Sensory evaluation of pressure cooked meat chunks indicated a marked toughness in spent male and female buffalo

meat samples. These results suggest that young male buffalo meat is more suitable for processing in chunks and spent male and female buffalo meat is more suitable for processing in smaller particles.

Keywords: Buffalo meat; Young male; Spent male; Spent female; Processing characteristics

Gema Nieto, Manuel Castillo, Youling L. Xiong, Daniel Alvarez, Fred A. Payne, Maria Dolores Garrido, Antioxidant and emulsifying properties of alcalase-hydrolyzed potato proteins in meat emulsions with different fat concentrations, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 24-30, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4VXMPVD-2/2/cac84cd0420d614196af9fd9bc17f046>)

Abstract:

The effect of hydrolyzed potato protein (HPP), a natural antioxidant, on emulsion quality was investigated using a factorial design with two Fat (15%, 30%) and two HPP (0%, 2.5%) levels, with three replications. The colour of the raw emulsions as well as cooking losses, textural properties and TBARS of cooked frankfurters were measured. Increasing the Fat proportion significantly ($P < 0.05$) increased L^* , and decreased a^* , b^* , and hardness. Meat emulsions with added HPP were darker (lower L^*) than those made without HPP and also had lower values of a^* and b^* . The addition of HPP (2.5%) significantly ($P < 0.05$) decreased cooking losses and fracture force, and had a significant ($P < 0.05$) inhibitory effect on lipid oxidation in cooked frankfurters. These results suggest that HPP has both antioxidant and emulsifying properties which may be of potential use in meat emulsion manufacturing.

Keywords: Frankfurters; Lipid oxidation; Emulsion stability; Gel strength; Cooking losses; Colour

R.H. Yin, W.L. Bai, J.M. Wang, C.D. Wu, Q.L. Dou, R.L. Yin, J.B. He, G.B. Luo, Development of an assay for rapid identification of meat from yak and cattle using polymerase chain reaction technique, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 38-44, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4VYP9BW-1/2/04f86112397bc8d7c2a9252bec8b3f37>)

Abstract:

Yak meat is of good quality with fine texture, high protein and low fat content, and rich in amino acids compared with that of cattle, and it lacks anabolic steroids or other drugs. In general terms, however, the meat yield of yak is relatively low compared with that of the cattle. In order to prevent possible adulteration of yak meat with cattle meat, based on the sequence of mitochondrial 12S rRNA gene, a multiplex PCR-based approach was proposed for rapid identification of the meat from yak and cattle using three primers designed in this work. Through the combinatorial usage of three primers with a single reaction set, two fragments of 290 and 159 bp were amplified from the cattle meat DNA, whereas only a fragment of 290 bp was obtained from the yak meat DNA. Using the assay described, satisfactory amplification was accomplished in the analysis of raw and heat-treated binary meat mixtures of yak/cattle with a detection limit of 0.1% for cattle meat. The technique is fast and straightforward. It might be a useful tool in the quality control of yak meat and meat products.

Keywords: Yak meat; Cattle meat; Identification; 12S rRNA gene; Polymerase chain reaction

S. Carrasco, B. Panea, G. Ripoll, A. Sanz, M. Joy, Influence of feeding systems on cortisol levels, fat colour and instrumental meat quality in light lambs, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 50-56, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4W1BVC4-1/2/72e5f3187a717c3d85f3027a11b997e8>)

Abstract:

Forty-eight lambs were fed as follows: GR, lambs and dams grazed perennial pasture; GR+S, the same as GR except that lambs had access to concentrate; DRL-GRE, lambs in drylot and dams in rationed grazing; DRL, lambs with dams were stall-fed. DRL-GRE and DRL lambs were weaned at 45 days of age. Lambs were slaughtered when they reached 22-24 kg of live weight. Plasma cortisol concentration was determined three times before slaughter. Subcutaneous fat and meat colour, and texture were analysed.

The different levels of cortisol did not affect meat quality. Both grazing systems gave yellower subcutaneous fat and redder muscles than drylot lambs. Differences between systems relating to colour and texture of the meat disappeared with ageing time, which supports the idea that grazing systems are a good alternative in order to offer similar meat to that coming from drylot systems to which consumers are accustomed. Subcutaneous fat colour was a suitable method to discriminate between grazing and drylot systems, but not within them.

Keywords: Grazing lambs; Indoor lambs; Colour; Texture; Traceability

Chandrika Murugaiah, Zainon Mohd Noor, Maimunah Mastakim, Lesley Maurice Bilung, Jinap Selamat, Son Radu, Meat species identification and Halal authentication analysis using mitochondrial DNA, Meat Science, Volume 83, Issue 1, September 2009, Pages 57-61, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4W3HXC3-1/2/9f0821492b8238a728b1f59c6bff260d>)

Abstract:

A method utilizing PCR-restriction fragment length polymorphism (RFLP) in the mitochondrial genes was developed for beef (*Bos taurus*), pork (*Sus scrofa*), buffalo (*Bubalus bubali*), quail (*Coturnix coturnix*), chicken (*Gallus gallus*), goat (*Capra hircus*), rabbit (*Oryctolagus cuniculus*) species identification and Halal authentication. PCR products of 359-bp were successfully obtained from the cyt b gene of these six meats. AluI, BsaJI, RsaI, MseI, and BstUI enzymes were identified as potential restriction endonucleases to differentiate the meats. The genetic differences within the cyt b gene among the meat were successfully confirmed by PCR-RFLP. A reliable typing scheme of species which revealed the genetic differences among the species was developed.

Keywords: Cyt b gene; Mitochondrial DNA; Halal authentication; Forensic science; Meat; PCR-restriction fragment length polymorphism (RFLP); Species identification

M. Armenteros, M. Heinonen, V. Ollilainen, F. Toldra, M. Estevez, Analysis of protein carbonyls in meat products by using the DNPH-method, fluorescence spectroscopy and liquid chromatography-electrospray ionisation-mass spectrometry (LC-ESI-MS), Meat Science, Volume 83, Issue 1, September 2009, Pages 104-112, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4W26GFN-4/2/b9e1d34fd9404b98283c1218d90cb629>)

Abstract:

Liquid chromatography-electrospray ionisation-mass spectrometry (LC-ESI-MS) was applied as an advanced methodology to study the suitability of using [alpha]-amino adipic semialdehyde (AAS) and [gamma]-glutamic semialdehyde (GGS) as protein oxidation markers in meat products. The results obtained were compared to those obtained by using the DNPH-method and fluorescence spectroscopy for the analysis of protein carbonyls. Lipid oxidation was also investigated in order to elucidate the relationship between lipid and protein oxidation measurements. Both semialdehydes were originally detected in a food system which proves that lysine, arginine and proline are degraded as a result of oxidative reactions to yield AAS and GGS in meat products. A lack of consistency was observed between the MS results for AAS and GGS and the values obtained by the DNPH-method and the fluorescence spectroscopy. Unlike the last two methods, AAS and GGS measurements have proved to be unaffected by the composition or the structure of the food

matrix providing precise information about the fate of particular amino acids during processing of muscle foods. These semialdehydes, and particularly GGS, could be used as indicators of protein oxidation in meat products like TBARS numbers are commonly used as lipid oxidation markers. In fact, a significant correlation was found between GGS values and TBARS highlighting the timely interaction between lipid and protein oxidation.

Keywords: Protein oxidation; DNPH; Spectrofluorometry; LC-ESI-MS; [alpha]-Amino adipic semialdehyde; [gamma]-Glutamic semialdehyde; Meat products

P. Wiener, J.A. Woolliams, A. Frank-Lawale, M. Ryan, R.I. Richardson, G.R. Nute, J.D. Wood, D. Homer, J.L. Williams, The effects of a mutation in the myostatin gene on meat and carcass quality, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 127-134, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4W3HXC3-3/2/7ec87ecdfb26f69daceff613f9e6fb3>)

Abstract:

This study examined the effects of a mutation that inactivates the myostatin gene on calving, growth, carcass and meat quality traits in South Devon cattle. This breed carries at intermediate frequency an 11-bp deletion (MH) in the myostatin gene, known to be associated with the double-muscling phenotype, thus allowing a comparison of three genotype classes. The MH allele was associated with increased calving difficulty, carcass weight, muscle conformation and ratio of polyunsaturated to saturated fatty acids, as well as with reduced growth rate, carcass and meat fatness, and desirable flavour. However, the nature of the genetic effects differed between traits: in some cases the heterozygote MH carriers were more similar to the non-carriers than to homozygote carriers and in some cases, intermediate between the two homozygotes. The direction of these genetic effects has implications for the management of this genetic variation in the South Devon and other breeds.

Keywords: Myostatin; South Devon; Cattle; Meat quality; Fatty acids

Carla Lazzaroni, Davide Biagini, Carola Lussiana, Fatty acid composition of meat and perirenal fat in rabbits from two different rearing systems, *Meat Science*, Volume 83, Issue 1, September 2009, Pages 135-139, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4W4CWTC-1/2/5ce10a4e4771390ba0a9a899ba4544f5>)

Abstract:

To evaluate the effect of different rearing systems and sex on the fatty acid composition of rabbit meat and perirenal fat, the fat content and fatty acid composition of *Longissimus lumborum* and perirenal fat were determined by gas chromatography on 40 rabbits (20 males and 20 females) of the Carmagnola Grey breed reared from 9 to 16 weeks of age in individual California type cages (0.12 m²) or in group ground pens (0.25 m²/head). Ether extract percentage of muscle was significantly influenced by the housing system while, both sex and rearing method affected the fatty acid composition with a decrease in monounsaturated fatty acid (MUFA) and an increase in polyunsaturated ones (PUFA) in penned and male rabbits. The same trends were observed in the fatty acid composition of the perirenal fat, gender only had a significant effect on the saturated fatty acid (SFA) content in the perirenal fat. Indices relating to human health showed the PUFA/SFA ratio to be over the minimum recommendation for rabbits reared in pens and for males, while only the n6/n3 ratio was above the maximum recommendation for caged rabbits. Atherogenic index (AI) of perirenal fat was affected by gender, but no differences were observed in thrombogenic index (TI) in either muscle or perirenal fat.

Keywords: Rabbit; Housing systems; Fatty acid; Human health

Petra Luber, Cross-contamination versus undercooking of poultry meat or eggs -- which risks need to be managed first?, *International Journal of Food Microbiology*, Volume 134, Issues 1-2, Food Micro 2008 'Evolving Microbial Food Safety and Quality' 1-4 September 2008, Aberdeen, Scotland, UK, 31 August 2009, Pages 21-28, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.02.012.

(<http://www.sciencedirect.com/science/article/B6T7K-4VP4WBF-1/2/35d8e171e2c8d636319e980c212e0c73>)

Abstract:

Epidemiological studies show that poultry meat and eggs are important sources for consumers' exposure to pathogens such as *Salmonella* and *Campylobacter*.

There is a focus in many countries to reduce the level of human illness from food-borne pathogens. Reduction of the prevalence of contaminated poultry meat or eggs is one major area of focus. The other is risk communication to the consumer, where information aimed at changing the food preparation behaviour has been utilised as a risk management tool. The efficacy of messages such as 'cook poultry meat and eggs thoroughly' or 'wash your hands' will depend both on the ability to change consumer behaviour as well as where the risk can best be mitigated. In order to prioritise what message should be given to the consumer, the relative contribution of different exposure pathways finally leading to ingestion of the pathogens and resulting in illness needs to be known. It is important to know whether cross-contamination events or undercooking are the greatest risk lurking in consumers' kitchens. A review of studies looking at the location of pathogens in food products has been performed and data regarding internal and external (surface) contamination of poultry meat with *Salmonella* spp. and *Campylobacter jejuni* and *C. coli* is presented. In the case of eggs, data on internal contamination with *Salmonella* and for contamination of egg shells with *Salmonella* and *Campylobacter* are discussed. The results from published risk assessments for these pathogen-food commodity combinations have been evaluated and conclusions regarding the relative risk of internal and external contamination of poultry meat and eggs were drawn.

In conclusion, cross-contamination events from activities such as use of the same cutting board for chicken meat and salad without intermediate cleaning or spreading of pathogens via the kitchen environment seem to be of greater importance than the risk associated with undercooking of poultry meat or eggs. Risk management options are discussed against the background of risk communication strategies used in different countries.

Keywords: Cross-contamination; Undercooking; *Campylobacter*; *Salmonella*; Poultry meat; Eggs

E. de Boer, J.T.M. Zwartkruis-Nahuis, B. Wit, X.W. Huijsdens, A.J. de Neeling, T. Bosch, R.A.A. van Oosterom, A. Vila, A.E. Heuvelink, Prevalence of methicillin-resistant *Staphylococcus aureus* in meat, *International Journal of Food Microbiology*, Volume 134, Issues 1-2, Food Micro 2008 'Evolving Microbial Food Safety and Quality' 1-4 September 2008, Aberdeen, Scotland, UK, 31 August 2009, Pages 52-56, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.12.007.

(<http://www.sciencedirect.com/science/article/B6T7K-4V4KPK5-2/2/71ce089f7100c3980059950725308502>)

Abstract:

Recently the isolation of methicillin-resistant *Staphylococcus aureus* (MRSA) strains from several food-producing animals has been reported. During slaughtering of MRSA-positive animals, contamination of carcasses with MRSA may occur and consequently the meat of these animals may get contaminated. The aim of this study was to estimate the prevalence of MRSA in raw meat samples from the retail trade.

Samples of raw beef, pork, veal, lamb/mutton, chicken, turkey, fowl and game were collected from the retail trade. A detection method including a two-step enrichment in Mueller-Hinton broth + 6.5% NaCl and phenol red mannitol broth containing ceftizoxime and aztreonam, followed by

isolation on MRSA ID agar (bioMerieux) was evaluated and subsequently applied for the detection of MRSA in samples of raw meats.

MRSA strains were isolated from 264 (11.9%) of 2217 samples analyzed. Isolation percentages for the meat species were: beef (10.6%), veal (15.2%), lamb and mutton (6.2%), pork (10.7%), chicken (16.0%), turkey (35.3%), fowl (3.4%) and game (2.2%). The majority (85%) of the isolated strains belonged to spa-types of pulsed-field gel electrophoresis (PFGE) non-typeable (NT)-MRSA, corresponding to the multilocus sequence type ST398, a type also recently isolated in the Netherlands from pigs. However, a smaller part of these strains were found to be of other ST's, possibly of human origin.

Further studies are needed to elucidate transmission routes of MRSA in relation to meat and other foods and to provide the tools for preventing the spread of MRSA. At present the high prevalence of MRSA in meat has not been shown to contribute significantly to the dissemination of MRSA to humans and the possible health hazard for consumers of the presence of MRSA in foods should be further elucidated.

Keywords: MRSA; Meat; MLST; spa-Typing

F. Ravyts, G. Vrancken, K. D'Hondt, C. Vasilopoulos, L. De Vuyst, F. Leroy, Kinetics of growth and 3-methyl-1-butanol production by meat-borne, coagulase-negative staphylococci in view of sausage fermentation, *International Journal of Food Microbiology*, Volume 134, Issues 1-2, Food Micro 2008 'Evolving Microbial Food Safety and Quality' 1-4 September 2008, Aberdeen, Scotland, UK, 31 August 2009, Pages 89-95, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.02.006.

(<http://www.sciencedirect.com/science/article/B6T7K-4VKP3RY-3/2/67ee380f78b7ac35782f8cc93d500876>)

Abstract:

Five species of meat-borne, coagulase-negative staphylococci were screened for their in vitro production of 3-methyl-1-butanol. The highest production level was encountered for *Staphylococcus sciuri* [alpha]SG2, despite its poor growth. With respect to *Staphylococcus* species that are generally applied in sausage starter cultures, production of 3-methyl-1-butanol was higher with *Staphylococcus xylosus* 3PA6 than with *Staphylococcus carnosus* 833. Mathematical modelling was used to link the kinetics of 3-methyl-1-butanol production by *S. xylosus* 3PA6 and *S. carnosus* 833 in meat simulation medium to bacterial growth and environmental factors, in casu temperature and pH. The specific production rate of 3-methyl-1-butanol was about ten times higher for *S. xylosus* 3PA6 than for *S. carnosus* 833, indicating a higher production rate per amount of biomass. This explains the higher concentrations of 3-methyl-1-butanol in the medium with *S. xylosus* 3PA6, despite its poorer growth.

Keywords: Fermented sausage; *Staphylococcus carnosus*; *Staphylococcus xylosus*; 3-methyl-1-butanol; Flavour

Allan E. Wilhelm, Magali B. Maganhini, Francisco J. Hernandez-Blazquez, Elza I. Ida, Massami Shimokomaki, Protease activity and the ultrastructure of broiler chicken PSE (pale, soft, exudative) meat, *Food Chemistry*, In Press, Accepted Manuscript, Available online 29 August 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.08.034.

(<http://www.sciencedirect.com/science/article/B6T6R-4X3W4B2-3/2/497faaf7e26418465e9af9b9a1d66572>)

Abstract:

The biological cause of broiler PSE meat seems to be an excessive release of Ca²⁺, promoted by a genetic mutation of ryanodine receptors located in the sarcoplasmic reticulum of skeletal muscle cells. Excessive Ca²⁺, associated with protein denaturation in meat, enhances protease activity and influences the functional properties of PSE meat. Twenty-four-hour post-mortem Pectoralis major m. samples exhibited lower values for pH, water-holding capacity, and shear force than did

control samples, in contrast to colour (L^*) and cooking loss values. Protease activity, measured as myofibril fragmentation index, presented higher values in PSE meat than in control samples. Ultrastructural examination revealed shrinking and depolymerisation of myofilaments and Z-lines disorganization within the sarcomere in PSE meat. Intense calpain activity was also observed, indicating that the process may initiate at the filaments, because of protein denaturation, and spread through Z-lines, resulting in the collapse of the sarcomere structure.

Keywords: myofibril fragmentation index; shear force values; calpain system

H. Sieczkowska, M. Kocwin-Podsiadla, A. Zybert, E. Krzecio, K. Antosik, S. Kaminski, E. Wojcik, The association between polymorphism of PKM2 gene and glycolytic potential and pork meat quality, *Meat Science*, In Press, Accepted Manuscript, Available online 28 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.045.

(<http://www.sciencedirect.com/science/article/B6T9G-4X3N463-1/2/7648faaef4f065971049a911ec5c2987>)

Abstract:

The objective of this study was to investigate the association of PKM2 gene with glycolytic potential and meat quality traits in three groups of fatteners - Landrace, Landrace x Yorkshire and (Landrace x Yorkshire) x Duroc. The present study was conducted on 243 fatteners, free of RYR1T gene, which 95 were of Landrace breed and the rest were the following crosses: 66 - Landrace x Yorkshire and 82 (Landrace x Yorkshire) x Duroc. It has been stated, that PKM2 gene (independently from the breed) was significantly associated with GP, lactate content, R1 indicator, pH and drip loss. The presence of TT genotype may lead to increase of GP and lactate content and results in low pH₂₄ and pH₁₄₄ and bigger drip loss measured 96 and 144 h after the slaughter. Except for the landrace fatteners, the association of the PKM2 gene with the glycogen content has not been statistically confirmed. Statistically confirmed interaction shows, that the association of PKM2 gene with glycolytic potential and glycogen content concerns mainly the Landrace pigs. Moreover, a high (almost 89%) conformability of the genotype of PKM2 gene with the RN- phenotype, can serve as an additional argument in favour of the thesis.

Keywords: pigs, PKM2 gene, glycolytic potential, breed, meat quality traits

Yun-Sang Choi, Ji-Hun Choi, Doo-Jeong Han, Hack-Youn Kim, Mi-Ai Lee, Hyun-Wook Kim, Ju-Woon Lee, Hai-Jung Chung, Cheon-Jei Kim, Optimization of Replacing Pork Backfat with Grape Seed Oil and Rice Bran Fiber for Reduced-fat Meat Emulsion Systems, *Meat Science*, In Press, Accepted Manuscript, Available online 28 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.048.

(<http://www.sciencedirect.com/science/article/B6T9G-4X3N463-2/2/aae4c1aab3b27c920e06ed56284c71ad>)

Abstract:

The effects of reducing pork fat levels from 30% to 20% and partially substituting the pork fat with a mix of grape seed oil (0%, 5%, 10% and 15%) and 2% rice bran fiber were investigated based on chemical composition, cooking characteristics, physicochemical and textural properties, and viscosity of reduced-fat meat batters. For reduced-fat meat batters containing grape seed oil and rice bran fiber the moisture and ash contents, uncooked and cooked pH values, yellowness, cohesiveness, gumminess, chewiness, and sarcoplasmic protein solubility were higher than in the control samples. The reduced-fat samples with increasing grape seed oil concentrations had lower cooking loss, emulsion stability, and apparent viscosity. The incorporation of grape seed oil and rice bran fiber successfully reduced the animal fat content in the final products while improving other characteristics.

Keywords: grape seed oil; dietary fiber; rice bran fiber; low-fat; meat batter

T. Srikanchai, E. Murani, C. Phatsara, M. Schwerin, K. Schellander, S. Ponsuksili, K. Wimmers, Association of ZYX polymorphisms with carcass and meat quality traits in commercial pigs, *Meat Science*, In Press, Accepted Manuscript, Available online 28 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.042.

(<http://www.sciencedirect.com/science/article/B6T9G-4X3N463-4/2/026c970d8454a1d7a41f50623f37fc3d>)

Abstract:

Zyxin (ZYX) is one of the proteins in focal adhesions along the actin fibers playing a role in actin organization and signal transduction. By radiation hybrid and genetic mapping we assigned ZYX to porcine chromosome 18 in the area of quantitative traits loci for carcass and meat quality and muscle fiber traits and hence considered ZYX a functional positional candidate gene. Analysis of a newly detected SNPs (c.+279 C>T, c.+399 A>G, c.+522 A>G) in pigs from different commercial breeds (Pietrain [Pi], German landrace [LR], German Large White x German Landrace [F1] and PiF1) revealed a significant association with carcass traits (including: side- and backfat thickness, loin weight and carcass lean content) and meat quality traits (including: pH, color and drip loss). However, the lack of consistent association across all pig populations in this study indicates that the association of the SNPs may be depending on causal mutations in linkage disequilibrium and/or interactions with other loci.

Keywords: candidate gene; zyxin; carcass and meat quality traits; commercial pig; single nucleotide polymorphism; mapping

J.H. Lee, M. Vanguru, G. Kannan, D.A. Moore, T.H. Terrill, B. Kouakou, Influence of dietary condensed tannins from sericea lespedeza on bacterial loads in gastrointestinal tracts of meat goats, *Livestock Science*, In Press, Corrected Proof, Available online 27 August 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.07.007.

(<http://www.sciencedirect.com/science/article/B7XNX-4X3DS71-1/2/45bed93e5df93bb6600beaa0a66412b6>)

Abstract:

This research assessed the potential use of a low input forage containing a high amount of condensed tannins (CT) to reduce foodborne pathogens prior to slaughter of meat goats. In a completely randomized design, twenty Kiko x Spanish intact male kids (BW = 19.2 +/- 0.74 kg) were fed ground sericea lespedeza [SL; *Lespedeza cuneata* (Dum-Cours) G. Don; 2 pens], a high-CT legume, or bermudagrass hay [BG; *Cynodon dactylon* (L.) Pers.; 2 pens], at 75% of daily intake with a corn-based supplement (25% of intake) for 14 weeks (n = 10 goats/treatment). At the end of the feeding trial, the animals were slaughtered using standard procedures. Immediately after evisceration, rumen and rectal samples were collected to assess bacterial loads and volatile fatty acids in the rumen. Concentrations of rumen volatile fatty acids were significantly different between dietary treatments. Goats fed SL hay had higher (P < 0.05) contents of butyric (8.66 vs 7.16 mM), isobutyric (1.94 vs 1.44 mM), isovaleric (3.03 vs 2.13 mM), and valeric (1.43 vs 1.07 mM) acids than those fed BG hay; however, the content of acetic acid (78.6 vs 64.4 mM) was higher (P < 0.05) in the BG-fed groups than in SL-fed groups. *Escherichia coli* (2.33 vs 1.13 log₁₀ CFU/g) counts of rumen contents were higher (P < 0.05) in the SL-fed group compared with the BG-fed group. However, *E. coli* counts in feces were not different (P > 0.05) between dietary treatments. The high-CT influenced (P < 0.05) total plate counts in the feces; and the total plate counts in feces of SL- and BG-fed goats were 4.95 and 6.57 log₁₀ CFU/g, respectively. The results indicated that high CT in the diet might influence rumen volatile fatty acid composition, but might not reduce the bacterial loads in gastrointestinal tracts of meat goats.

Keywords: Goat; Condensed tannins; *Sericea lespedeza*; *Escherichia coli*; Volatile fatty acids

Sz. Metzger, Zs. Szendro, M. Bianchi, I. Hullar, H. Febel, L. Maertens, C. Cavani, M. Petracchi, I. Radnai, E. Biro-Nemeth, Effect of energy restriction in interaction with genotype on the

performance of growing rabbits: II. Carcass traits and meat quality, *Livestock Science*, In Press, Corrected Proof, Available online 25 August 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.07.004.

(<http://www.sciencedirect.com/science/article/B7XNX-4X30CB4-1/2/dadb22b76b5b083ab0b80c5eff5d5ae1>)

Abstract:

In this experiment the effect of digestible energy (DE) restriction on carcass traits and meat quality of rabbits selected divergently for body fat content was studied. Using a 2 x 3 factorial arrangement, Pannon White rabbits selected for high (HFAT) or low (LFAT) total body fat content were fed isocaloric diets between 4 and 12 weeks of age. Energy restriction was achieved by reducing the daily feed intake by 10% (M) and 20% (L) compared to the ad libitum fed group (H). Proportional to the reduction of feed intake the nutrient density of diets M and L was increased. Thus, the DE intake was reduced while the nutrient intake remained stable among the 3 dietary groups. Effect of genetic group on carcass traits and on meat quality parameters was less marked than DE restriction. Selection for high body fat content improved the dressing out percentage (58.3 and 57.3% in HFAT and LFAT respectively; $P < 0.01$), and reduced the percentage of the full gastrointestinal tract to slaughter weight (13.7 and 14.3% in HFAT and LFAT respectively; $P < 0.05$). Reduction of DE intake decreased the body weight and the weight of the chilled and reference carcass ($P < 0.001$), while it had no effect on dressing out percentage. In group H the percentage of fore part to reference carcass was higher (29.7 vs 29.0%; $P < 0.01$) while that of the hind part was lower than in group L (37.0 vs 38.2%; $P < 0.001$). The Longissimus lumborum meat from HFAT rabbits exhibited a lower content of moisture (76.1 and 76.5% in HFAT and LFAT respectively; $P < 0.01$) as well as lower L^* (53.5 and 54.4 in HFAT and LFAT respectively; $P < 0.05$) and b^* (0.42 and 0.81 in HFAT and LFAT respectively; $P < 0.05$) colour values. When compared with ad libitum fed rabbits, those restricted at 20% (L) exhibited a higher content of moisture (76.9 vs 75.8%; $P < 0.01$), as well as higher pHu (5.87 vs 5.73; $P < 0.01$) associated with lower cooking loss (17.8 vs 19.1%; $P < 0.05$). L rabbits also produced lower values of redness (a^* , 2.21 vs 3.35; $P < 0.01$) and yellowness (b^* , 0.23 vs 0.91; $P < 0.01$). No effect of the divergent selection for body fat content on the total lipid percentage and on most of the fatty acids in the meat of the hind leg was found. DE restriction resulted in lower SFA (L: 32.1 vs H: 35.8%; $P < 0.01$) and MUFA (L: 21.0 vs H: 28.6; $P < 0.01$) but higher PUFA contents (L: 45.5 vs H: 34.9%; $P < 0.01$) in the hind leg meat.

Keywords: Rabbit; Genetic group; DE intake; Carcass traits; Meat quality

Ultan Mc Carthy, Gashaw Ayalew, Francis Butler, Kevin McDonnell, Shane Ward, Impact of reader antenna polarisation, distance, inlay design, conveyor speed, tag location and orientation on the coupling of UHF RFID as applied to modified atmosphere packaged meat, *Computers and Electronics in Agriculture*, In Press, Corrected Proof, Available online 20 August 2009, ISSN 0168-1699, DOI: 10.1016/j.compag.2009.07.018.

(<http://www.sciencedirect.com/science/article/B6T5M-4X1XYC3-1/2/74f36826bf5546099a6d5de172424640>)

Abstract:

Undetected RFID tags make the potential benefits of RFID unattainable. This study aimed to determine the most significant factors that affect RFID and particularly its application to the traceability of meat. Experimental parameters included five RFID tag inlays, two levels of conveyor speeds, five variations of beef sample and an empty container, 12 tags per test sample, three distances and two types of reader antenna polarisations. Tag detection rates were determined in three replicates per combination of test parameters. A GLM ANOVA was carried out on tag detection rate. In decreasing order of significance in terms of the effect on mean tag detection rate were distance, sample, inlay design, conveyor speed and reader antenna polarisation. Interaction of these factors also proved significant, in decreasing order of importance were reader antenna *

inlay, sample type * distance, inlay * distance, sample type * inlay, sample type * reader antenna, distance * speed, sample type * speed and finally sample type * distance * speed. Linearly polarised antenna performed better overall at detecting tags, with 63% mean detection rate compared with circularly polarised antenna with 57% mean detection rate. Varying the tag inlay resulted in mean detection rates of between 62% and 88%. Ideal transponder location on package was reader antenna polarisation dependent, but generally tags facing reader antennas exhibited better detection rate. Results revealed that the under side of the package was the most undetectable transponder location, considering the placement of reader antennas on top, left and right sides of the sample. Conveyor speed also proved significant with a variation from 0.5 to 1.0 m/s resulting in an average detection rate ranging from 62% to 57%, respectively. Circularly polarised antennas are believed to perform better in cases of random tag orientation on products. It can be concluded that RFID systems implementation in the meat supply chain requires a holistic approach where distances, polarisations, inlay type, meat composition and conveyor speed need to be considered.

Keywords: Ultra high frequency radio frequency identification; Inlay design; Reader antenna polarisation; Coupling

V. Berthelot, P. Bas, P. Schmidely, Utilization of extruded linseed to modify fatty composition of intensively-reared lamb meat: effect of associated cereals (wheat vs corn) and linoleic acid content of the diet, *Meat Science*, In Press, Accepted Manuscript, Available online 19 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.034.

(<http://www.sciencedirect.com/science/article/B6T9G-4X1SBJB-3/2/ac6ee241f50cbd2470cff1d4beee10be>)

Abstract:

Sixty male lambs were used in 2 trials to study the efficiency of transfer and elongation of linolenic acid (ALA) in muscle and caudal adipose tissue and to assess factors affecting this process and related changes in fatty acid (FA) profile. In exp. 1, lambs were fed a control diet or extruded linseed (L) diet either with wheat (W, rapid starch) or corn (C, slow starch). In exp. 2, lambs were fed L with normal rapeseed, or high oleic rapeseed, or soybean. In exp. 1, L increased ALA proportion and total n-3 PUFA in muscle and adipose tissue. In adipose tissue but not in muscle, LC-lambs had higher proportion of ALA than LW-lambs. In exp. 2, increasing linoleic acid (LA) intake increased LA proportion in muscle and adipose tissue but did not modify ALA proportion. Moreover, in muscle, it did not change the desaturation and elongation processes of ALA to long-chain n-3 PUFA.

Keywords: Lamb; Muscle; Fat supplementation; Polyunsaturated fatty acids

Jonathan F. Holmes, Wiley D. Holcombe, Guidelines for Designing Washdown Robots for Meat Packaging Applications, *Trends in Food Science & Technology*, In Press, Accepted Manuscript, Available online 19 August 2009, ISSN 0924-2244, DOI: 10.1016/j.tifs.2009.08.003.

(<http://www.sciencedirect.com/science/article/B6VHY-4X1SB8B-1/2/d4ff5eba41c9daafd65d9ac108fa4436>)

Abstract:

Robots are prominent in several industries where high volumes of products are produced and handled; however, certain food processing industries have been slow to adopt robotic work cells due to the high cost of existing systems, difficulties in handling fresh meat products, and inability for robots to survive a corrosive washdown environment. In this paper, we describe the development of a robot specifically designed to address all of these needs with special attention on testing and validation of that machine. The end result of this is the beginning of a design guideline to assist those involved in the design and operation of washdown robots for the food processing industry.

Hainer Wackerbarth, Uwe Kuhlmann, Filip Tintchev, Volker Heinz, Peter Hildebrandt, Structural changes of myoglobin in pressure-treated pork meat probed by resonance Raman spectroscopy, *Food Chemistry*, Volume 115, Issue 4, 15 August 2009, Pages 1194-1198, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.01.027.

(<http://www.sciencedirect.com/science/article/B6T6R-4VDS8M7-B/2/77f687465614fe082394d0ecd62a94ed>)

Abstract:

Pork meat was pressurised at 600-700 MPa under conditions applicable for non-thermal food preservation and studied by resonance Raman spectroscopy with 413-nm excitation to probe selectively myoglobin, which is the origin of the red colour of meat. The spectra of intact, non-pressurised meat tissue exclusively display the resonance Raman bands of the ferrous deoxy-form of myoglobin whereas upon pressure treatment a new six-coordinated low spin ferrous species is formed (>60%), that is assigned to a bis-histidine complex including the distal histidine 64. This structural change is associated with a shift of the electronic transitions of the haeme and thus affects the colour of the meat. In contrast, solutions containing myoglobin extracted from pressurised and non-pressurised pork meat give rise to resonance Raman spectra characteristic of the ferrous oxy-form of myoglobin, evidently due to the accessibility of the proteins for oxygen in solution. Upon pressure treatment of the extracted myoglobin solution, the oxy-form is partially converted to the met-(like) ferric form implying a pressure-induced oxidation of the haeme. Thus, this structural transition does not only cause a colour change but also may initiate unwanted oxidative side reactions involving further components of meat. Evidently, such effects can be largely avoided when the oxy- to deoxy-myoglobin ratio is kept small prior to pressure treatment.

Keywords: Meat; Myoglobin; Raman spectroscopy; High pressure; Food processing

Hariklia Vaikousi, Costas G. Biliaderis, Konstantinos P. Koutsoumanis, Applicability of a microbial Time Temperature Indicator (TTI) for monitoring spoilage of modified atmosphere packed minced meat, *International Journal of Food Microbiology*, Volume 133, Issue 3, 15 August 2009, Pages 272-278, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.05.030.

(<http://www.sciencedirect.com/science/article/B6T7K-4WGDR0P-2/2/266626064c17215bd69cb44527882254>)

Abstract:

The applicability of a microbial Time Temperature Indicator (TTI) prototype, based on the growth and metabolic activity of a *Lactobacillus sakei* strain developed in a previous study, in monitoring quality of modified atmosphere packed (MAP) minced beef was evaluated at conditions simulating the chill chain. At all storage temperatures examined (0, 5, 10, 15 [degree sign]C), the results showed that lactic acid bacteria (LAB) were the dominant bacteria and can be used as a good spoilage index of MAP minced beef. The end of product's shelf life as revealed by the sensory evaluation coincided with a LAB population level of 7 log₁₀ CFU/g. For all temperatures tested, the growth of *L. sakei* in the TTI resembled closely the growth of LAB in the meat product, with similar temperature dependence of the μ_{max} and thus similar activation energy values calculated as 111.90 and 106.90 kJ/mol, for the two systems, respectively. In addition, the end point of TTI colour change coincided with the time of sensory rejection point of the beef product during its storage under isothermal chilled temperature conditions. The estimated activation energy, E_{α} , values obtained for parameters related to the response of ΔE (total colour change of the TTI) describing the kinetics of colour change of the TTI during isothermal storage (i.e. the maximum specific rate of ΔE evolution curve, $\mu_{\Delta E}$, and also the reciprocal of t_i , time at which half of the maximum ΔE is reached), were 112.77 and 127.28 kJ/mol, respectively. Finally, the application of the microbial TTI in monitoring the quality deterioration of MAP minced beef due to spoilage was further evaluated under dynamic conditions of storage, using two separate low temperature periodic changing scenarios, resembling the actual conditions occurring in the distribution chill chain. The results showed that the end point of TTI,

after storage at those fluctuating temperature conditions, was noted very close to the end of product's sensorial shelf life. This finding points to the applicability of the developed microbial TTI as a valuable tool for monitoring the quality status during distribution and storage of chilled meat products, which are spoiled by lactic acid bacteria or other bacteria exhibiting similar kinetic responses and spoilage potential.

Keywords: Time Temperature Indicators (TTI); Microbial TTI; MAP beef spoilage; Lactic acid bacteria; Shelf life; Dynamic conditions

Lars O. Dragsted, Biomarkers of meat intake and the application of nutrigenomics, *Meat Science*, In Press, Accepted Manuscript, Available online 15 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4X0XFDX-5/2/af2094764f7f994ddccb870024035416>)

Abstract:

Objective dietary intake markers for meat would be useful to assess meat intake in observational studies and as compliance markers in dietary intervention studies. A number of compounds are specific to meat compared with most other dietary items but there is some overlap between protein rich foods. A number of single compounds have been analysed in urine, plasma, serum or hair samples in studies of their relationship to meat or total protein intake. Among potential markers of dietary meat intake are urea, creatine, creatinine, carnitine, carnosine, anserine, ophidine, 1- and 3-methylhistidine, and sulphate or sulphite. Anserine and 1-methylhistidine come close to being meat-specific markers but true quantitative biomarker may not exist. Modern profiling techniques are increasingly used to look for useful biomarkers or for constructing them from latent information in complex profiles. Metabolomics by NMR spectroscopy of urine has also been applied to search for meat intake markers. Studies on single compounds or metabolomics markers are shortly reviewed here.

Keywords: Meat intake; Biomarkers; Metabolomics

Alison J McAfee, Emeir M Duffy, Geraldine J Cuskelly, Bruce W Moss, Julie M Wallace, Maxine P Bonham, Ann M Fearon, Red meat consumption: An overview of the risks and benefits, *Meat Science*, In Press, Accepted Manuscript, Available online 15 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4X0XFDX-6/2/a61f703bb1113a0885e7cb0fb74dcea7>)

Abstract:

Red meat is long established as an important dietary source of protein and essential nutrients including iron, zinc and vitamin B12, yet recent reports that its consumption may increase the risk of cardiovascular disease (CVD) and colon cancer, have led to a negative perception of the role of red meat in health. The aim of this paper is to review existing literature for both the risks and benefits of red meat consumption, focusing on case control and prospective studies. Despite many studies reporting an association between red meat and the risk of CVD and colon cancer, several methodological limitations and inconsistencies were identified which may impact on the validity of their findings. Overall, there is no strong evidence to support the recent conclusion from the World Cancer Research Fund (WCRF) report that red meat has a convincing role to play in colon cancer. A substantial amount of evidence supports the role of lean red meat as a positive moderator of lipid profiles with recent studies identifying it as a dietary source of the anti-inflammatory long chain (LC) n-3 PUFAs and conjugated linoleic acid (CLA). In conclusion, moderate consumption of lean red meat as part of a balanced diet is unlikely to increase risk for CVD or colon cancer, but may positively influence nutrient intakes and fatty acid profiles, thereby impacting positively on long term health.

Keywords: Red meat consumption; Processed meat; Lean red meat; Cardiovascular disease; Colon cancer; Long- chain n-3 polyunsaturated fatty acids

L.C. Hoffman, A.C. Mostert, L.L. Laubscher, Meat quality of kudu (*Tragelaphus strepsiceros*) and impala (*Aepyceros melampus*): The effect of gender and age on the fatty acid profile, cholesterol content and sensory characteristics of kudu and impala meat, *Meat Science*, In Press, Accepted Manuscript, Available online 14 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4X0PC52-5/2/910aba213c8057006e64b23378149895>)

Abstract:

Game meat has distinct sensory characteristics and favourable fatty acid profiles which differ between species. The SFA's percentage was found to be higher in impala meat (51.12%) than kudu meat (34.87%) whilst the total PUFA was higher in kudu (38.88%) than impala (34.06%). Stearic acid (22.67%) was the major fatty acid in impala and oleic acid in kudu (24.35). Linoleic acid, C20:3n-6 and C22:6n-3 were higher in kudu while C20:4n-6, C20:5n-3 and C22:5n-3 were higher in impala. The PUFA:SFA ratio for kudu (1.22) was higher than for impala (0.73) while impala had a higher n-6 PUFA's to n-3 PUFA ratio (3.76) than kudu (2.20). Kudu was higher in cholesterol (71.42 +/- 2.61mg/100g muscle) than impala (52.54 +/- 2.73mg/100g muscle). Sensory evaluation showed impala had a more intense game aroma and flavour while the initial juiciness of cooked samples of kudu was higher. The results show kudu and impala can be marketed for their unique flavours and aromas as well as being a healthy substitute for other red meats.

Keywords: Game meat; Kudu; Impala; Fatty acids; Cholesterol; Sensory characteristics, sustainable utilisation

L.C. Hoffman, A.C. Mostert, M. Kidd, L.L. Laubscher, Meat quality of kudu (*Tragelaphus strepsiceros*) and impala (*Aepyceros melampus*): Carcass yield, physical quality and chemical composition of kudu and impala *Longissimus dorsi* muscle as affected by gender and age, *Meat Science*, In Press, Accepted Manuscript, Available online 14 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4X0PC52-7/2/cae83a4e6de767bb5698a1c90067c880>)

Abstract:

The meat quality of kudu and impala was compared. Live weight and carcass weight differed between species, genders and age groups. Impala had the highest dressing percentage while kudu had the highest live weight and carcass weight. Kudu had the lowest fat content whilst female animals had a higher fat and myoglobin content than males. Sub-adults had a higher ash content than adults. Species, gender and age had no effect of pH, drip loss, cooking loss or tenderness although kudu had higher L*, a* and b* and chroma values than impala. Impala sub-adults had significantly higher insoluble collagen, soluble collagen, total collagen and hydroxyproline content than kudu sub-adults. Kudu had the highest potassium levels while impala had the highest phosphorus levels. Potassium, sodium, iron and copper levels also differed between species.

Keywords: Game meat; Proximate composition; Myoglobin; Collagen; Mineral content; Drip loss; Cooking loss; Colour; tenderness; sustainable utilisation

M.A. Ayadi, I. Makni, H. Attia, Thermal diffusivities and influence of cooking time on textural, microbiological and sensory characteristics of turkey meat prepared products, *Food and Bioproducts Processing*, In Press, Corrected Proof, Available online 13 August 2009, ISSN 0960-3085, DOI: 10.1016/j.fbp.2009.03.002.

(<http://www.sciencedirect.com/science/article/B8JGD-4X0F6VM-1/2/2cff3eea9e2c694a5798e782a5311063>)

Abstract:

Cooking represents an important step in food processing for both sensorial and safety aspects. The aim of this study is to determine (i) the thermal diffusivity and (ii) the impact of cooking time on sensorial and microbiological characteristics of sausages (locally called salami) and ham products prepared from turkey meat. The water immersion method is used for cooking and cooling. Time-temperature profiles and thermal diffusivity values show that heat penetration in ham is slower than heat penetration in salami products. Three cooking times were applied to each material, and cooking time variation had a significant ($p < 0.05$) effect on the textural parameters of both salami and ham samples. Sensorial tests also showed significant differences ($p < 0.05$) between products cooked for different times, whereas all three gave acceptable hygienic parameters.

Keywords: Turkey meat products; Cooking; Cooling; Thermal diffusivity; Texture; Microbiology

Y.J. Nam, Y.M. Choi, S.H. Lee, J.H. Choe, D.W. Jeong, Y.Y. Kim, B.C. Kim, Sensory evaluations of porcine longissimus dorsi muscle: relationships with postmortem meat quality traits and muscle fiber characteristics, *Meat Science*, In Press, Accepted Manuscript, Available online 13 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4X0F40P-4/2/abfafd7fb2158cc6d5f0c0a680c0699b>)

Abstract:

The objective of this study was to investigate sensory evaluations and their relationships with meat quality measurements and histochemical characteristics in both fresh and cooked pork. Based on the results, postmortem meat quality traits were closely related to almost all the evaluated sensory attributes. With regard to histochemical characteristics, muscle fiber area was related to both fresh- ($r = 0.18$, $P < 0.05$) and cooked-meat color ($r = -0.24$, $P < 0.01$) as well as abnormal flavor intensity ($r = 0.25$, $P < 0.01$), and muscle fiber composition was associated with fresh pork color and taste acceptability after cooking. There were no significant relationships ($P > 0.05$) between type IIa muscle fiber content and the evaluated sensory attributes; however, good meat sensory quality was partially explained by the percentage of type I fiber.

Keywords: Sensory evaluation; postmortem meat quality; histochemical characteristics; pork

M. El Jabri, S. Abouelkaram, J.L. Damez, P. Berge, Image analysis study of the perimysial connective network, and its relationship with tenderness and composition of bovine meat, *Journal of Food Engineering*, In Press, Accepted Manuscript, Available online 12 August 2009, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.08.006.

(<http://www.sciencedirect.com/science/article/B6T8J-4X08775-3/2/ad97ecb1a25b5222ca6e4a4c92501f9d>)

Abstract:

Image processing method was developed to predict beef tenderness, collagen and lipids contents. The study was carried out on the semimembranosus muscle (SM). Images of SM slices were acquired under visible and ultraviolet lighting. In this work statistical technique was implemented as a method to relate the distribution of intramuscular connective tissue (IMCT), characterized by image analysis, to sensory tenderness evaluated by a trained panel and collagen and total lipids contents assessed chemically. Using Multiple Linear Regression (MLR) combining visible and ultraviolet lighting, IMCT image parameters were found to be good predictors of beef tenderness ($R^2=0.89$), collagen and lipids contents (respectively $R^2=0.82$ and $R^2=0.91$).

Keywords: Image analysis; Beef tenderness; Collagen contents; Lipids contents

Vanessa B. Woods, Anna M. Fearon, Dietary sources of unsaturated fatty acids for animals and their transfer into meat, milk and eggs: A review, *Livestock Science*, In Press, Corrected Proof, Available online 12 August 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.07.002.

(<http://www.sciencedirect.com/science/article/B7XNX-4X07750-1/2/a2892a4e31b535d9e7978efbda1a2e80>)

Abstract:

Dietary intake of unsaturated fatty acids (UFA) has been shown to reduce the risk of cardiovascular disease (CVD) and possibly the incidence of some cancers, asthma and diabetes among other conditions. Meanwhile, animal products have been criticised for their high content of saturated fatty acids (SFA), being damaging to health. Modification of animal diets can now easily increase the proportion of UFA in meat, milk and eggs. Consuming a greater proportion of these beneficial fatty acids as part of an everyday diet will appeal to the public, as opposed to taking dietary supplements. This study encompasses a review of the literature on dietary sources of UFA available for animals and their subsequent transfer into milk, meat (beef, lamb, pork, poultry) and eggs. Including these fatty acid sources in the diet of animals improves the fatty acid profile of milk, meat and eggs by increasing the ratio of UFA:SFA, decreasing the ratio of n-6:n-3 fatty acids and, with ruminant products, increasing conjugated linoleic acid (CLA) levels. Care must be taken however, when introducing these fatty acid sources into animal diets as some adverse effects can result. For example, large amounts of UFA in the diet of dairy cows may affect rumen activity, reducing milk yield, fat and protein concentrations, while the impact of increased levels of polyunsaturated fatty acids (PUFA) in meat on shelf life and flavour parameters is an area that warrants further investigation. Novel fatty acid sources such as hemp, camelina or lupin, although effective in some instances, are so far proving an expensive option for commercial purposes. Current thinking on the relevance of the dietary n-6:n-3 ratio to cardiovascular risk in humans is also examined.

Keywords: Fatty acid; Meat; Milk; Eggs

Vibeke Lind, Jan Berg, Lars Olav Eik, Jorgen Molmann, Espen Haugland, Marit Jorgensen, Margrethe Hersleth, Meat quality of lamb: Pre-slaughter fattening on cultivated or mountain range pastures, *Meat Science*, In Press, Accepted Manuscript, Available online 9 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4WYJSP3-1/2/e18e9bb43790260d6633b25a9c77bbda>)

Abstract:

Many consumers perceive lamb meat from mountain pastures to be of superior quality, a quality that may be altered if lambs are kept for a longer period on cultivated pastures before slaughtering. The objective of this experiment was to compare sensory profile and fatty acid composition in meat from lambs slaughtered directly from unimproved mountain pastures with meat from lambs raised on unimproved mountain pastures and fattened on biodiverse cultivated pastures for 26, 39 and 42 days before slaughtering. The experiment was conducted at two different locations in Norway in 2006 and 2007, with a total of 124 Norwegian Crossbred Sheep lambs. Loin samples of *M. Longissimus dorsi* from lambs above a body weight of 40 kg were selected and analysed for sensory attributes. Fatty acid composition was determined in the subcutaneous fat over the *Longissimus dorsi*. Small but significant differences were found in hardness, tenderness, fattiness, metallic and rancid flavour, and in polyunsaturated fatty acids. This indicates that to a small extent pre-slaughter fattening on cultivated pastures alters meat characteristics.

Keywords: Lamb, meat quality, sensory attributes, fatty acid, pastures

Hua Wei Liu, Francesco Gai, Laura Gasco, Alberto Brugiapaglia, Carola Lussiana, Kai Jun Guo, Jian Ming Tong, Ivo Zoccarato, Effects of chestnut tannins on carcass characteristics, meat quality, lipid oxidation and fatty acid composition of rabbits, *Meat Science*, In Press, Accepted Manuscript, Available online 7 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4WY6K31-2/2/5d19f68e0d6f5c039f47bd5151dc35a9>)

Abstract:

Seventy two male Bianca Italiana rabbits were used to study the effects of the inclusion (0%, 0.5%, and 1.0%) of a natural extract of chestnut wood (Silvafeed ENC) in the diet on productive traits, carcass characteristics, meat quality, lipid oxidation and fatty acid composition of rabbit meat. Results showed ENC had no significant effect on live weight, productive traits, hot carcass weight, dressing percentage, skin weight, pH, cooking losses, shear force and colour. The iron content was higher in Longissimus thoracis et lumborum (LTL) muscle of rabbit fed the ENC 1.0% diet than the control group. TBARS average values in the group ENC 0.5% were significantly lower ($P < 0.05$) than in the control and ENC 1.0% groups. Myristic acid (C14:0; $P < 0.01$), palmitoleic acid (C16:1 cis-9; $P < 0.05$) and pentadecanoic acid (C15:0; $P < 0.01$) contents were lower in LTL muscle of rabbits fed the ENC 1.0% diet, whereas the palmitic acid (C16:0) content was higher ($P < 0.05$) in the rabbits of this group. Moreover, the rabbits fed with the ENC 0.5% diet had lower ($P < 0.01$) levels of trans-vaccenic acid (C18:1 trans-11) compared to rabbits fed with the control diet. No significant differences were observed in saturated (SFA), monounsaturated (MUFA), polyunsaturated (PUFA) fatty acids, as well as in PUFA/SFA and n-6/n-3 ratios among the groups. Keywords: chestnut tannins; lipid oxidation; fatty acids; meat quality; rabbits

M. D'Agata, G. Prezioso, C. Russo, A. Dalle Zotte, E. Mourvaki, G. Paci, Effect of an outdoor rearing system on the welfare, growth performance, carcass and meat quality of a slow-growing rabbit population, Meat Science, In Press, Accepted Manuscript, Available online 7 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4WY6K31-4/2/e90daef2f8d99408c067af5ef38d581c>)

Abstract:

The effect of Outdoor or Indoor housing systems on the growth, welfare and carcass and meat quality of a local rabbit population was investigated. The slaughter age was 103 \pm 2 days. Open field tests showed an effective capacity of the Outdoor group to combat stressors. Compared to Indoor rabbits, Outdoor rabbits showed better growth performance and higher slaughter weight (SW) (2535 vs 2137 g; $P < 0.01$). Outdoor housing conditions increased the physical activity of rabbits and their hind legs were more developed (36.1% vs 34.9%; $P < 0.01$). Slaughter yield was lower in Outdoor rabbits (57.8% vs 58.4% SW; $P < 0.05$) due to the higher skin proportion (17.2% vs 15.6% SW; $P < 0.05$). Outdoor rabbit meat showed lower L* value (L. lumborum: 55.6 vs 59.2 $P < 0.01$; B. femoris: 53.0 vs 55.5 $P < 0.01$) and cooking loss (L. lumborum: 15.9% vs 18.1%; $P < 0.05$). Outdoor rabbit hind leg meat was characterized by lower water (74.5% vs 75.1%; $P < 0.01$) and higher protein (22.9% vs 22.6%; $P < 0.01$) and fat (1.4% vs 1.1%; $P < 0.01$) contents; lipids were lower in SFA and higher in MUFA. Outdoor rearing seems to be a possible alternative housing system that allays the ethical concerns of modern consumers while also providing good meat quality.

Keywords: rabbit; outdoor rearing system; antioxidant enzymes; meat quality; fatty acid profile

J.A. Rodriguez-Sanchez, G. Ripoll, S. Calvo, L. Arino, M.A. Latorre, The effect of seasonality of the growing-finishing period on carcass, meat and fat characteristics of heavy barrows and gilts, Meat Science, In Press, Corrected Proof, Available online 6 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4WY1437-1/2/f4064b7afbcf2ab5246da5d8122d88bc>)

Abstract:

A trial was conducted to study the effect of gender (barrows; gilts) and seasonality of growing-finishing period (S, summer; W, winter) on the carcass and meat characteristics and fatty acid (FA)

profile of subcutaneous fat of pigs slaughtered at 131 kg of body weight. No significant gender x seasonality interaction was detected and the differences between genders were scarce. The S pigs had a 13.2% thinner fat depth over the Gluteus medius muscle and a higher yield of shoulders and loins by 10.6% and 10.0%, respectively than W pigs. Meat from S pigs had 32.5% lower intramuscular fat content and higher cooking losses (9.1%) and shear force (6.4%) than meat from W pigs. Subcutaneous fat from S pigs had a 7.8% higher percentage of saturated FA and 4.9% lower monounsaturated FA than that from W pigs. It is concluded that in Spanish natural-environment facilities, the seasonality of the growing-finishing period affects the carcass, and meat and fat quality of heavy pigs.

Keywords: Seasonality; Gender; Carcass; Meat; Fat; Heavy pigs

Gema Nieto Pedro Diaz Sancho Banon, Maria Dolores Garrido, Dietary administration of ewe diets with a distillate from Rosemary leaves (*Rosmarinus officinalis* L): influence on lamb meat quality, Meat Science, In Press, Accepted Manuscript, Available online 6 August 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.08.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4WXYRBP-1/2/cc67db5ed93b649fc67645571e1d59a5>)

Abstract:

The effect of including distilled rosemary leaf in the diet of pregnant ewes on subsequent lamb meat quality was studied. Thirty six Segurena ewes were randomly assigned to three homogeneous groups. One group was fed a basal diet (BD) as control while the diet of the other two groups was modified by substituting 10% (R1) and 20% (R2) of the BD with a pellet made from 50% barley and 50% of distilled rosemary leaves (DRL). Meat spoilage (TVC, PSY, MYC), TBARS, CIELab coordinates and the sensory characteristics contribution of fresh lamb meat packed in MAP (70% O₂:30% CO₂) were analyzed on days 0, 7, 14 and 21. In general, R1 and R2 had higher a* values, better scores for meat and fat colour (P<0.05) and lower TBARS and rancid odour (P<0.05), than the control samples. The total viable count was lower in meat DRL. No statistically significant differences were detected between the two treatments (10-20% DRL).

Keywords: Lamb meat; *Rosmarinus officinalis*; microbiology; colour; lipid oxidation; sensory

Marta S. Madruga, J. Stephen Elmore, Andrew T. Dodson, Donald S. Mottram, Volatile flavour profile of goat meat extracted by three widely used techniques, Food Chemistry, Volume 115, Issue 3, 1 August 2009, Pages 1081-1087, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.12.065.

(<http://www.sciencedirect.com/science/article/B6T6R-4V88FTP-N/2/cc58f35471a31b6f16cbc91dc9505ed5>)

Abstract:

Three procedures for the isolation of volatiles from grilled goat meat were compared: dynamic headspace entrainment on Tenax TA, simultaneous steam distillation-extraction, and solid-phase microextraction. Headspace entrainment on Tenax TA extracted the highest number of Maillard-derived volatile compounds. Two hundred and three volatile components were identified; 159 are reported for the first time in goat meat. Most of the volatiles detected (155) were lipid oxidation products, such as hydrocarbons, aldehydes, alcohols, ketones, carboxylic acids and esters. Forty-eight Maillard-derived compounds were identified, comprising pyrazines, pyrroles, thiophenes, furanthiol derivatives, alkyl and alicyclic sulphides, pyridines, and thiazoles. Some reported character impact compounds of cooked meat, e.g., 12-methyltridecanal, (E,E)-2,4-decadienal, methional, and dimethyl trisulphide were identified in the volatile profile of goat meat, together with a series of C₂ to C₅ alkylformylcyclopentenones, which have been reported in cooked chicken, pork, beef and lamb, as being important for the characteristic flavour impression of different animal species.

Keywords: Goat meat; Simultaneous steam distillation-extraction; Dynamic headspace concentration; Tenax TA; Solid-phase microextraction; Aroma

S. Ghovvati, M.R. Nassiri, S.Z. Mirhoseini, A. Heravi Moussavi, A. Javadmanesh, Fraud identification in industrial meat products by multiplex PCR assay, *Food Control*, Volume 20, Issue 8, August 2009, Pages 696-699, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.09.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4TGHN8W-1/2/b31cf9ece7ecf315baa5d56225db6f6f>)

Abstract:

The identification of animal species used in industrial meat products is very important in respect to economic considerations because European Union, which has implemented a set of very strict procedures to correctly label food. In this paper we present conserved region from mitochondrial 12S rRNA and 16S rRNA genes are powerful region for evaluate the presence of fraudulently added meat in compound food by multiplex polymerase chain reaction assay for the identification of most species (ruminant, poultry and porcine). For each food sources (ground meat, sausages and cold cut) 10 samples were collected and DNA extracted successfully. The results demonstrated that none of the samples were contaminated with porcine residuals, but 40% of sausages samples and 30% of cold cut samples were contaminated with poultry residuals. Also the ground meat samples were not contaminated with poultry residuals.

Keywords: Multiplex PCR; Species identification; Ground meat; Sausages; Cold cut

Helena Albano, Catarina Pinho, Daniela Leite, Joana Barbosa, Joana Silva, Luisa Carneiro, Rui Magalhaes, Tim Hogg, Paula Teixeira, Evaluation of a bacteriocin-producing strain of *Pediococcus acidilactici* as a biopreservative for 'Alheira', a fermented meat sausage, *Food Control*, Volume 20, Issue 8, August 2009, Pages 764-770, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.09.021.

(<http://www.sciencedirect.com/science/article/B6T6S-4TPHRM9-1/2/8ed7ae086111e82913723c058b7dce85>)

Abstract:

This study was conducted to evaluate the ability of *Pediococcus acidilactici* HA-6111-2, a PA-1 bacteriocin-producing lactic acid bacterium (LAB), isolated from 'Alheira' to inhibit a cocktail of *Listeria innocua* strains during production and shelf-life of these products. The bacteriocinogenic culture reduced the *Listeria* population below the detection limit (1.5log CFU/g) and had no effect on the growth of the natural LAB flora or on the pH. Pathogenic organisms were not detected in any sample. The presence of some virulence factors and antibiotic resistances of the strain to be used as a bioprotective culture were investigated. *P. acidilactici* HA-6111-2 did not produce any of the biogenic amines tested; no formation of biofilms was observed; more l(+)lactic acid was produced than its isomer d(-); no gelatinase, DNase or lipase activity was recorded; no structural genes for the haemolysin, enterococcal surface protein, hydrolytic compounds, aggregation protein and cell-wall adhesins were detected, no significant antibiotic resistances were found. *P. acidilactici* HA-6111-2 appears to have potential as a bioprotective culture during 'Alheira' fermentation. Moreover, a trained panel considered the protected product to be sensorially acceptable.

Keywords: Bioprotective culture; Bacteriocin; *Listeria*; Fermented sausages

Karen Silagyi, Shin-Hee Kim, Y. Martin Lo, Cheng-i Wei, Production of biofilm and quorum sensing by *Escherichia coli* O157:H7 and its transfer from contact surfaces to meat, poultry, ready-to-eat deli, and produce products, *Food Microbiology*, Volume 26, Issue 5, August 2009, Pages 514-519, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.03.004.

(<http://www.sciencedirect.com/science/article/B6WFP-4VVXSTV-1/2/df5816df9ec1adff8aa002ff34c6efd7>)

Abstract:

Multistate outbreaks of *Escherichia coli* O157:H7 infections through consumption of contaminated foods including produce products have brought a great safety concern. The objectives of this study were to determine the effect of biofilm and quorum sensing production on the attachment of *E. coli* O157:H7 on food contact surfaces and to evaluate the transfer of the pathogen from the food contact to various food products. *E. coli* O157:H7 produced maximum levels of AI-2 signals in 12 h of incubation in tested meat, poultry, and produce broths and subsequently formed strong biofilm in 24 h of incubation. In general, *E. coli* O157:H7 formed stronger biofilm on stainless steel than glass. Furthermore, *E. coli* O157:H7 that had attached on the surface of stainless steel was able to transfer to meat, poultry, ready-to-eat deli, and produce products. Strong attachment of the transferred pathogen on produce products (cantaloupe, lettuce, carrot, and spinach) was detected (>103 CFU/cm²) even after washing these products with water. Our findings suggest that biofilm formation by *E. coli* O157:H7 on food contact surfaces can be a concern for efficient control of the pathogen particularly in produce products that require no heating or cooking prior to consumption. Keywords: *E. coli* O157:H7; Biofilm; Quorum sensing; Produce products

J. Barbosa, V. Ferreira, P. Teixeira, Antibiotic susceptibility of enterococci isolated from traditional fermented meat products, *Food Microbiology*, Volume 26, Issue 5, August 2009, Pages 527-532, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.03.005.

(<http://www.sciencedirect.com/science/article/B6WFP-4VWB179-1/2/69864473e21d13475353d483bcb624ed>)

Abstract:

Antibiotic susceptibility was evaluated for 182 *Enterococcus* spp. isolated from Alheira, Chourica de Vinhais and Salpicao de Vinhais, fermented meat products produced in the North of Portugal. Previously, a choice was made from a group of 1060 isolates, using phenotypic and genotypic tests. From these, 76 were previously identified as *Enterococcus faecalis*, 44 as *Enterococcus faecium*, one as *Enterococcus casseliflavus* and 61 as *Enterococcus* spp. In order to encompass several of the known chemical and functional classes of antibiotics, resistance to ampicillin, penicillin G, ciprofloxacin, chloramphenicol, erythromycin, nitrofurantoin, rifampicin, tetracycline and vancomycin was evaluated. All the isolates were sensitive to antibiotics of clinical importance, such as penicillins and vancomycin. Some differences in Minimal Inhibitory Concentrations (MICs) of antibiotics, could be associated with the enterococcal species.

Keywords: Alheira; Salpicao de Vinhais; Chourica de Vinhais; Fermented meat products; Enterococci; Antibiotic susceptibility

M.A. Ayadi, A. Kechaou, I. Makni, H. Attia, Influence of carrageenan addition on turkey meat sausages properties, *Journal of Food Engineering*, Volume 93, Issue 3, August 2009, Pages 278-283, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.01.033.

(<http://www.sciencedirect.com/science/article/B6T8J-4VJ4WGS-4/2/1be955861d7cd49a86065d2f535e90a3>)

Abstract:

Influence of carrageenan addition on the properties of turkey meat sausages was studied. The results obtained show that carrageenan causes a decrease in emulsion stability, and an increase in water holding capacity, hardness and cohesiveness of the formulated sausage samples. Carrageenan addition at low levels (0.2% and 0.5%) increases gel elasticity. However, a higher carrageenan concentration causes a reduction in sausages elasticity. Microstructure observation shows that increasing carrageenan levels in sausage formulation leads to a progressive appearance of an additional carrageenan gel network. Sensorial analysis shows that carrageenan presence has no significant effect on sausages taste. However, it improves sausage appearance and texture.

Keywords: Mechanically separated turkey meat; Sausages; Carrageenan; Meat emulsion and gelling properties

L. Braeckman, F. Ronsse, P. Cueva Hidalgo, J. Pieters, Influence of combined IR-grilling and hot air cooking conditions on moisture and fat content, texture and colour attributes of meat patties, *Journal of Food Engineering*, Volume 93, Issue 4, August 2009, Pages 437-443, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.02.009.

(<http://www.sciencedirect.com/science/article/B6T8J-4VNH3K3-4/2/b66292fbab0115cf0991847c9351e8ff>)

Abstract:

The influence of different IR-grilling/hot air cooking conditions on moisture and fat content and on texture and colour attributes of meat patties (hamburgers) was studied. A custom-built lab-scale grill and oven were used to study the effects of grilling time (0 [less-than-or-equals, slant] tgrill [less-than-or-equals, slant] 150 s), air temperature (100 [less-than-or-equals, slant] Tair [less-than-or-equals, slant] 175 [degree sign]C) and air velocity (3.8 [less-than-or-equals, slant] vair [less-than-or-equals, slant] 7.5 m/s) on meat patty moisture loss, fat loss, total weight loss, texture and colour. The cooking time was defined as the time required until the hamburger reached a core temperature of 72 [degree sign]C. Clear relationships between the intensity of thermal processing and the weight and moisture loss rates, colour and texture were found. No significant effect of thermal processing conditions on fat losses were found. However, it was also observed that intensifying thermal processing (i.e., higher air velocity, higher air temperature) led to shorter cooking times to attain a core temperature of 72 [degree sign]C, resulting in less significant differences in moisture and total weight loss of the processed meat patties.

Keywords: Hamburger; Heat and mass transfer; Cooking; Grilling; Texture; Colour

M.P. Serrano, D.G. Valencia, A. Fuentetaja, R. Lazaro, G.G. Mateos, Effect of castration on productive performance, carcass characteristics and meat quality of Iberian pig females reared under intensive management systems, *Livestock Science*, Volume 123, Issues 2-3, August 2009, Pages 147-153, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.11.001.

(<http://www.sciencedirect.com/science/article/B7XNX-4VC150Y-1/2/971875566c73839a0e1a507daaa68c4b>)

Abstract:

Sixty crossbred (Iberian dam x Duroc sire) females, 80 days of age (17.6 +/- 0.13 kg body weight, BW), was used to investigate the effect of castration on productive performance, carcass and meat quality and fatty acid profile of backfat (BF). There were 2 treatments (intact females, IF; castrated females, CF) and 5 replicates of 6 pigs per treatment. Pigs were reared indoor under an intensive production system, ovariectomized at 92 days of age (26.1 +/- 0.19 kg BW) and slaughtered at 267 days of age (143.6 +/- 6.49 kg BW). Meat samples were taken at longissimus dorsi muscle at the level of the last rib and BF samples were taken at the tail insertion. For the entire experiment (18 to 144 kg BW), IF ate less feed and were more efficient than CF (P < 0.05). Also, IF had less carcass yield (P < 0.01) and fat thickness at the gluteus medius muscle (P < 0.05) and tended to have lower backfat depth (P < 0.10) than CF. However, IF had higher shoulder yield at 2 and at 24 h post mortem (P < 0.05) and after trimmed (P < 0.10) than CF. The pH₂₄ of the semimembranosus muscle tended to be lower for IF than for CF. Also, IF had more moisture (710 vs. 691 g/kg) and less fat (66.4 vs. 91.2 g/kg) in the longissimus dorsi muscle than CF (P < 0.05). Meat from IF was more lightness (higher L* value; P < 0.01), redder (higher a* value; P < 0.001) and had more intensive color (higher c* value; P < 0.001) than meat from CF. Backfat was more saturated in CF than in IF (P < 0.05), mostly because of the higher palmitic acid (P < 0.05) and the lower linolenic acid (P < 0.05) content. We conclude that intact females have better productive performance and shoulder yield but less carcass yield than castrated females and that castration does not improve meat quality. Therefore, when animal welfare, cost of castration, productive performance and carcass and meat quality traits are considered, the use of intact females rather

than castrated females is recommended for the production of Iberian pigs reared under intensive management systems.

Keywords: Iberian pigs; Intact females; Castrated females; Productive performance; Carcass and meat quality; Fatty acid profile

Nurinisa Esenbuga, Muhlis Macit, Mevlut Karaoglu, Vecihi Aksakal, Muhammet Irfan Aksu, Mehmet Akif Yoruk, Mehmet Gul, Effect of breed on fattening performance, slaughter and meat quality characteristics of Awassi and Morkaraman lambs, *Livestock Science*, Volume 123, Issues 2-3, August 2009, Pages 255-260, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.11.014.

(<http://www.sciencedirect.com/science/article/B7XNX-4V69JKH-3/2/46721de28d74f21e2c524ada41b24483>)

Abstract:

The influence of breed on fattening performance, slaughter and meat quality traits was studied in Awassi and Morkaraman male lambs at approximately 8 months of age. All of the groups were fed a diet consisting of concentrate mixture offered ad libitum, and 300 g of grass hay per lamb per day during 60-day fattening period. Initial live weight, final live weight, daily weight gain and feed conversion efficiency (concentrate and hay consumption for 1 kg of live weight gain) were 39.63 kg, 55.08 kg, 0.258 kg and 6.37 for Awassi; 40.54 kg, 55.58 kg, 0.234 kg and 6.77 for Morkaraman, respectively. The effect of breed on fattening performance and slaughter traits except for LD area was not significant. In addition, meat colour parameters (L^* = lightness, a^* = redness, b^* = yellowness, H = hue angle and C = chroma), pH values, drip loss and sensory attributes were not affected by breed in present study. A significant muscle effect was observed for instrumental measurements of some meat quality characteristics as meat colour parameters (L^* , a^* and C), collagen, drip loss, pH, moisture and protein content, WBS, and for some sensory attributes (tenderness, juiciness, acceptability and number of chewing). Results of this study indicate that fattening performance, slaughter and meat quality traits were similar between Awassi and Morkaraman male lambs.

Keywords: Awassi; Morkaraman; Fattening performance; Slaughter; Meat quality traits

G. Clemente, J. Bon, J. Benedito, A. Mulet, Desorption isotherms and isosteric heat of desorption of previously frozen raw pork meat, *Meat Science*, Volume 82, Issue 4, August 2009, Pages 413-418, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4VWB1F4-1/2/9843a74a073723c12b7b297bb0ed2052>)

Abstract:

Some meat products involve drying previously frozen pork meat, which makes the knowledge of sorption characteristics very important for the design and management of meat dehydration processes. The sorption isotherms of raw pork meat from the Biceps femoris and Semimembranosus muscles were determined at four temperatures: 25, 30, 35 and 40 [degree sign]C. The experimental results were modelled using the GAB (Guggenheim, Anderson and De Boer) model. The effect of temperature was also taken into account to model the experimental sorption isotherms using four models (GAB, Oswin, Halsey and Henderson). The best results were provided by the GAB model. From the experimental sorption isotherms the isosteric heats of sorption were determined. For a moisture content higher than 0.15 kg water/kg dm, the isosteric heat of meat was similar to the latent heat of vaporization for pure water. For a lower moisture content, an increase in the isosteric heat was observed when the moisture content decreased.

Keywords: Biceps femoris; Semimembranosus; Isotherms; Modelling; Isosteric heat

L.U. Karumendu, R. van de Ven, M.J. Kerr, M. Lanza, D.L. Hopkins, Particle size analysis of lamb meat: Effect of homogenization speed, comparison with myofibrillar fragmentation index and its

relationship with shear force, Meat Science, Volume 82, Issue 4, August 2009, Pages 425-431, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4VPV5MP-2/2/d3975d32d963f372ae61d62c4bebf2f4>)

Abstract:

The impact of homogenization speed on Particle Size (PS) results was examined using samples from the M. longissimus thoracis et lumborum (LL) of 40 lambs. One gram duplicate samples from meat aged for 1 and 5 days were homogenized at five different speeds; 11,000, 13,000, 16,000, 19,000 and 22,000 rpm. In addition to this LL samples from 30 different lamb carcasses also aged for 1 and 5 days were used to study the comparison between PS and myofibrillar fragmentation index (MFI) values. In this case, 1 g duplicate samples (n = 30) were homogenized at 16,000 rpm and the other half (0.5 g samples) at 11,000 rpm (n = 30). The homogenates were then subjected to respective combinations of treatments which included either PS analysis or the determination of MFI, both with or without three cycles of centrifugation. All 140 samples of LL included 65 g blocks for subsequent shear force (SF) testing. Homogenization at 16,000 rpm provided the greatest ability to detect ageing differences for particle size between samples aged for 1 and 5 days. Particle size at the 25% quantile provided the best result for detecting differences due to ageing. It was observed that as ageing increased the mean PS decreased and was significantly ($P < 0.001$) less for 5 days aged samples compared to 1 day aged samples, while MFI values significantly increased ($P < 0.001$) as ageing period increased. When comparing the PS and MFI methods it became apparent that, as opposed to the MFI method, there was a greater coefficient of variation for the PS method which warranted a quality assurance system. Given this requirement and examination of the mean, standard deviation and the 25% quantile for PS data it was concluded that three cycles of centrifugation were not necessary and this also applied to the MFI method. There were significant correlations ($P < 0.001$) within the same lamb loin sample aged for a given period between mean MFI and mean PS (-0.53), mean MFI and mean SF (-0.38) and mean PS and mean SF (0.23). It was concluded that PS analysis offers significant potential for streamlining determination of myofibrillar degradation when samples are measured after homogenization at 16,000 rpm with no centrifugation.

Keywords: Lamb; Homogenization speed; Ageing; Particle size analysis; Myofibrillar fragmentation index; Shear force

Fatima Paiva-Martins, Susana Barbosa, Vitor Pinheiro, Jose Luis Mourao, Divanildo Outor-Monteiro, The effect of olive leaves supplementation on the feed digestibility, growth performances of pigs and quality of pork meat, Meat Science, Volume 82, Issue 4, August 2009, Pages 438-443, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4VPV5MP-4/2/cb295e1d48803946e0de093027a72b77>)

Abstract:

The influence of olive leaves supplementation on feed digestibility, growth performance of pigs and pork meat quality was investigated. Pigs fed diets with olive leaves at 5% (OL5) and 10% (OL10) levels had lower daily weight gain (DG) and daily feed intake (DFI) than pigs fed a conventional diet (OL0) but differences were not observed between groups fed with the different quantities of leaves. Additionally, pigs fed diets with leaves had the worst feed:gain ratio and showed a decrease in overall backfat. Chops from pigs fed the leaf diets had lower peroxide (PV) and conjugated diene (CD) contents than chops from pigs fed conventional diets. Moreover, chops from pigs fed with the higher quantity of leaves also showed a lower drip loss. After a storage period of 8 days at 4 [degree sign]C, meat obtained from both OL5 and OL10 animals also differed ($P < 0.05$) in PV and %CD values from those fed a conventional diet. Since the fatty acid composition of the longissimus muscles was not different, differences in oxidative stability could

only be explained by the significantly higher [alpha]-tocopherol concentration in intramuscular fat and backfat in pigs fed with olive leaf diets.

Keywords: Olive leaves; Pig performances; Pork meat; Oxidative stability; Oleuropein; Tocopherol

Z. Kesmen, A. Gulluce, F. Sahin, H. Yetim, Identification of meat species by TaqMan-based real-time PCR assay, *Meat Science*, Volume 82, Issue 4, August 2009, Pages 444-449, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4VWB1F4-2/2/5767426f1fe5a540ff95e025f8b37ca6>)

Abstract:

In this study, a convenient, sensitive and specific real-time PCR assay was described for the species identification and their quantification in raw and cooked meat products. Specific primers and TaqMan probes were designed on the mitochondrial ND2, ND5 and ATP 6-8 genes for donkey, pork and horse, respectively, and the performance of the method was tested. In the results, no cross-reaction was observed between the donkey and pork species specific primer-probe systems and non-target species (bovine, ovine, chicken and turkey). Only one cross reaction was observed between the horse species specific primer-probe set and 100 ng pork DNA at the ct 33.01 level (corresponding to 0.01 ng horse DNA). The real-time quantitative assay used in this study allowed the detection of as little as 0.0001 ng template DNA from pure meat for each species investigated and experimental meat mixtures. In conclusion, it can be suggested that the TaqMan probe assay used in this research might be a rapid and sensitive method for the routine meat species identifications studies in raw or cooked meat products.

Keywords: Meat species identification; Real-time PCR; TaqMan probe; Horse; Donkey; Pork

Bettit K. Salva, Jose M. Zumalacarregui, Ana C. Figueira, Maria T. Osorio, Javier Mateo, Nutrient composition and technological quality of meat from alpacas reared in Peru, *Meat Science*, Volume 82, Issue 4, August 2009, Pages 450-455, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4VR24C3-1/2/25f73207efd25e6535e6d1ec372dff9>)

Abstract:

The aim of this study was to increase the knowledge on alpaca meat quality characteristics. Twenty Huacaya breed alpacas, reared under a traditional unspecialized production system at the Andean region of Peru, were slaughtered at ages between 18 and 24 months. Analyses were carried out on Longissimus thoracis and lumborum muscle (LTLM), unless otherwise specified. These included composition parameters: moisture, fat, protein, ash, minerals, amino acids, fatty acid profile (of both LTLM and perirenal fat), retinol and tocopherol concentrations and myoglobin and collagen contents. Other meat quality parameters were evaluated: pH, colour, water holding capacity and Warner-Bratzler shear-force. Alpaca LTLM was characterized by a low intramuscular fat content and mineral and amino acid compositions, polyunsaturated to saturated fatty acids ratio and conjugated linoleic acid content comparable to those found for beef and sheep meat. However, specifically, alpaca meat showed a relatively high n-6 to n-3 (3.7) ratio and low vitamin E concentration. Values of alpaca meat technological quality parameters were in the ranges reported for more conventional red meats, the exception being a lower b* value.

Keywords: Meat quality; South American camelids; Lama pacos

P. Polidori, C. Cavallucci, D. Beghelli, S. Vincenzetti, Physical and chemical characteristics of donkey meat from Martina Franca breed, *Meat Science*, Volume 82, Issue 4, August 2009, Pages 469-471, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.03.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4VWB1F4-3/2/488435a5ba658f9404f3dca410f85585>)

Abstract:

The rheological and chemical characteristics of meat obtained from 12 Martina Franca donkey males, slaughtered at 14 months of age and a mean final body weight of 169 kg were determined. Meat samples were taken four days post mortem from muscles Longissimus thoracis et lumborum and Biceps femoris, colorimetric parameters were measured to determine L* (lightness), a* (redness), b* (yellowness) and chroma. The Longissimus was significantly lighter ($P < 0.05$) compared to the Biceps femoris, with L* indexes of 35.86 and 31.34, respectively. Fatty acid composition of the intramuscular fat showed a high content of polyunsaturated fatty acids (PUFAs) in both muscles, respectively 25.16 g/100 g total fatty acids in the Longissimus and 24.97 g/100 g total fatty acids in the Biceps femoris; oleic acid and palmitic acid were the two most abundant fatty acids in both muscles. The percentages of essential amino acids were higher in both muscles compared with the total amino acid content, respectively 52.88% in the Longissimus, and 51.26% in the Biceps femoris. The high level of unsaturation of the intramuscular fat resulted in a high ratio of unsaturated to saturated fat, and the total amount of essential amino acids, exceeding 50% of the total amino acids showed that donkey meat from a health point of view is a good alternative to traditional red meats.

Keywords: Donkey; Meat colour; Fatty acids; Amino acids

M. Uyttendaele, P. Busschaert, A. Valero, A.H. Geeraerd, A. Vermeulen, L. Jacxsens, K.K. Goh, A. De Loy, J.F. Van Impe, F. Devlieghere, Prevalence and challenge tests of *Listeria monocytogenes* in Belgian produced and retailed mayonnaise-based deli-salads, cooked meat products and smoked fish between 2005 and 2007, *International Journal of Food Microbiology*, Volume 133, Issues 1-2, 31 July 2009, Pages 94-104, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.05.002.

(<http://www.sciencedirect.com/science/article/B6T7K-4W7YXN1-3/2/7a71e9ac26dd4bf31dfdf3735aebdde>)

Abstract:

Processed ready-to-eat (RTE) foods with a prolonged shelf-life under refrigeration are at risk products for listeriosis. This manuscript provides an overview of prevalence data ($n = 1974$) and challenge tests ($n = 299$) related to *Listeria monocytogenes* for three categories of RTE food i) mayonnaise-based deli-salads (1187 presence/absence tests and 182 challenge tests), ii) cooked meat products (639 presence/absence tests and 92 challenge tests), and iii) smoked fish (90 presence/absence tests and 25 challenge tests), based on data records obtained from various food business operators in Belgium in the frame of the validation and verification of their HACCP plans over the period 2005-2007. Overall, the prevalence of *L. monocytogenes* in these RTE foods in the present study was lower compared to former studies in Belgium. For mayonnaise-based deli-salads, in 80 out of 1187 samples (6.7%) the pathogen was detected in 25 g. *L. monocytogenes* positive samples were often associated with smoked fish deli-salads. Cooked meat products showed a 1.1% ($n = 639$) prevalence of the pathogen. For both food categories, numbers per gram never exceeded 100 CFU. *L. monocytogenes* was detected in 27.8% (25/90) smoked fish samples, while 4/25 positive samples failed to comply to the 100 CFU/g limit set out in EU Regulation 2073/2005. Challenge testing showed growth potential in 18/182 (9.9%) deli-salads and 61/92 (66%) cooked meat products. Nevertheless, both for deli-salads and cooked meat products, appropriate product formulation and storage conditions based upon hurdle technology could guarantee no growth of *L. monocytogenes* throughout the shelf-life as specified by the food business operator. Challenge testing of smoked fish showed growth of *L. monocytogenes* in 12/25 samples stored for 3-4 weeks at 4 [degree sign]C. Of 45 (non-inoculated) smoked fish samples (13 of which were initially positive in 25 g) which were subjected to shelf-life testing, numbers exceeded 100 CFU/g in only one sample after storage until the end of shelf-life. Predictive models, dedicated to and validated for a particular food category, taking into account the inhibitory effect of various factors in hurdle technology, provided predictions of growth potential of *L. monocytogenes* corresponding to observed growth in challenge testing. Based on the combined prevalence data

and growth potential, mayonnaise-based deli-salads and cooked meat products can be classified as intermediate risk foods, smoked fish as a high risk food.

Keywords: *Listeria monocytogenes*; Prevalence; Challenge testing; Cooked meat; Deli-salads; Smoked fish

Dereje T. Asefa, Trond Moretro, Ragnhild O. Gjerde, Solveig Langsrud, Cathrine F. Kure, Maan S. Sidhu, Truls Nesbakken, Ida Skaar, Yeast diversity and dynamics in the production processes of Norwegian dry-cured meat products, *International Journal of Food Microbiology*, Volume 133, Issues 1-2, 31 July 2009, Pages 135-140, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.05.011.

(<http://www.sciencedirect.com/science/article/B6T7K-4W99VTK-3/2/85c21cc08843f731704aa731891dda0c>)

Abstract:

This study investigate the diversity and dynamics of yeasts in the production processes of one unsmoked and two smoked dry-cured meat products of a Norwegian dry-cured meat production facility. A longitudinal observational study was performed to collect 642 samples from the meat, production materials, room installations and indoor and outdoor air of the production facility. Nutrient rich agar media were used to isolate the yeasts. Morphologically different isolates were re-cultivated in their pure culture forms. Both classical and molecular methods were employed for species identification. Totally, 401 yeast isolates belonging to 10 species of the following six genera were identified: *Debaryomyces*, *Candida*, *Rhodotorula*, *Rhodospodium*, *Cryptococcus* and *Sporidiobolus*. *Debaryomyces hansenii* and *Candida zeylanoides* were dominant and contributed by 63.0% and 26.4% respectively to the total isolates recovered from both smoked and unsmoked products. The yeast diversity was higher at the pre-salting production processes with *C. zeylanoides* being the dominant. Later at the post-salting stages, *D. hansenii* occurred frequently. Laboratory studies showed that *D. hansenii* was more tolerant to sodium chloride and nitrite than *C. zeylanoides*. Smoking seems to have a killing or a temporary growth inhibiting effect on yeasts that extend to the start of the drying process. Yeasts were isolated only from 31.1% of the environmental samples. They belonged to six different species of which five of them were isolated from the meat samples too. *Debaryomyces hansenii* and *Rhodotorula glutinis* were dominant with a 62.6% and 22.0% contribution respectively. As none of the air samples contained *D. hansenii*, the production materials and room installations used in the production processes were believed to be the sources of contamination. The dominance of *D. hansenii* late in the production process replacing *C. zeylanoides* should be considered as a positive change both for the quality and safety of the products, as *C. zeylanoides* has been documented as an emerging pathogen.

Keywords: Dry-cured meat products; Dry-cured meat production processes; Yeasts

L. Frylinck, G.L. Van Wyk, T.P.L. Smith, P.E. Strydom, E van Marle- Koster, E.C. Webb, M. Koohmaraie, M.F. Smith, Evaluation of biochemical parameters and genetic markers for association with meat tenderness in South African feedlot cattle, *Meat Science*, In Press, Accepted Manuscript, Available online 30 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4WWG396-2/2/bb7bbbeb8066480e8262f52d2657e8c6>)

Abstract:

A large proportion of South African feedlot cattle are crossbreds of Brahman (BrX, *Bos indicus*), and Simmental (SiX, *Bos taurus*). A sample of 20 grain fed bulls from each of these crossbreds was used to compare meat quality with that of the small frame indigenous Nguni (NgX, Sanga) by evaluating a variety of biochemical and genetic parameters previously shown to be associated with meat tenderness. Shear force values were generally high (5.6 kg average at 14 d post mortem), with SiX animals higher than BrX or NgX ($P = 0.051$) despite higher calpastatin:calpain ratio in BrX ($P < 0.05$). Calpain activity and cold shortening were both correlated with tenderness for all

classes. The sample size was too small to accurately estimate genotypic effects of previously published markers in the CAST and CAPN1 genes, but the allele frequencies suggest that only modest progress would be possible in these South African crossbreds using these markers.

Keywords: Beef crossbreds; tenderness; calpain proteolytic system; genetic markers; cold shortening/toughening

Tim Brown, R. Ian Richardson, Carol-Ann Wilkin, Judith A. Evans, Vascular perfusion chilling of red meat carcasses - A feasibility study, *Meat Science*, In Press, Corrected Proof, Available online 30 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4WWG396-1/2/59a4d4a9eb5b31d5e3b1bdc88ef7d201>)

Abstract:

Meat carcasses must be chilled to below 7 [degree sign]C before leaving the slaughterhouse. Typically this is done by passing cold air over the surfaces of eviscerated and de-hided carcasses. This surface cooling can take many hours to reduce centre temperatures to below 7 [degree sign]C. In vascular perfusion chilling (VPC), a cold fluid is circulated through the intact vascular system, offering significant reductions in cooling time.

This paper describes a small feasibility study to evaluate vascular perfusion techniques for rapid chilling of lamb carcasses using a proprietary Flo-ice(TM) system. This produces pumpable ice slurries containing very fine ice particles, suitable for circulating through vascular systems.

VPC was found to be capable of rapid initial reduction of carcass temperatures in comparison with air chilling (mean times to 20 [degree sign]C in deep legs were reduced from 2.6 to 1.3 h, which was significantly different at $P < 0.05$). In all cases however, uptake of perfusate into the carcasses occurred. This limited the duration of the perfusion treatment and as a result restricted the period of enhanced cooling. Samples from carcasses treated with VPC were lighter ($P < 0.05$, with mean measured L value increasing from 43.4 to 46.8) and more yellow ($P < 0.05$, with mean measured b value increasing from 6.7 to 7.9) than samples from conventionally chilled carcasses, and had lower shear force values when cooked ($P < 0.05$, with mean force reducing from 10.0 to 6.8 kg). This was most probably due to the added water in the meat. Microbial quality of the meat was not significantly affected by the perfusion treatments.

Keywords: Carcass chilling; Vascular perfusion; Cooling rates; Texture; Colour; Microbiology

Ph. Gatellier, V. Sante-Lhoutellier, S. Portanguen, A. Kondjoyan, Use of meat fluorescence emission as a marker of oxidation promoted by cooking, *Meat Science*, In Press, Corrected Proof, Available online 29 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4WW9KWW-1/2/8225e41ddc7217fc22a5b6bd3e82a762>)

Abstract:

Accumulation of fluorescent pigments in cooked bovine meat (*M. Longissimus thoracis*) was studied in relationship with the heating parameters (time and temperature). Muscles were aged at 4 [degree sign]C for 11 days under vacuum before cooking. Meat cooking was performed by applying jets of steam. Three different heating treatments were tested: two with constant surface temperatures of 65 and 96 [degree sign]C for 300 s, and one with a continuously increasing surface temperature up to 207 [degree sign]C. After extraction in water/dichloromethane/ethanol, fluorescence pigments were distributed between the apolar phase (emission 420-440 nm after excitation at 360 nm) and the polar phase, where two emission peaks were seen (emission 410-430 and 515 nm after excitation at 360 nm). Fluorescence in the two phases was little affected by heating at the two constant temperatures while it increased exponentially after 1 min of treatment, as the varying temperature reached 141 [degree sign]C. The maximum fluorescence increases, measured in the extreme conditions of cooking (207 [degree sign]C/300 s), were of 5000% in the apolar phase and 1700% in the polar phase. Thiobarbituric acid reactive substances (TBARS) and

protein carbonyls were measured in parallel. The correlations between these two parameters and the fluorescence emission demonstrated that the interaction between proteins and aldehyde products of lipid peroxidation was mainly involved in the production of fluorescent pigments in cooked meat.

Keywords: Cooked meat; Fluorescent pigments; Schiff bases; Maillard products; Carbonyls; TBARS

Shiowshuh Sheen, Cheng-An Hwang, Mathematical modeling the cross-contamination of *Escherichia coli* O157:H7 on the surface of ready-to-eat meat product while slicing, *Food Microbiology*, In Press, Corrected Proof, Available online 24 July 2009, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.07.016.

(<http://www.sciencedirect.com/science/article/B6WFP-4WV77VJ-2/2/8c416ec11474c3569f6b81bda78340da>)

Abstract:

Microbial cross-contamination either at home or production site is one of the major factors of causing contamination of foods and leading to the foodborne illness. The knowledge regarding *Escherichia coli* O157:H7 surface transfer on ready-to-eat (RTE) deli meat and the slicer used for slicing different RTE products are needed to ensure RTE food safety. The objectives of this study were to investigate and to model the surface cross-contamination of *E. coli* O157:H7 during slicing operation. A five-strain cocktail of *E. coli* O157:H7 was inoculated directly onto a slicer's round blade rim area at an initial level of ca. 4, 5, 6, 7 or 8 log CFU/blade (ca. 3, 4, 5, 6 or 7 log CFU/cm² of the blade edge area), and then the RTE deli meat (ham) was sliced to a thickness of 1-2 mm. For another cross-contamination scenario, a clean blade was initially used to slice ham which was pre-surface-inoculated with *E. coli* O157:H7 (ca. 4, 5, 6, 7 or 8 log CFU/100 cm² area), then, followed by slicing un-inoculated ham. Results showed that the developed empirical models were reasonably accurate in describing the transfer trend/pattern of *E. coli* O157:H7 between the blade and ham slices when the total inoculum level was ≥ 5 log CFU on the ham or blade. With an initial inoculum level at ≤ 4 log CFU, the experimental data showed a rather random microbial surface transfer pattern. The models, i.e., a power equation for direct-blade-surface-inoculation, and an exponential equation for ham-surface-inoculation are microbial load and sequential slice index dependent. The surface cross-contamination prediction of *E. coli* O157:H7 for sliced deli meat (ham) using the developed models were demonstrated. The empirical models may provide a useful tool in developing the RTE meat risk assessment.

Keywords: *E. coli* O157:H7; Surface cross-contamination; Modeling; Slicing

Zouhaier Ben Belgacem, Hikmate Abriouel, Nabil Ben Omar, Rosario Lucas, Magdalena Martinez-Canamero, Antonio Galvez, Mohamed Manai, Antimicrobial activity, safety aspects, and some technological properties of bacteriocinogenic *Enterococcus faecium* from artisanal Tunisian fermented meat, *Food Control*, In Press, Corrected Proof, Available online 18 July 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.07.007.

(<http://www.sciencedirect.com/science/article/B6T6S-4WSY49M-4/2/3705fb5330081f6521f0fa9424ab7438>)

Abstract:

In an ecological study, a collection of Gram-positive bacteria were isolated from Gueddid, an artisanal Tunisian fermented meat. From these, 24 strains showed antimicrobial activity and identified as *Enterococcus faecium* using molecular methods. The enterococci strains were further investigated regarding their safety aspects and functional properties. All the isolates produce bacteriocins with inhibitory activity against several food spoilage bacteria and food borne pathogens, including *Listeria* spp. *Enterococcus* spp. and *Staphylococcus aureus*. One isolate was active against *Escherichia coli* CECT 877. The majority of the isolates tested positive upon PCR amplification of structural genes for enterocins A, B and P. Investigation of virulence factors by

PCR amplification revealed the presence of genes encoding for gelatinase (gelE), enterococcal antigen (efaAfm), sex pheromone (cpd and ccf) and expression of cytolysin (the haemolytic component cylB) whereas, other presumed virulence genes encoding for (agg, esp, cylM, cylA, and cob) were not detected. The isolates were mostly resistant to erythromycin, rifampicin, ciprofloxacin, levofloxacin, and nitrofurantoin. All of them showed sensitivity to several antibiotics (ampicillin, penicillin, vancomycin, chloramphenicol, teicoplanin, gentamicin, streptomycin, and quinupristin/dalfopristin). Tyrosine, lysine, ornithine and histidine were not decarboxylated by any enterococcal isolate. Nine of the antagonistic enterococci tested did not show any virulence traits or produced biogenic amines, and still had important technological properties. The safety aspects of these selected strains should be studied in deeper details in order to evaluate their potential for biotechnological applications.

Keywords: Enterococcus faecium; Enterocins; Virulence factors; Antibiotic resistance; Biogenic amines; Food safety; Fermented meat

G.C. Miranda-de la Lama, M. Villarroel, J.L. Olleta, S. Alierta, C. Sanudo, G.A. Maria, Effect of the pre-slaughter logistic chain on meat quality of lambs, Meat Science, In Press, Corrected Proof, Available online 18 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4WSY4HY-1/2/09bbcb29e35bb13ef6b0ec6baaaeb867>)

Abstract:

A total of 144 lambs were sampled in a 3 x 2 x 2 factorial design, testing three residence (stay) times at a pre-slaughter classification centre (0, 7, and 28 days) and two seasons (summer and winter), with two replicates in each season. Meat from the longissimus dorsi was analysed in terms of pH, WHC, texture, colour ($L^*a^*b^*$, chroma and hue) and carcass bruising. Stay time had a significant effect ($p < 0.001$) on meat texture, while season had a significant effect ($p < 0.001$) on all variables analysed. Overall, stay time had less effect on meat quality than season and the interaction between treatments was not significant. Meat from lambs slaughtered in winter had some dark-cutting characteristics, with darker colour, higher ultimate pH, tougher meat and lower press juice. In conclusion, pre-slaughter classification and season are sources of stress for lambs and affect meat quality traits.

Keywords: Pre-slaughter logistic chain; Season; Meat quality; Welfare; Lambs

G. Maiorano, A. Ciarlariello, D. Cianciullo, S. Roychoudhury, A. Manchisi, Effect of suckling management on productive performance, carcass traits and meat quality of Comisana lambs, Meat Science, In Press, Corrected Proof, Available online 17 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4WSRF7M-1/2/183de7eec285223c631353f95c818b0e>)

Abstract:

The effect of restricted suckling on productive performance, carcass traits, meat quality and skeletal development of growing lambs was studied. Twenty-one naturally suckled male Comisana lambs were divided into three equal weight groups differing in suckling management systems: (1) only maternal milk (C); (2) only maternal milk until 15th day of age, and then, till slaughter, maternal milk, concentrate and Lucerne hay ad libitum (T1); (3) only maternal milk until 15th day of age, and then from 16th to 30th days of age, maternal milk, concentrate and Lucerne hay ad libitum, and, from 31st day of age till slaughter, only concentrate and Lucerne hay ad libitum (T2). The total mean milk yield was 22.7 and 41.6 kg per ewe for T1 and T2, respectively. Restricted suckling did not significantly affect slaughter weight, hot and cold carcass weights, carcass shrink losses, pH, colour and area of Longissimus muscle, pelvic limb, or bone characteristics. Suckling management system significantly affected ADG, milk intake, dressing percentage, and percentages of intestine, stomach, offal, kidney fat, shoulder, lean and fat, and there were

differences in total collagen, and hydroxylysylpyridinoline crosslink concentrations. In addition, different IMC maturity among the muscles was apparent.

Keywords: Lamb; Suckling management; Growth; Meat quality; Intramuscular collagen; Bone

W.Q. Sun, G.H. Zhou, X.L. Xu, Z.Q. Peng, Studies on the structure and oxidation properties of extracted cooked cured meat pigment by four spectra, *Food Chemistry*, Volume 115, Issue 2, 15 July 2009, Pages 596-601, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.12.060.

(<http://www.sciencedirect.com/science/article/B6T6R-4V7MSVB-4/2/f981551a1e66477c24674a8f467a5186>)

Abstract:

The structure and oxidation properties of cooked cured meat pigment (CCMP) were investigated by comparing the change in spectra of CCMP before and after oxidation. CCMP was extracted using petroleum ether/acetone/ethyl acetate step by step from precooked cured beef. The extracted sample was oxidised by being exposed to air with normal lighting or adding 1.5 ppm H₂O₂, respectively. The structure of CCMP was identified as a pentacoordinate mononitrosylheme complex by electron paramagnetic resonance (EPR), HPLC/ESI-HR-MS, Raman and FT-IR spectra. The changed EPR spectra of CCMP in acetone oxidised under different conditions suggested a new proposal that the NO- group might not detach itself from iron porphyrin during oxidation in air with normal lighting, but changed in conjugated structure, and the structure tended to axial symmetry by analysis of the changes in g factor. This hypothesis was further supported by the results of the HPLC/ESI-HR-MS and Raman spectrum.

Keywords: Extracted cooked cured meat pigment; Structure; Oxidation properties; Electron paramagnetic resonance (EPR); HPLC/ESI-HR-MS; FT-IR; Raman spectra

Markus Zell, James G. Lyng, Denis A. Cronin, Desmond J. Morgan, Ohmic heating of meats: Electrical conductivities of whole meats and processed meat ingredients, *Meat Science*, In Press, Corrected Proof, Available online 15 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4WS9BWS-1/2/20ee5fafa12f2c5c9ce2bfe447aaa5f9>)

Abstract:

The ohmic heating rate of a food is highly influenced by its electrical conductivity (σ). A survey of σ values of commonly used meat ingredients when dispersed as 5% (w/w) aqueous solutions/suspensions was undertaken. A subset was further investigated at typical usage levels in solution/suspension, and/or when incorporated into beef blends, while σ of selected cuts from five meat species (beef, pork, lamb, chicken and turkey) was also measured. Measurements were made from 5 to 85 °C and showed a linear increase in σ values with increasing temperature. In processed beef, addition of sodium chloride and phosphate (P22) caused a significant increase in σ which in turn would lead to an increase in ohmic heating rates. Furthermore, whole meats with lower endogenous fat or processed meats with the least added fat displayed higher σ and reduced ohmic heating times. In beef maximum σ was observed when fibres were aligned with the current flow.

Keywords: Ohmic heating; Electrical conductivity; Meat formulation ingredients; Fibre direction

Sheila McGuinness, Evonne McCabe, Edel O'Regan, Anthony Dolan, Geraldine Duffy, Catherine Burgess, Seamus Fanning, Thomas Barry, Justin O'Grady, Development and validation of a rapid real-time PCR based method for the specific detection of Salmonella on fresh meat, *Meat Science*, In Press, Corrected Proof, Available online 14 July 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.07.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4WS2J1S-1/2/36fdd05b1a28a02b50a16a0fcc9bc543>)

Abstract:

In this study, a combined enrichment/real-time PCR method for the rapid detection of Salmonella on fresh meat carcasses, was designed, developed and validated in-house following requirements outlined in ISO 16140:2003. The method included an 18 h non-selective enrichment in buffered peptone water (BPW) and a 6 h selective enrichment in Rappaport Vasiliadis Soya (RVS) broth, based on the traditional culture method, ISO 6579:2002. The real-time PCR assay included an internal amplification control (IAC), was 100% specific and was sensitive to one cell equivalent. The alternative method was validated against the traditional culture method and relative accuracy of 94.9%, sensitivity of 94.7% and specificity of 100% were determined using 150 fresh meat carcass swabs. This alternative method had a detection limit of 1-10 CFU/100 cm² for fresh meat carcass swabs and was performed in 26 h. Following further inter-laboratory studies, this alternative method could be suitable for implementation in testing laboratories for the analysis of carcass swabs.

Keywords: Salmonella; Real-time PCR; *ssrA* Gene; IAC; Fresh meat; Detection

I.T. Kadim, O. Mahgoub, W. Al-Marzooqi, S. Khalaf, S.S.H. Al-Sinawi, I.S. Al-Amri, Effects of transportation during the hot season and low voltage electrical stimulation on histochemical and meat quality characteristics of sheep longissimus muscle, *Livestock Science*, In Press, Corrected Proof, Available online 10 July 2009, ISSN 1871-1413, DOI: 10.1016/j.livsci.2009.06.014.

(<http://www.sciencedirect.com/science/article/B7XNX-4WR5NWX-4/2/640ec266684a92abf5416aa8b804165e>)

Abstract:

The effect of transportation during the hot season (42 [degree sign]C) and low voltage electrical stimulation on physiological, histochemical and meat quality characteristics of Omani sheep was studied. Forty intact male sheep were divided into two equal groups: 3 h transported or non-transported. The non-transported group remained in holding pens for 48 h prior to slaughter, while the transported group was transported 300 km (approximately 3 h) in an open truck under solar radiation on the day of slaughter. Blood samples were collected from the animals before loading and prior to slaughter. Fifty percent of the carcasses from each group were randomly assigned to low voltage (90 V) at 20 min postmortem. Temperature and pH decline of the left longissimus thoracis muscle were monitored. Ultimate pH, WB-shear force, sarcomere length, myofibrillar fragmentation index (MFI), expressed juice, cooking loss and color L*, a*, b* were measured on samples from both sides muscles collected at 24 h postmortem at 3-4 [degree sign]C. The transported sheep had significantly higher plasma cortisol ($P < 0.01$), adrenaline, nor-adrenaline and dopamine concentrations ($P < 0.05$) than non-stimulated animals. Electrical stimulation resulted in a significantly ($P < 0.05$) more rapid pH fall in muscle during the first 12 h after slaughter. Muscles from electrically-stimulated carcasses had significantly ($P < 0.05$) lower pH values, longer sarcomere length, lower shear force value, higher expressed juice, MFI and lighter L* than those from non-stimulated ones. The muscle samples from the transported sheep had significantly ($P < 0.05$) smaller and lower proportion of Types I and IIA fibers than those from the non-transported group. This study indicated that pre-slaughter transport at high ambient temperatures can cause noticeable changes in physiological and muscle metabolism responses in sheep. Electrical stimulation improved meat quality characteristics, which indicate that meat quality of transported sheep can be improved by electrical stimulation.

Keywords: Sheep; Transportation stressor; Longissimus dorsi; Electrical stimulation; Muscle fiber type

James Hsu, Jayashree Arcot, N. Alice Lee, Nitrate and nitrite quantification from cured meat and vegetables and their estimated dietary intake in Australians, *Food Chemistry*, Volume 115, Issue 1, 1 July 2009, Pages 334-339, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.11.081.

(<http://www.sciencedirect.com/science/article/B6T6R-4V2NP5F-3/2/47f90f7080b57c0eb4d5be222abf9173>)

Abstract:

High dietary nitrate and nitrite intake may increase the risk of gastro-intestinal cancers due to the in vivo formation of carcinogenic chemicals known as N-nitroso compounds. Water and leafy vegetables are natural sources of dietary nitrate, whereas cured meats are the major sources of dietary nitrite. This paper describes a simple and fast analytical method for determining nitrate and nitrite contents in vegetables and meat, using reversed-phase HPLC-UV. The linearity R² value was >0.998 for the anions. The limits of quantification for nitrite and nitrate were 5.0 and 2.5 mg/kg, respectively. This method is applicable for both leafy vegetable and meat samples. A range of vegetables was tested, which contained <23 mg/kg nitrite, but as much as 5000 mg/kg of nitrate. In cured and fresh meat samples, nitrate content ranged from 3.7 to 139.5 mg/kg, and nitrite content ranged from 3.7 to 86.7 mg/kg. These were below the regulatory limits set by food standards Australia and New Zealand (FSANZ). Based on the average consumption of these vegetables and cured meat in Australia, the estimated dietary intake for nitrate and nitrite for Australians were 267 and 5.3 mg/adult/day, respectively.

Keywords: Anions; Extraction; Carcinogen; Cured meat; Nitrates; Nitrites; Tetrabutylammonium phosphate; Matrix interference

J.M. Barat, M. Alino, A. Fuentes, R. Grau, J.B. Romero, Measurement of swelling pressure in pork meat brining, *Journal of Food Engineering*, Volume 93, Issue 1, July 2009, Pages 108-113, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.01.007.

(<http://www.sciencedirect.com/science/article/B6T8J-4VGPDV2-1/2/a810eea6cfd189de066ca14d9d441fb>)

Abstract:

This paper describes a new controlled swelling device fabricated to measure the corresponding swelling pressure of meat immersed in brine throughout salting. To set up the proposed device, swelling in pieces of pork meat immersed in a 5% (w/w) NaCl brine was studied. It is well known and described in literature the influence of NaCl on the water holding capacity of meat. The increase in that value has been related with the existence of swelling pressures in the protein matrix.

The obtained results indicated that the developed device provides swelling pressure values which are in accordance with the measured changes in composition, weight and height of non-constrained samples.

Keywords: Swelling pressure; Brine salting; Pork meat salting; Water holding capacity

H. Hashiba, H. Gocho, J. Komiyama, Dual mode diffusion and sorption of sodium chloride in pork meats under cooking conditions, *LWT - Food Science and Technology*, Volume 42, Issue 6, July 2009, Pages 1153-1163, ISSN 0023-6438, DOI: 10.1016/j.lwt.2009.02.002.

(<http://www.sciencedirect.com/science/article/B6WMV-4VKP479-2/2/791d4c2f51fc504b7c327e37fe122e06>)

Abstract:

This study aims to obtain insight into mechanisms of NaCl diffusion in pork meats under cooking conditions: the loins at 5 (raw), 63 (pre-cooked) and 98 [degree sign]C (pre-cooked), the mince at 98 [degree sign]C (pre-cooked), and the filet at 98 [degree sign]C (pre-cooked). It has been generally presumed that NaCl in any of pork meats diffuses with a constant Fick's diffusion coefficient, D, through liquid water channel imbibed in them. However in the present study, we experimentally obtained skewed bell shape variations of D in all of the above meats with respective maxima at certain low NaCl concentrations. These variations were interpreted in terms of a dual mode sorption and diffusion theory, which had been successfully applied to NaCl diffusion behaviors in Japanese radish and solidified egg white. This interpretation gives a

thermodynamic diffusion coefficient, $DT(p)$ for the partition species of NaCl and another one, $DT(L)$ for the Langmuir type sorption species, both in the water swollen substrates in the meats. It was found that $DT(p)$ values are sizably smaller than corresponding $DT(L)$ values. This difference was ascribed to the lower water content in the p region than that in the L region. With the two DT s and additional equilibrium parameters, the theory explained the remarkable decrease of D value with C at 21 [degree sign] C found by Guiheneuf et al. and nearly constant D values in the higher C range at 5 [degree sign] C reported by other researchers. Experimentally obtained sorption isotherms of NaCl, which were slightly convex upward in the low C range, were satisfactorily reproduced with the parameters and the fractions of water swollen substrates in the whole meats.

Keywords: Diffusion; NaCl; Pork; Foodstuff; Cooking

M.D. Fraser, D.A. Davies, J.E. Vale, G.R. Nute, K.G. Hallett, R.I. Richardson, I.A. Wright, Performance and meat quality of native and continental cross steers grazing improved upland pasture or semi-natural rough grazing, *Livestock Science*, Volume 123, Issue 1, July 2009, Pages 70-82, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.10.008.

(<http://www.sciencedirect.com/science/article/B7XNX-4V053P8-2/2/ebc01a5219879179a22da284335ebf6e>)

Abstract:

There is growing interest in the environmental benefits of grazing by cattle, yet little information is available regarding the levels of production that might be achieved on semi-natural rough grazing (SNRG). The overall aim of this research was to assess the performance of native and 'improved' breeds of cattle when grazing grass/clover swards and SNRG in order to explore potential genotype x nutritional environment interactions. This paper reports the findings of three experiments conducted over three years. The first experiment assessed the performance of autumn-born Welsh Black (WB) and Charolais cross (CX) cattle aged approximately 9 months when grazing ryegrass/white clover-dominated improved permanent pasture (PP) and *Molinia caerulea*-dominated SNRG. Both genotype and pasture type had significant effects on liveweight gain, with growth rates higher for WB steers than CX steers ($P < 0.001$) and higher on the improved pasture than on the SNRG ($P < 0.001$). The second experiment was conducted the following summer when the steers were 20 months old and evaluated the effects of breed and pasture type on subsequent finishing performance, carcass composition, meat quality, flavour and fatty acid composition. Genotype had no effect on liveweight gain during the grazing period, but pasture type again had a highly significant effect on growth rate ($P < 0.001$). Carcass conformation was good and similar for both breeds. Pasture type had a greater effect on fatty acid composition of the meat than did breed. Likewise, genotype had no effect on meat colour or stability, whereas pasture type affected both. Loin steaks from the SNRG-grazed animals had significantly more vitamin E than those from PP-grazed animals ($P < 0.001$) and this was reflected in lower lipid oxidation (TBARS) after simulated retail display ($P < 0.001$). The third experiment assessed the performance of spring-born Welsh Black and Limousin cross steers aged 14 months when grazing PP and SNRG. Again only pasture type had a highly significant effect on growth rate ($P < 0.001$). Measurements made during the first two experiments using automatic behaviour recorders indicated that pasture type influenced grazing behaviour to a greater degree than breed, and sward measurements found no between-breed differences in utilisation of *M. caerulea*. Overall the results indicate that the type of sward grazed has a greater influence on animal performance and meat quality than breed type when beef cattle are produced in Less Favoured Areas.

Keywords: Cattle; *Molinia caerulea*; Beef; Grassland; Breed

Abdullah Y. Abdullah, Rasha I. Qudsieh, Effect of slaughter weight and aging time on the quality of meat from Awassi ram lambs, *Meat Science*, Volume 82, Issue 3, July 2009, Pages 309-316, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4VJM30K-2/2/74e29fd6a184e06ef6e4972aaacf627d>)

Abstract:

Thirty Awassi ram lambs were used to investigate the effects of live weight at slaughter (SW) and aging time (AT) on meat quality attributes of Mm. Semitendinosus, Semimembranosus, Biceps femoris and Longissimus. Lambs were slaughtered at 20, 30 or 40 kg live weight, and muscles of each lamb carcass were aged for either 24 h or 7 days. Warner-Bratzler shear force values increased ($P < 0.01$) with increasing live weight and decreased ($P < 0.01$) by increasing AT in both M. Semimembranosus and Biceps femoris. Lightness (L^*) of the four muscles decreased ($P < 0.001$) with increasing weight but was not affected by AT. Aging time increased ($P < 0.05$) redness (a^*) in Mm. Semitendinosus and Longissimus. Cooking loss was reduced ($P < 0.001$) by increased AT in M. Longissimus and by increasing ($P < 0.001$) live weight in M. Semitendinosus. Aging time had no effect on expressed juice of all muscles but it was improved ($P < 0.001$) with increasing live weight in M. Semimembranosus. pH values were significantly influenced for Mm. Semimembranosus and Biceps femoris and values were higher for lighter weight and decreased with increasing weight. Aging time did not influence pH. In conclusion, meat quality for lambs slaughtered up to 30 kg was better than for lambs slaughtered at 40 kg with quality being improved by increasing aging time.

Keywords: Awassi ram lambs; Live weight; Aging time; Meat quality

G. Arsenos, P. Fortomaris, E. Papadopoulos, S. Sotiraki, C. Stamataris, D. Zygyiannis, Growth and meat quality of kids of indigenous Greek goats (*Capra prisca*) as influenced by dietary protein and gastrointestinal nematode challenge, *Meat Science*, Volume 82, Issue 3, July 2009, Pages 317-323, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4VJM30K-3/2/5b9f0352553c72e9efaf250b2b4a7a10>)

Abstract:

The effect of dietary protein and gastrointestinal nematode (GIN) parasitism on growth and meat quality of growing kids was assessed using sixty (60) kids in three groups ($n = 20$); A: control, B: regularly treated with ALBENDAZOLE(R) and C: supplemented with dietary protein. The kids grazed in a pasture contaminated with L3 larvae of GIN. Growth and condition score were assessed at 21-day intervals. After 86 days all kids were slaughtered. Carcasses were assessed for conformation, fatness, ultimate pH and other meat quality characteristics. Parasitic challenge was assessed by means of faecal egg counts (FEC), pasture larvae and adult nematodes in the GI tract of kids at slaughter. Groups C and B had higher growth rates and body condition score and produced significantly heavier ($P < 0.05$) carcasses with better ($P < 0.01$) conformation and fatness when compared to those of group A. Total unsaturated and monounsaturated fatty acids were higher ($P < 0.05$) in fat tissue of groups B and C. Group A had the highest FEC and group C had the lowest ($P < 0.05$) FEC. The parasitic challenge of L3 on pasture reached its highest point at 42 days and there were significant ($P < 0.01$) differences between the numbers of *Teladorsagia* spp., *Trichostrongylus* spp., *Haemonchus contortus*, *Oesophagostomum* spp. and *Chabertia* spp. found in the GI tract of kids between the three groups; group A had the highest numbers. Overall, the results showed that the increased protein content in the diet of growing kids grazing on a pasture contaminated with L3 nematode larvae resulted in the production of acceptable carcasses.

Keywords: Growing kids; Dietary protein; Gastrointestinal nematodes; Meat quality

M.D. Coker, R.L. West, J.H. Brendemuhl, D.D. Johnson, A.M. Stelzleni, Effects of live weight and processing on the sensory traits, androstenedione concentration and 5- α -androst-16-en-3-one (androstenone) concentration in boar meat, *Meat Science*, Volume 82, Issue 3, July 2009, Pages 399-404, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.02.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4VPV5MP-1/2/0d35e5f37458fd9c826970641ebe6cf5>)

Abstract:

Twenty-nine crossbred boars were used to evaluate the effects of live weight and processing on the sensory attributes and concentrations of androstenedione and androstenone (boar taint) in boar meat. Boars were stratified by litter across six weight group endpoints (90.9, 95.5, 100.0, 104.5, 109.1, and 113.6 kg). Back fat and longissimus muscle from the lumbar region were used for androstenone determination, proximate analysis and sensory evaluation. Hams were cured for sensory analysis and were used to determine androstenone concentrations. Androstenone as an off-flavor did not differ ($P > 0.05$) among treatments for longissimus lean or cured hams and was found to be in the 'threshold' to 'none detected' range. Back fat androstenone concentration was positively correlated ($P < 0.05$) to hot carcass weight, however, lean androstenone concentration was not ($P > 0.05$). No relationship was found ($P > 0.05$) between androstenone concentration and days on feed, average daily gain or androstenedione concentration. Additionally, further processing decreased androstenone concentration by approximately 29%.

Keywords: Boar; Boar taint; Androstenone; Androstenedione

H. Vergara, R. Bornez, M.B. Linares, CO₂ stunning procedure on Manchego light lambs: Effect on meat quality, *Meat Science*, In Press, Corrected Proof, Available online 28 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.036.

(<http://www.sciencedirect.com/science/article/B6T9G-4WMM7G7-2/2/ca9d66fa4a060c062021a5a193dbfc33>)

Abstract:

This study examined the effect of different gas stunning methods (concentration of CO₂/time of exposure (G1: 80%90s; G2: 90%90s; G3: 90%60s; G4: 80%60s) on the initial meat quality of Manchego breed light lambs (25 kg live weight) and at 7 days post-mortem, assessed by pH, colour coordinates, water holding capacity (WHC), cooking loss (CL), drip loss (DL) shear force (SF) and lipid oxidation. An electrically stunned control group (G5) was used. Stunning method had a significant effect on pH values ($P < 0.001$) as well as on pH decline ($P < 0.01$). The lowest pH was found at 24 h post-slaughter in G1 and the highest one on G5. The greatest drop in pH (pH₀-pH₂₄) was found in G1 and G5 while the smallest in G3. In general values of colour coordinates, WHC and DL were similar in all groups. Stunning method affected CL ($P < 0.001$) at 7 days post-slaughter, with the lowest values being found in G1. Significant differences among groups were found ($P < 0.05$) in SF values at both post-mortem times, with less tender meat in groups stunned with 80% CO₂, especially in G1. A significant effect ($P < 0.001$) due to the type of stunning was found at 24 h on lipid oxidation, with the highest value in G5. After ageing this parameter was lowest ($P < 0.05$) in G1 and G4.

Keywords: Light lamb; Gas stunning; Carbon dioxide; Meat quality

Eliana Jeronimo, Susana P. Alves, Jose A.M. Prates, Jose Santos-Silva, Rui J.B. Bessa, Effect of dietary replacement of sunflower oil with linseed oil on intramuscular fatty acids of lamb meat, *Meat Science*, In Press, Corrected Proof, Available online 25 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.033.

(<http://www.sciencedirect.com/science/article/B6T9G-4WM0JFX-1/2/0dcf42f4c23be795de2f3410e2a64159>)

Abstract:

The effect of stepwise replacement of dietary sunflower oil (SO) with linseed oil (LO) on carcass composition, meat colour and fatty acid (FA) composition of intramuscular lipids of lamb meat was investigated. Thirty-six lambs were fed one of four diets consisting of pellets of lucerne with oil (60 g/kg): the diet varied in the composition of oil added and were: 100% SO; 66.6% SO plus 33.3% LO; 33.3% SO plus 66.6% LO and 100% LO. The experimental period was 7 weeks. Live

slaughter weight, hot carcass weight and intermuscular fat percentage of chump and shoulder increased linearly with replacement of SO by LO.

Total FA content of longissimus dorsi muscle and polar and neutral lipids were not affected by the treatments. Replacement of SO with LO increased the content of 18:3n - 3 and total n - 3 long chain ([greater-or-equal, slanted]C20) PUFA (LC-PUFA) and decreased the 18:2n - 6, total n - 6 LC-PUFA and 18:2 cis-9, trans-11 in meat lipids. Maximum CLA concentration (42.9 mg/100 g fresh muscle) was observed with 100% of SO, decreasing linearly by SO with LO replacement. Maximum n - 3 LC-PUFA was predicted to be 27 mg/100 g of fresh muscle at 78% of SO with LO replacement. Considering both CLA and n - 3 LC-PUFA, the maximum levels were estimated to be reached at 52% of replacement of SO with LO. The utilization of blends of SO and LO is a good approach for obtaining lamb meat enriched with both CLA and n - 3 LC-PUFA.

Keywords: Conjugated linoleic acid; Lamb meat; Linseed oil; Meat; Polyunsaturated fatty acids; Sunflower oil

Lynnette R. Ferguson, Meat and cancer, Meat Science, In Press, Corrected Proof, Available online 23 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4WKK1SF-1/2/903d60dba6ab542f1ce7ff574604524a>)

Abstract:

An increasing literature associates high intake of meat, especially red meat and processed meat with an increased risk of cancers, especially colorectal cancer. There is evidence that this risk may not be a function of meat per se, but may reflect high-fat intake, and/or carcinogens generated through various cooking and processing methods. The cancer risk may be modulated by certain genotypes. Cancers associated with high meat consumption may be reduced by the addition of anticarcinogens in the diet, especially at the same time as meat preparation or meat consumption, or modification of food preparation methods. Meat contains potential anticarcinogens, including omega-3 polyunsaturated fatty acids, and conjugated linoleic acid (CLA). Red meat, in particular, is an important source of micronutrients with anticancer properties, including selenium, vitamin B6 and B12, and vitamin D. Adjusting the balance between meat and other dietary components may be critical to protecting against potential cancer risks.

Keywords: Meat; Fat; Heterocyclic amine; Polycyclic aromatic hydrocarbon; Heme iron; Wheat bran

Jimian Yu, Shu Tang, Endong Bao, Miao Zhang, Qingqing Hao, Zhenghua Yue, The effect of transportation on the expression of heat shock proteins and meat quality of M. longissimus dorsi in pigs, Meat Science, In Press, Corrected Proof, Available online 21 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4WK43Y2-4/2/d16857ec97469916bc9f61c58b4e40b1>)

Abstract:

This study investigates the effect of different transport times on meat quality and the correlation between meat quality and Hsp expression in M. longissimus dorsi (LD) of pigs. After transportation for 1 h, 2 h or 4 h, respectively, blood plasma creatine kinase (CK) and lactate dehydrogenase (LDH) increased. The LD meat from 1 h and 2 h transported pigs had lower initial and ultimate pH values (pHi and pHu, respectively), higher drip loss and L* values compared to controls, indicating a higher likelihood of pale, soft and exudative (PSE) meat. Meat quality was lower after 2 h compared to 1 h or 4 h of transport. All four Hsps tested (alpha-B-crystalline, Hsp27, Hsp70 and Hsp90) by ELISA in the LD tissue of pigs tended to decrease after transportation. One possible mechanism resulting in poor meat quality in the LD after transport seems to be a decline in Hsp expression.

Keywords: Pig; Transportation; Meat quality; Heat shock proteins

Santosh Haunshi, Rantu Basumatary, P.S. Girish, Sunil Doley, R.K. Bardoloi, Ashok Kumar, Identification of chicken, duck, pigeon and pig meat by species-specific markers of mitochondrial origin, Meat Science, In Press, Corrected Proof, Available online 21 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4WK43Y2-1/2/6917a8bd638ebad56381936515090283>)

Abstract:

In the present study, PCR based method for meat species identification of chicken, duck, pigeon and pig was achieved by developing species-specific markers. Using mitochondrial sequences species-specific primers were designed and the sizes of them were 256 bp, 292 bp, 401 bp and 835 bp for chicken, duck, pigeon and pig, respectively. The species-specific PCR products were sequenced to confirm the specificity of the product amplified. These markers were subsequently tested for cross amplification by checking them with beef, mutton, chevon, pork, rabbit, chicken, duck, turkey and pigeon meat. DNA markers developed in this study can help identify the species of fresh, cooked and autoclaved meat of chicken, duck and pigeon and fresh and cooked meat of pig. The process of identification is simple, economical and quick as compared to other methods such as RAPD, PCR-RFLP and sequencing method of species identification.

Keywords: Chicken; Duck; Pigeon; Pig; PCR; Mitochondria; Speciation; Marker

I. Lopez-Lopez, S. Bastida, C. Ruiz-Capillas, L. Bravo, M.T. Larrea, F. Sanchez-Muniz, S. Cofrades, F. Jimenez-Colmenero, Composition and antioxidant capacity of low-salt meat emulsion model systems containing edible seaweeds, Meat Science, In Press, Corrected Proof, Available online 21 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4WK4SPW-1/2/32be554ff736d268aa7c0bdb0b21ca32>)

Abstract:

The study was designed to determine the influence of the addition of edible seaweeds, Sea Spaghetti (*Himanthalia elongata*), Wakame (*Undaria pinnatifida*), and Nori (*Porphyra umbilicalis*), on fatty acid composition, amino acid profile, protein score, mineral content and antioxidant capacity in low-salt meat emulsion model systems. The addition of seaweeds caused an increase ($P < 0.05$) in n-3 polyunsaturated fatty acids (PUFA) and a decrease ($P < 0.05$) in the n-6/n-3 PUFA ratio. The thrombogenic index significantly decreased ($P < 0.05$) in Nori and Wakame meat samples. Meat systems made with added seaweeds had lower ($P < 0.05$) sodium contents than control samples. In general, addition of seaweeds to products increased ($P < 0.05$) the concentrations of K, Ca, Mg and Mn. The presence of Nori caused an increase ($P < 0.05$) in levels of serine, glycine, alanine, valine, tyrosine, phenylalanine and arginine, whereas Wakame and Sea Spaghetti produced no significant changes in amino acid profiles in the model systems. The inclusion of Sea Spaghetti increased the sulphur amino acid score by 20%. The added seaweeds supplied the meat samples with soluble polyphenolic compounds, which increased the antioxidant capacity of the systems. The polyphenol supply and antioxidant increase were greatest ($P < 0.05$) in the samples containing Sea Spaghetti.

Keywords: Meat emulsion model systems; Edible seaweeds; Fatty acids; Amino acids; Minerals; Polyphenols; Antioxidant capacity

Henrik C. Wegener, Danish initiatives to improve the safety of meat products, Meat Science, In Press, Corrected Proof, Available online 21 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4WK43Y2-2/2/41a30ba456504a432d2e579c3423aa24>)

Abstract:

During the last two decades the major food safety problems in Denmark, as determined by the number of human patients, has been associated with bacterial infections stemming from meat products and eggs. The bacterial pathogens causing the majority of human infections has been *Salmonella* and *Campylobacter*, and to a lesser extent *Yersinia*, *Escherichia coli* O157 and *Listeria*. Danish initiatives to improve the safety of meat products have focused on the entire production chain from the farm to the consumer, with a special emphasis on the pre-harvest stage of production. The control of bacterial pathogens which are resistant to antibiotics has been a new area of attention in the recent decade, and recently, the increasing globalization of the domestic food supply has called for a complete rethinking of the national food safety strategies. The implementations of a 'case-by-case' risk assessment system, as well as increased international collaboration on surveillance, are both elements in this new strategy.

Keywords: Food safety; Denmark; *Salmonella*; *Campylobacter*; Risk assessment

Daniel Franco, Esperanza Bispo, Laura Gonzalez, Jose Antonio Vazquez, Teresa Moreno, Effect of finishing and ageing time on quality attributes of loin from the meat of Holstein-Friesian cull cows, *Meat Science*, In Press, Corrected Proof, Available online 21 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4WK4SPW-2/2/fa3d939a7d294b4d27b1d34a6c9d3ad2>)

Abstract:

The effects of finishing time, (T0 = 0, T1 = 30 and T2 = 60 days), on Holstein-Friesian cull cows (n = 18) and post-mortem ageing, (1, 7, 14, 21, 35 and 42 days), under vacuum conditions of *Longissimus thoracis* (LT) muscles were investigated. The objective of this research was to study how finishing feeding (based on a commercial concentrate and corn silage), following a pasture period of 90 days, affected carcass and meat quality. Ageing time effect was also evaluated on the main quality attribute of added value pieces, such as 'striploin of ox' from cull cows. Finishing treatment affected intramuscular fat content (IMF), moisture percentage, water-holding capacity (WHC), colour parameters and shear force of meat at 24 h post-mortem, whereas ageing time enhanced meat tenderness, when this was measured by two textural tests, Warner-Braztler (WB) and textural profile analysis (TPA). A minimum shear force was achieved at 7 and 14 days of ageing for T1 and T2, respectively. No differences ($P > 0.05$) could be found in colour parameters from 7 to 42 days. The results show that a finishing time of two months is very beneficial, due to the increase in meat fatness, improved overall carcass quality and luminosity (L^*). Furthermore, 14 ageing days were sufficient to improved tenderness. Ageing time did not have an effect on lipid oxidation ($P > 0.05$) and this leads us to conclude that meat shelf life exceeded 42 days under vacuum conditions'.

Keywords: Cull dairy cows; Finishing feeding; Meat ageing; Textural properties

Patricia da Silva Malheiros, Catia Tavares dos Passos, Leticia Sopena Casarin, Leandro Serraglio, Eduardo Cesar Tondo, Evaluation of growth and transfer of *Staphylococcus aureus* from poultry meat to surfaces of stainless steel and polyethylene and their disinfection, *Food Control*, In Press, Corrected Proof, Available online 18 June 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.06.008.

(<http://www.sciencedirect.com/science/article/B6T6S-4WJHB32-2/2/3c74a739b0e9c05e529f533179ff2450>)

Abstract:

The growth of *Staphylococcus aureus* inoculated onto poultry meat was investigated under different incubation periods and temperature patterns. Transfer of this microorganism to surface materials and their disinfection was also evaluated. The evaluation of transfer was carried out by placing the contaminated meat cubes on stainless steel and polyethylene surfaces for 10 s and 10 min each, and the surfaces were disinfected with 0.5% chlorhexidine digluconate (CHXdG) for 1

and 10 min each. After 24 h, there was a significant increase of the bacteria count at 20 [degree sign]C, but not at temperatures between 7 and 15 [degree sign]C. Significant counts of *S. aureus* were transferred after a few seconds of contact of the cubes with both materials, and significant differences of transferred cell counts were not detected among the surface materials or durations of contact. The CHXdG solution was able to inactivate all the transferred cells after 10 min of exposure; however, the same result was not observed with 1-min exposure. The time of contact and the type of surface material did not influence the quantity of the transferred cells. The 0.5% CHXdG solution was effective for the disinfection of the contaminated surfaces without previous cleaning.

Keywords: *Staphylococcus aureus*; Stainless steel; Polyethylene; Chlorhexidine digluconate

F. Pena, A. Bonvillani, B. Freire, M. Juarez, J. Perea, G. Gomez, Effects of genotype and slaughter weight on the meat quality of Criollo Cordobes and Anglonubian kids produced under extensive feeding conditions, *Meat Science*, In Press, Corrected Proof, Available online 16 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4WJ3DYM-4/2/b45ddf7d1954fb0a68005676796941f8>)

Abstract:

Physicochemical and organoleptic characteristics of meat (longissimus muscle) from Criollo Cordobes (CC) and Anglonubian (AN) suckling kids were analysed to determine the effects of genotype and slaughter weight. Forty suckling entire male kids, 20 CC and 20 AN were assigned to two age/slaughter weight groups (I: 60 + 2 days old and [less-than-or-equals, slant]11 kg, and II: 90 + 2 days old and >11 kg). Colour, shear force and cholesterol levels of meat were affected by breed. Tenderness decreased and cholesterol increased with age/slaughter weight. Fatty acid profiles were affected primarily by genotype. The sensory attributes were perceived as medium-high intensity, and meat from CC and AN goat kids was valued as tender. However, initial tenderness and connective tissue varied with genotype. The main effect due to the increase in age/slaughter weight was a decrease in tenderness (initial and overall), as observed for instrumental shear force.

Keywords: Goat meat; Fatty acids; Cholesterol; Sensory quality; Production systems

G. Pignoli, R. Bou, M.T. Rodriguez-Estrada, E.A. Decker, Suitability of saturated aldehydes as lipid oxidation markers in washed turkey meat, *Meat Science*, In Press, Corrected Proof, Available online 16 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4WJ3DYM-1/2/ebe156588bc1d2b5f232187dd38484b8>)

Abstract:

The aim of this study was to evaluate the suitability of saturated aldehydes as lipid oxidation markers in washed turkey muscle, by means of headspace solid phase microextraction-gas chromatography (HS-SPME-GC); the results were compared with the widely used thiobarbituric acid-reactive substances (TBARs) method. Changes in TBARs, propanal and hexanal concentrations were determined over time in a model system consisting of turkey muscle washed with a sodium phosphate buffer (pH 5.6). To stop oxidation from occurring during analysis, an antioxidant mixture (EDTA, trolox and propyl gallate) was added immediately before analyses. After antioxidant addition, propanal and TBARs concentrations did not increase during 8 h of further storage, while an unexpected decrease in hexanal was observed. To determine if aldehydes were interacting with washed turkey muscle, hexanal and propanal were added to either phosphate buffer or washed muscle and concentrations were monitored for 24 h. Neither propanal nor hexanal decreased in the phosphate buffer over time, but the headspace concentration of propanal and hexanal in washed turkey muscle were markedly lower (76% and 96%, respectively) at time zero and continued to decrease up to 24 h of storage. Because of this

decrease in headspace aldehyde concentrations, TBARs were found to be a more sensitive and accurate marker of oxidative deterioration in washed turkey muscle.

Keywords: Turkey meat; HS-SPME-GC; TBARs; Volatile saturated aldehydes; Lipid oxidation

M. Font i Furnols, J. Gonzalez, M. Gispert, M.A. Oliver, M. Hortos, J. Perez, P. Suarez, L. Guerrero, Sensory characterization of meat from pigs vaccinated against gonadotropin releasing factor compared to meat from surgically castrated, entire male and female pigs, *Meat Science*, In Press, Corrected Proof, Available online 16 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4WJ3DYM-6/2/7bd1f5909698e6bea7daaab0bc50d74>)

Abstract:

Boar taint is a sensory defect mainly due to androstenone and skatole. The most common method to control boar taint is surgical castration at an early age. Vaccination against gonadotropin releasing factor (also known as immunocastration) is an alternative to surgical castration to reduce androstenone content. In this experiment, loins from 24 female (FE), 24 entire male (EM), 24 vaccinated males (IM) and 23 surgically castrated males (CM) were evaluated by eight trained panellists in 24 sessions. Loins were cooked in an oven at 180 [degree sign]C for 10 min. Furthermore loins were evaluated by consumers and its androstenone and skatole content were also chemically determined. Meat from EM had higher androstenone and skatole odour and flavour than meat from FE, IM and CM and lower sweetness odour scores. High correlations were found between androstenone and skatole levels assessed by trained panelists, chemical analysis and consumers' acceptability. Moreover meat from EM is mainly related to androstenone and skatole attributes.

Keywords: Gonadotropin releasing factor; Vaccination; Immunocastration; Sensory characterization; Pork; Androstenone; Skatole; Boar taint

Maria Font i Furnols, Marina Gispert, Comparison of different devices for predicting the lean meat percentage of pig carcasses, *Meat Science*, In Press, Corrected Proof, Available online 16 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4WJ3DYM-7/2/aea83019b03d01c4114e69dd604942bf>)

Abstract:

Lean meat percentage (LMP) is the criterion for carcass classification and it must be measured on line objectively. The aim of this work was to compare the error of the prediction (RMSEP) of the LMP measured with the following different devices: Fat-O-Meat'er (FOM), UltraFOM (UFOM), AUTOFOM and VCS2000. For this reason the same 99 carcasses were measured using all 4 apparatuses and dissected according to the European Reference Method. Moreover a subsample of the carcasses (n = 77) were fully scanned with X-ray Computed Tomography equipment (CT). The RMSEP calculated with cross validation leave-one-out was lower for FOM and AUTOFOM (1.8% and 1.9%, respectively) and higher for UFOM and VCS2000 (2.3% for both devices). The error obtained with CT was the lowest (0.96%) in accordance with previous results, but CT cannot be used on line. It can be concluded that FOM and AUTOFOM had better accuracy than UFOM and VCS2000.

Keywords: Pig carcass classification; Lean meat percentage; Classification devices; X-ray computed tomography; Prediction error; Calibration

T. Economou, N. Pournis, A. Ntzimani, I.N. Savvaidis, Nisin-EDTA treatments and modified atmosphere packaging to increase fresh chicken meat shelf-life, *Food Chemistry*, Volume 114, Issue 4, 15 June 2009, Pages 1470-1476, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.11.036.

(<http://www.sciencedirect.com/science/article/B6T6R-4TYJV3N-3/2/878680fb8f9d536d6f6760ce981a183e>)

Abstract:

The effect of nisin and EDTA treatments on the shelf-life of fresh chicken meat stored under modified atmosphere packaging at 4 [degree sign]C was evaluated. Chicken meat was subjected to the following antimicrobial treatment combinations: Nisin-EDTA treatments (added post-production to the chicken samples) included: N1 (no nisin-EDTA added; control sample), N2 (500 IU/g; no EDTA added), N3 (1500 IU/g; no EDTA added), N4 (500 IU/g-10 mM EDTA), N5 (1500 IU/g-10 mM EDTA), N6 (500 IU/g-50 mM EDTA), N7 (1500 IU/g-50 mM EDTA), N8 (10 mM EDTA; no nisin added), and N9 (50 mM EDTA; no nisin added). N3, N4, N5, N6 and N7 affected populations of mesophilic bacteria, *Pseudomonas* sp., *Brochothrix thermosphacta*, lactic acid bacteria, and Enterobacteriaceae. The antimicrobial combination treatments N5, N6 and N7 had a significant effect on the formation of volatile amines, trimethylamine nitrogen (TMA-N) and total volatile basic nitrogen (TVB-N) in chicken meat. The use of MAP in combination with nisin-EDTA antimicrobial treatments resulted in an organoleptic extension of refrigerated, fresh chicken meat by approximately 1-2 days (N2), 3-4 days (N3 and N4), 7-8 days (N5), 9-10 (N7) and by 13-14 days (N6). Chicken was better preserved under treatments N6 and N7, maintaining acceptable odour attributes even up to 24 and 20 days of storage, respectively.

Keywords: Modified atmosphere packaging; Nisin; Chelators; Chicken freshness; Natural antimicrobials; Combination treatments

Rhys J. Jones, Monique Zagorec, Gale Brightwell, John R. Tagg, Inhibition by *Lactobacillus sakei* of other species in the flora of vacuum packaged raw meats during prolonged storage, *Food Microbiology*, In Press, Corrected Proof, Available online 12 June 2009, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.06.003.

(<http://www.sciencedirect.com/science/article/B6WFP-4WH8C6P-2/2/cd96236cbd84e6bcab467f6b850db228>)

Abstract:

The abilities of five *Lactobacillus sakei* strains and one *Lactococcus lactis* strain to retain inhibitory activity against several target organisms in the flora of product during 12 weeks storage of vacuum-packaged lamb and beef was investigated. *L. sakei* strains were generally found capable of developing dominant populations on both beef and lamb. *L. lactis* 75 grew poorly on lamb did not inhibit co-inoculated *Brochothrix thermosphacta*. Lamb inoculated with the Sakacin-A producer *L. sakei* Lb706 had lower *Listeria monocytogenes* populations than lamb inoculated with a bacteriocin-negative variant. In beef packs inoculated with *Clostridium estertheticum* spores and *L. sakei* strain 27, 44 or 63, the development of blown-pack spoilage was delayed by up to one week. *Campylobacter jejuni* inoculated onto beef was recovered from fewer packs when it was co-inoculated with 3000 CFU cm⁻² of *L. sakei* strain 27, 44 or 63. Observed inhibition did not always correlate with inhibition observed in earlier media-based studies, supporting the view that functionality identified using simple media-based screening methods may not be replicated in the complex environment of stored foods, and vice-versa. These findings further define a set of *L. sakei* strains with potential for the extended bio-preservation of minimally processed fresh beef and lamb.

Keywords: Bio-preservation; *Lactobacillus sakei*; *Lactococcus lactis*; Meat storage

Xingfeng Guo, Shaojun Tian, Darryl M. Small, Generation of meat-like flavourings from enzymatic hydrolysates of proteins from *Brassica* sp., *Food Chemistry*, In Press, Corrected Proof, Available online 11 June 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.089.

(<http://www.sciencedirect.com/science/article/B6T6R-4WH2M66-1/2/40ec986c0171811132c38b6524cd1145>)

Abstract:

Proteins from Brassica sp. were prepared by alkaline extraction followed by acid precipitation. A double-enzyme (As1.398 and Flavourzyme) two-stage hydrolysis was used to hydrolyse Brassica sp. proteins, and the hydrolysates were used to generate meat-like flavourings. The effect of processing conditions on the volatile products generated from the thermal reaction between the protein hydrolysates and other additives was studied. The results indicated that temperature and pH influenced not only the number but also the amount of products. Those with the most favourite flavour and the highest volatile amount were generated at 160 [degree sign]C, pH 4.0, whereas a burnt odour was produced at 180 [degree sign]C, pH 8.0. Analysis using response surface methodology showed that the interaction of pH and temperature had a significant influence on the total amount of volatile products ($P < 0.01$). GC-MS analysis demonstrated that most of the components in the reaction products occur in food flavourings which had been identified in model systems.

Keywords: Brassica sp.; Protein; Enzymatic hydrolysis; Generation of flavour

R. Bornez, M.B. Linares, H. Vergara, Microbial quality and lipid oxidation of Manchega breed suckling lamb meat: Effect of stunning method and modified atmosphere packaging, Meat Science, In Press, Corrected Proof, Available online 11 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4WH2M69-3/2/79257b9e280ce88d7060f4b97ffd7eac>)

Abstract:

The effect of CO₂ concentration and exposure time at stunning [80% CO₂ for 90 s (G1); 90% CO₂ for 90 s (G2); 90% CO₂ for 60 s (G3); 80% CO₂ for 60 s (G4)] plus an electrically stunned control group (G5) was assessed for lipid oxidation (LO) and microbial levels, [total viable counts, lactic acid bacteria, Enterobacteriaceae and Pseudomonas spp.] in Manchega breed suckling lamb meat at 24 h and 7 days post-mortem. Differences in LO were found at 7 days post-mortem ($P < 0.05$) with the highest value for G4. In general, values of all microorganisms studied were higher in G5.

In addition the effects of these stunning methods (TS) on both LO and microbial counts were assessed in samples packed under two different types of modified atmospheres (MA: MA-A: 70% O₂ + 30% CO₂; MA-B: 69.3% N₂ + 30% CO₂ + 0.7% CO) at 7, 14 and 21 days post-packaging. Both factors (TS and MA), significantly affected LO, which was highest in the samples from the MA-A/G4 group. In general there were no significant differences in microbial quality between modified atmospheres. However, the type of stunning affected microbial count ($P < 0.001$) at all analysis times. In general, G4 and G5 showed the highest level in all microorganisms assessed, while the rest of the gas-stunning groups showed more stability with ageing.

Keywords: Suckling lamb; Gas-stunning; Packaging; Microbiology; Lipid oxidation

N.G. Gregory, How climatic changes could affect meat quality, Food Research International, In Press, Corrected Proof, Available online 9 June 2009, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.05.018.

(<http://www.sciencedirect.com/science/article/B6T6V-4WGMB4M-1/2/fee89007071720d7dddc1717d69529dd>)

Abstract:

Climate change could affect meat quality in two ways. First, there are direct effects on organ and muscle metabolism during heat exposure which can persist after slaughter. For example heat stress can increase the risks of pale-soft-exudative meat in pigs and turkeys, heat shortening in broilers, dark cutting beef in cattle and dehydration in most species. Second, changes in livestock and poultry management practices in response to hazards that stem from climate change could indirectly lead to changes in meat quality. For example, changing to heat-tolerant Bos indicus cattle sire lines could lead to tougher, less juicy beef with less marbling. Also, pre-conditioning broilers to heat stress to encourage better survival during transport could lead to more variable

breast meat pH_{ult}. The impacts that short term climate change could have will vary between regions. The ways the impacts are managed need to be based on experience while appreciating the range of approaches that could be used.

Keywords: Climate change; Heat stress; Meat quality; PSE meat; High pH meat; Transport; Mortality; Dark cutting beef

Maryam Ansari-Lari, Sahar Soodbakhsh, Leila Lakzadeh, Knowledge, attitudes and practices of workers on food hygienic practices in meat processing plants in Fars, Iran, Food Control, In Press, Corrected Proof, Available online 8 June 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.06.003.

(<http://www.sciencedirect.com/science/article/B6T6S-4WGBFKH-5/2/4cd65a954b5f7fab335ca0de6441dd09>)

Abstract:

This cross-sectional study was conducted to evaluate the knowledge, attitudes and practices of food workers in four meat processing plants in the Fars province, southern Iran. A self-administered, structured questionnaire was designed and completed by 97 food workers during November 2006-January 2007. Results indicated that the respondents had acceptable level of knowledge, excellent attitudes and poor practices toward food hygiene measures. Almost all of the food workers (97.9%) were aware of the critical role of general sanitary measures in the work place while there was lack of knowledge about microbial food hazards in the majority (67-78%) of them. A significant negative correlation was observed between knowledge and practices ($r_s = -0.20$, $P = 0.04$), and attitudes and practices ($r_s = -0.27$, $P = 0.009$), revealing that increased knowledge and even attitudes toward food safety does not always result in positive change in food handling behaviors.

Keywords: Attitudes; Food hygiene; Iran; Knowledge; Meat plant; Practices

N.R. Lambe, E.A. Navajas, A.V. Fisher, G. Simm, R. Roehe, L. Bunger, Prediction of lamb meat eating quality in two divergent breeds using various live animal and carcass measurements, Meat Science, In Press, Corrected Proof, Available online 8 June 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.06.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4WGBFMM-2/2/0aea5d7cc0a23c19cbd67c7de1572b22>)

Abstract:

This study investigated how accurately taste panel sensory assessments of meat eating quality (MEQ) could be predicted in two divergent lamb breeds, using predictors measured in live animals (weights, subjective conformation assessments, ultrasound, computed tomography (CT) and video image analysis measurements) and carcasses (weights, MLC fat and conformation classes, pH, temperature, carcass dimensions and cross-sectional tissue dimensions), individually and in optimal combinations. Grilled muscle samples from the pelvic limb (semimembranosus) and loin (Longissimus lumborum) of 120 Texel (TEX) and 112 Scottish Blackface (SBF) lambs were assessed by a trained taste panel for texture, juiciness, flavour, abnormal flavour and overall liking. Residual correlations (adjusted for fixed effects, age and sire) between MEQ and predictor traits were low to moderate in size ($<+/-0.42$). MEQ traits predicted best by single measurements were loin flavour and overall liking for TEX (using fat area in a CT scan or subcutaneous fat depth measured post-mortem), and for SBF were leg texture (using carcass weight or temperature) and juiciness (using CT fat area or shoulder conformation score). Combining live animal and carcass measurements increased MEQ prediction accuracies, compared with using either set alone, to explain >40% of residual variation in several MEQ traits, with the highest adjusted R² values for leg juiciness in TEX (0.53) and leg texture in SBF (0.59). The most useful predictors of MEQ depended on breed, with measurements of fatness generally more important in the lean breed and carcass size and muscling more important in the fatter breed.

Keywords: Lambs; Carcass composition; Meat quality

M. Juarez, S. Failla, A. Ficco, F. Pena, C. Aviles, O. Polvillo, Buffalo meat composition as affected by different cooking methods, Food and Bioproducts Processing, In Press, Corrected Proof, Available online 3 June 2009, ISSN 0960-3085, DOI: 10.1016/j.fbp.2009.05.001.

(<http://www.sciencedirect.com/science/article/B8JGD-4WF8SHD-1/2/341166ac79bf54c7fe07711df3c19e8e>)

Abstract:

Buffalo meat is considered in Italy as an alternative product for its good nutritional characteristics. The influence of three cooking methods (boiling, grilling and frying) on the chemical and lipid composition of buffalo meat was evaluated. All the treatments reduced the moisture and increased protein, ash and fat content. The increase in fat content was higher after frying due to the incorporation of fat from olive oil. Fried meat had lower saturated fatty acid content due to the incorporation of mono-unsaturated (C18:1) fatty acids from oil. The incorporation of oil fatty acids caused a decrease in conjugated linoleic acid relative content. Moreover, fried meat showed the highest levels of the unhealthy trans fatty acids. Therefore, frying was shown as the worst cooking methods regarding human health. Boiling and grilling increased thiobarbituric acid reactive substances, while frying had no effect on them.

Keywords: Fatty acid; Grilling; Frying; Boiling; TBARS

Ph. Gatellier, A. Kondjoyan, S. Portanguen, E. Greve, K. Yoon, V. Sante-Lhoutellier, Determination of aromatic amino acid content in cooked meat by derivative spectrophotometry: Implications for nutritional quality of meat, Food Chemistry, Volume 114, Issue 3, 1 June 2009, Pages 1074-1078, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.10.009.

(<http://www.sciencedirect.com/science/article/B6T6R-4TP49SC-1/2/0f173e5808ea0454d5bee0075cc1c0f3>)

Abstract:

The technique of second derivative spectrophotometry was used to determine the level and the heat stability of the three aromatic amino acids (tryptophan, tyrosine and phenylalanine) in bovine meat (*M. Longissimus thoraci*). This paper presents a method which measures the second derivative absorbance values at a wavelength specifically assigned to each aromatic amino acid with corrections for the interference from other amino acids at the same wavelength. Three cooking temperatures were tested in this study (60, 100 and 140 [degree sign]C). Due to important cooking losses, results differ slightly according to the method of calculation (level expressed by gram of wet meat or by gram of proteins). Whatever the calculation method, heating at 60 [degree sign]C had little effect on aromatic acid levels while higher temperatures had a dramatic effect on aromatic amino acids stability. The stability of the three aromatic amino acids during cooking decreased in the order tryptophan > phenylalanine > tyrosine.

Keywords: Meat; Cooking; Second derivative spectrophotometry; Tryptophan; Tyrosine; Phenylalanine

Saqer M. Herzallah, Determination of aflatoxins in eggs, milk, meat and meat products using HPLC fluorescent and UV detectors, Food Chemistry, Volume 114, Issue 3, 1 June 2009, Pages 1141-1146, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.10.077.

(<http://www.sciencedirect.com/science/article/B6T6R-4TW14XP-5/2/1ce44037c19e02e07e11aeac8cec995d>)

Abstract:

Raw and pasteurised sheep's, cow's and goat's milk, eggs, and beef samples from different local markets in Jordan were collected during a period of 5 months (January through May 2007) and examined for aflatoxins B1(AFB1), B2(AFB2), G1(AFG1), G2(AFG2), M1(AFM1) and M2(AFM2). The samples were analysed with high performance liquid chromatography (HPLC) using UV and

Fluorescent detectors. The analysed samples of milk collected in January were found to contain 0.56 [μ g L⁻¹ AFM1 and 0.1 [μ g L⁻¹ AFM2 whilst, the concentration of AFM1 and AFM2 was < 0.05 [μ g L⁻¹ for milk samples collected between March and May. The AFB1, AFB2, AFG1 and AFG2 contents in the analysed food products ranged from 1.10 to 8.32 [μ g L⁻¹ and 0.15 to 6.36 [μ g L⁻¹ in imported and fresh meat samples collected during March, respectively. The mean recovery for the HPLC method was 92% to 109% and the quantification levels were 50 ng L⁻¹ for AFM1 and AFM2. The AFM1 was found in 10% of the tested samples with concentrations between 0.08 and 1.1 [μ g kg⁻¹ and AFM2 was only found in 1.82% of the tested samples with a level of 0.1 [μ g kg⁻¹. The AFM1 levels in the examined foods were higher than the maximum level of AFM1 in liquid milk set by the European Community and Codex Alimentarius of 50 ng L⁻¹.
Keywords: Aflatoxin; M1 (AFM1); M2 (AFM2); B1 (AFB1); B2 (AFB2); G1 (AFG1); G2 (AFG2); High performance liquid chromatography (HPLC)

Hodaka Suzuki, Shigeki Yamamoto, Campylobacter contamination in retail poultry meats and by-products in Japan: A literature survey, Food Control, Volume 20, Issue 6, June 2009, Pages 531-537, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.08.016.

(<http://www.sciencedirect.com/science/article/B6T6S-4TCR1NB-1/2/a2e192d2bc2ea26c3ef311ed174067bc>)

Abstract:

Campylobacter species are common bacterial pathogens that cause gastroenteritis in humans worldwide. In Japan, campylobacteriosis is the leading food-borne bacterial illness, and the consumption of poultry meats and/or by-products is suspected to be the major cause of this illness. In this review, we summarized the papers describing Campylobacter contamination of retail poultry meats and by-products in Japan, most of which were written in Japanese, for estimating the nationwide situation of Japan. On the average, the prevalence of Campylobacter contamination in retail poultry meats and by-products was approximately 60%; this contamination level is comparable to those observed in North America and Europe. Campylobacter jejuni was the dominant species isolated from retail poultry, and Penner serotype 2 and 4-complex were the predominant serotypes of C. jejuni. A large section of poultry was contaminated with Campylobacter spp. at levels that were adequate to induce gastroenteritis if the meat consumed was raw or undercooked. Moreover, quinolone resistance was frequently found in poultry isolates. This review provides detailed and referable data on Campylobacter contamination of retail poultry meats and by-products in Japan, especially for researchers of other countries.

Keywords: Campylobacter spp.; Retail poultry meats and by-products; Japan

Mariusz Rudy, The analysis of correlations between the age and the level of bioaccumulation of heavy metals in tissues and the chemical composition of sheep meat from the region in SE Poland, Food and Chemical Toxicology, Volume 47, Issue 6, June 2009, Pages 1117-1122, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.01.035.

(<http://www.sciencedirect.com/science/article/B6T6P-4VJ0CWR-3/2/e276bc6b73e5a890dbe417fd4c421f7>)

Abstract:

The aim of the research was to determine the level of accumulation of selected heavy metals (Pb, Cd, Hg, As) in meat and liver of sheep. The animals were divided into adequate age groups which allowed the analysis of statistical-mathematical correlations between the age of the animals and contamination of meat. Moreover there was determined the chemical composition of meat of animals of particular age groups. The research material for determining the content of heavy metals was taken from the longissimus muscle of back (m. longissimus dorsi), and samples of liver from the tail lobe. The analysis carried out results allows stating that together with age of sheep there decreases the content of water in meat and the content of protein, fat and ash increases. The contamination of meat and liver of sheep by Cd and Pb apparently depends on age of these

animals. But there was a several times difference between the youngest and the oldest animals in the level of contamination of these tissues was. In muscles and in the liver of tested animals there was not stated the presence of arsenic over 0.001 mg/kg.

Keywords: Sheep meat; Heavy metals; Coefficients of correlation

Tonu Pussa, Piret Raudsepp, Peeter Toomik, Regina Pallin, Uno Maeorg, Sirje Kuusik, Riina Soidla, Meili Rei, A study of oxidation products of free polyunsaturated fatty acids in mechanically deboned meat, *Journal of Food Composition and Analysis*, Volume 22, Issue 4, June 2009, Pages 307-314, ISSN 0889-1575, DOI: 10.1016/j.jfca.2009.01.014.

(<http://www.sciencedirect.com/science/article/B6WJH-4VT5TJX-1/2/9c9fb162a68bd80533c18cf1c0198560>)

Abstract:

Preparation of mechanically deboned meat (MDM) enables a more economical use of animal products and reduction of the amount of biological wastes. On the other hand, enhanced lipid oxidation causes concerns about safety and quality of MDM. There is no information about the actual chemical structure and possible health impact of these oxidation products. The relatively low price of MDM may cause a temptation of adulteration of comminuted meat products with MDM. Until now, no good chemical marker for the presence of MDM is known. We have investigated the chemical composition of different MDMs by LC-tandem mass-spectrometry and identified a number of free fatty acid oxidation products (oxylipins). All the MDMs studied contained significantly higher amounts of free unsaturated fatty acids and oxylipins than the corresponding hand-deboned meats (HDMs). Their concentration generally yet remarkably increased during storage of the MDMs. The highest peaks at the MS base peak chromatogram of a MDM belong to 9,10,13-trihydroxy-11-octadecenoic acid (9,10,13-THODE), the main candidate for the chemical marker of MDM and an unresolvable mixture of 13-hydroxy-9,11-octadecadienoic (13-HODE) and 9-hydroxy-11,13-octadecadienoic (9-HODE) acid. In most of the oxidized MDM samples, 9,10-dihydroxy-12-octadecenoic acid (9,10-DiHOME; LTX-diol) was observed in concentrations that may give rise to some toxicological concern.

Keywords: Mechanically deboned meat (MDM); Oxidation; Oxylipins; PUFAs; THODE; HODE; Leukotoxin diol; LC-ESI-MS/MS; Food safety; Food analysis; Food composition

Anna Jofre, Teresa Aymerich, Narcis Grebol, Margarita Garriga, Efficiency of high hydrostatic pressure at 600 MPa against food-borne microorganisms by challenge tests on convenience meat products, *LWT - Food Science and Technology*, Volume 42, Issue 5, June 2009, Pages 924-928, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.12.001.

(<http://www.sciencedirect.com/science/article/B6WMMV-4V47CNS-2/2/611091772e67b94a9f653e7ccfed0453>)

Abstract:

The food-borne pathogens *Listeria monocytogenes*, *Salmonella enterica*, *Staphylococcus aureus*, *Yersinia enterocolitica* and *Campylobacter jejuni*, and the spoilage lactic acid bacteria (LAB), *Escherichia coli* and the yeast *Debaryomyces hansenii* were inoculated on slices of cooked ham, dry cured ham and marinated beef loin. During storage at 4 [degree sign]C, *L. monocytogenes* and LAB increased up to 3.5 log units while the other species, unable to grow under refrigeration, continued at the spiking level. The application of a 600 MPa treatment effectively inactivated most of the microorganisms, the counts of which, except for LAB that increased in cooked ham and in beef loin, progressively decreased or maintained below the detection limit during the whole storage (120 days at 4 [degree sign]C).

Keywords: Food-borne pathogens; High-pressure processing; Meat products; Safety; Shelf-life

Y.M. Choi, B.C. Kim, Muscle fiber characteristics, myofibrillar protein isoforms, and meat quality, *Livestock Science*, Volume 122, Issues 2-3, June 2009, Pages 105-118, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.08.015.

(<http://www.sciencedirect.com/science/article/B7XNX-4TN5MR0-1/2/0da904d666193cc2e4b7dfd535e3837c>)

Abstract:

The objectives of this review were to examine the present knowledge on: (1) the muscle fiber characteristics of skeletal muscle, (2) the diversity of the myofibrillar protein isoforms and their relationship to muscle fiber characteristics, and (3) the understanding of how the effects of the fiber characteristics and protein isoforms influence postmortem metabolism and meat quality, including the technological aspects and sensory characteristics of meat. The histochemical characteristics of skeletal muscle are primarily the result of genetic and environmental factors, including gender, muscle type, breed, age, hormones, exercise, etc. The morphological and biochemical characteristics of muscle fiber are factors that influence energy metabolism in living muscle, but they influence postmortem muscle as well. Muscle fibers are divided into various types, depending on the myosin heavy chain (MHC) isoforms they express. Moreover, not only the MHC, but also the myosin light chain, troponin, and tropomyosin isoforms can influence muscle fiber characteristics. On this basis, the isoform composition of myofibrillar protein can influence postmortem rigor development, and consequently, meat quality. Hence, muscle fiber characteristics and myofibrillar protein isoforms are very useful indicators for examining variations in muscle metabolism at the postmortem period as well as ultimate meat quality. Moreover, such characteristics from live animals can be used to predict meat quality and can be applied in selection programs to improve and control meat quality. Still, however, the effects of the protein isoforms on ultimate meat quality are not yet fully understood. Therefore, to practically apply this knowledge for the improvement and control of meat quality, more information must be gathered on how histochemical and biochemical characteristics influence meat quality in livestock.

Keywords: Myofibrillar protein isoforms; Muscle fiber; Meat quality

Claudia Terlouw, Alban Berne, Thierry Astruc, Effect of rearing and slaughter conditions on behaviour, physiology and meat quality of Large White and Duroc-sired pigs, *Livestock Science*, Volume 122, Issues 2-3, June 2009, Pages 199-213, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.08.016.

(<http://www.sciencedirect.com/science/article/B7XNX-4TT1G7W-1/2/370f13eae71edeba13e550bce7fe088>)

Abstract:

The present study investigated the effect of outdoor rearing and genetic background on behaviour and meat quality traits in heavyweight pigs. Large White and Duroc-sired pigs were reared in groups of 3 castrated males and 3 females, conventionally or in fields, from April to October, in a study with two replicates. Compared to indoor pigs, outdoor pigs were more active and showed a larger range of behaviour suggesting improved welfare from a behavioural point of view. During 5 h of isolation, outdoor pigs were less active and had lower heart rates, and in another test, they reacted less to a non-familiar object (traffic cone). Pigs were slaughtered at 150 kg live weight, half of each treatment group after mixing, short transport, and overnight lairage and half immediately following short transport. Outdoor pigs were less aggressive during pre-slaughter mixing. Ante- and post-mortem glycogen content of the Longissimus lumborum (LL), Semimembranosus (SM) and Semispinalis capitis (SC) muscles depended on slaughter conditions, sire breed, rearing conditions, gender and year of experimentation, sometimes influencing ultimate pH. Effects of rearing on muscle glycogen content and post-mortem pH were stronger during the second year of rearing. Effect of slaughter conditions on glycogen content and ultimate pH depended on fighting levels during pre-slaughter mixing. Outdoor rearing increased muscle redness. Drip and cooking loss were higher in Large White than Duroc-sired pigs. Drip and cooking loss were correlated with

early post-mortem and ultimate pH. Thawing loss was correlated with early post-mortem temperature and ultimate pH. Finally, reactivity to isolation had a predictive value as pigs more active during isolation had less skin damage due to fighting during pre-slaughter mixing. In conclusion, despite large effects of year of experimentation, outdoor rearing, sire breed, and slaughter conditions influenced behaviour and muscle characteristics.

Keywords: Duroc; Large White; Stress; Individual differences; Meat quality; Slaughter

R.L. Farrow, G.H. Loneragan, J.W. Pauli, T.E. Lawrence, An exploratory observational study to develop an improved method for quantifying beef carcass salable meat yield, *Meat Science*, Volume 82, Issue 2, June 2009, Pages 143-150, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4VBDKPB-2/2/830864544c484242196edfea80b6e63a>)

Abstract:

Eighty-seven grain-finished steers were harvested, evaluated, and fabricated into wholesale cuts to determine what measured composition indicators most accurately describe the percentage of closely trimmed salable meat yield. Indicators of lean and fat composition present at the cross-section between the 12th and 13th ribs were objectively evaluated using Assess image analysis software. Salable meat yield ranged from 50.18% to 72.92%, trimmable fat yield ranged from 12.87% to 36.69%, and bone yield ranged from 10.07% to 19.21%. Regression models were developed to estimate percentage of total salable meat yield. Composition indicators chosen to predict salable meat yield included hot carcass weight (HCW), perinephric fat weight, longissimus muscle area (LMA), subcutaneous fat thickness (SFT), ratio of LMA to subcutaneous fat area, and ratio of subcutaneous fat depth to HCW. These results indicate that prediction of beef carcass salable meat yield can be improved via modification to current measures used in the USDA yield grade equation and addition of new measures.

Keywords: Beef; Fabrication yield; Prediction

G. Luciano, F.J. Monahan, V. Vasta, P. Pennisi, M. Bella, A. Priolo, Lipid and colour stability of meat from lambs fed fresh herbage or concentrate, *Meat Science*, Volume 82, Issue 2, June 2009, Pages 193-199, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4VCH71K-4/2/9bf103952a548435067d41bf79b8eafd>)

Abstract:

Fourteen male Comisana lambs were divided into two groups at 45 days of age and were individually penned for 105 days. Over this period, seven lambs were fed a concentrate-based diet (C), whereas the remaining animals received vetch (*Vicia sativa*; H) harvested daily and given fresh to the animals. Lipid oxidation was measured in both minced cooked meat (semimembranosus muscle, SM) over 4 days of aerobic refrigerated storage and on minced raw meat stored over 14 days in a high oxygen atmosphere. Colour descriptors, haem pigment concentration, and metmyoglobin percentages were also determined during storage duration on the minced raw meat. Lipid oxidation increased over time in cooked and raw meat ($P < 0.0005$), but lower TBARS values were found in both cooked and minced meat from lambs fed vetch compared to those given concentrates ($P = 0.001$; $P = 0.006$, respectively). Higher a^* values, lower b^* values and lower hue angle values were observed in meat from H-fed animals as compared to meat from C-fed lambs ($P = 0.006$; $P = 0.02$; $P = 0.005$, respectively). Metmyoglobin formation increased over time ($P < 0.0005$), but the H diet resulted in lower metmyoglobin percentages than the C diet ($P = 0.006$). Haem pigment concentration decreased over the 14 days of storage ($P < 0.0005$). We conclude that, under conditions that promote oxidative stress in meat, a herbage-based diet can improve the oxidative stability of meat compared to a concentrate-based diet.

Keywords: Lamb; Lipid oxidation; Colour stability; Herbage; Concentrate; Diet

M.K. Youssef, S. Barbut, Effects of protein level and fat/oil on emulsion stability, texture, microstructure and color of meat batters, *Meat Science*, Volume 82, Issue 2, June 2009, Pages 228-233, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4VD9X9W-5/2/b91355eb0b2f0200da6668a374128db0>)

Abstract:

Beef meat batters formulated with increasing protein level (10-15%) and containing 25% beef fat were compared to batters prepared with 25% canola oil. Emulsion stability of the canola oil treatments was higher (less separation during cooking) at the 10-13% protein level compared to the beef fat treatments. However, above 13% protein this was reversed and the canola oil treatments showed high fat and liquid separation, which did not occur at all in the beef fat treatments. This indicates differences in stabilization of fat versus oil in such meat emulsions. Hardness of the cooked meat batters showed significantly ($P < 0.05$) higher values when the protein level was raised, and was higher in canola oil than in beef fat meat emulsions at similar protein levels. Products' chewiness were higher in the canola oil treatments compared to the beef fat emulsions. Lightness decreased and redness increased in canola oil batters as the protein level was raised. The micrographs revealed the formation of larger fat globules in the beef fat emulsions compared to the canola oil meat emulsions. The canola oil treatment with 14% protein started to show fat globule coalescence, which could be related to the reduced emulsion stability.

Keywords: Meat; Emulsion; Microstructure; Protein; Texture; Canola oil

A. Vicenti, F. Totada, L. Di Turi, C. Cocca, M. Perrucci, L. Melodia, M. Ragni, Use of sweet lupin (*Lupinus albus* L. var. *Multitalia*) in feeding for Podolian young bulls and influence on productive performances and meat quality traits, *Meat Science*, Volume 82, Issue 2, June 2009, Pages 247-251, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4VFK82K-1/2/2d0910f2265f64fbbd7c142980d94ff7>)

Abstract:

The objective of this study was to evaluate the effect of sweet lupin (*Lupinus albus* L. var. *Multitalia*) as a substitute for soybean (*Glycine max* [L] Merr.) in feed on the productive performance and meat quality of Podolian young bulls. The steers were divided into 2 homogeneous groups and were fed durum wheat (*Triticum durum* L.), straw and a complete pellet feed containing 20% sweet lupin seeds or 16.5% soybean. Productive performances were similar for both groups. The values of pH, measured on *Longissimus lumborum* and *Semitendinosus* muscles 24 h after slaughter, were similar. No differences were shown between groups regarding the colour characteristics of both muscles or the tenderness of the cooked meat. No statistical differences were found between diets regarding the fatty acid profile of meats, except for a significantly higher incidence of linoleic acid in the meat obtained from animals on soybean feed. In conclusion, comparable results were obtained when soybean was replaced with sweet lupin seeds in complete pellet feed for Podolian steers.

Keywords: Fatty acid profile; Meat quality; Productive performance; Soybean; Sweet lupin seeds; Young Podolian bulls

Yun-Sang Choi, Ji-Hun Choi, Doo-Jeong Han, Hack-Youn Kim, Mi-Ai Lee, Hyun-Wook Kim, Jong-Youn Jeong, Cheon-Jei Kim, Characteristics of low-fat meat emulsion systems with pork fat replaced by vegetable oils and rice bran fiber, *Meat Science*, Volume 82, Issue 2, June 2009, Pages 266-271, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.01.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4VFK82K-5/2/fd46335e4d026a40b90f1433e2668d79>)

Abstract:

The effects of vegetable oils prepared from olive, corn, soybean, canola, or grape seed, and rice bran fiber on the composition and rheological properties of meat batters were studied. Pork fat at 30% in the control was partially replaced by one of the vegetable oils at 10% in addition to reducing the pork fat to 10%. The chemical composition, cooking characteristics, texture properties, and viscosity of low-fat meat batters were analyzed. The moisture, protein, ash content, uncooked and cooked pH values, b*-value, hardness, cohesiveness, gumminess, chewiness, and viscosity of meat batters with vegetable oil and rice bran fiber were all higher than the control. In addition, batters supplemented with vegetable oil and rice bran fiber had lower cooking loss and better emulsion stability. Low-fat meat batters with reduced pork fat content (10%) and 10% vegetable oil plus rice bran fiber had improved characteristics relative to the regular fat control.

Keywords: Vegetable oil; Frankfurter; Dietary fiber; Rice bran; Low-fat

Tom Ross, Sven Rasmussen, Aamir Fazil, Greg Paoli, John Sumner, Quantitative risk assessment of *Listeria monocytogenes* in ready-to-eat meats in Australia, *International Journal of Food Microbiology*, Volume 131, Issues 2-3, 31 May 2009, Pages 128-137, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.02.007.

(<http://www.sciencedirect.com/science/article/B6T7K-4VKXBW0-1/2/0edba182d5d3098ab9055e5a5045c93f>)

Abstract:

Listeria monocytogenes is a food-borne pathogen that can contaminate processed meats and has caused outbreaks in several nations in which processed meats were the vehicle. Due to its ecology, the control of this organism in ready-to-eat meats is difficult. As a first step in improving risk management for this product: pathogen pair in Australia, a stochastic simulation model to predict the numbers of *L. monocytogenes* likely to be consumed in those products under a wide range of scenarios was developed. The predictions are based on data describing initial contamination levels of both lactic acid bacteria and *L. monocytogenes*, product formulation, times and temperatures of distribution and storage prior to consumption, and consumption patterns. The model was used to estimate the probable numbers of cases of listeriosis due to processed meats in Australia per year. The model predicted that processed meats could be responsible for up to ~40% of cases of listeriosis in Australia, a level considered credible by comparison with available epidemiological data. The reliability of the model, as well as data gaps and further research needs, is discussed.

Keywords: Quantitative risk assessment; Smallgoods; Processed meat; Ham; *Listeria monocytogenes*; Australia

Line Skjot-Rasmussen, Steen Ethelberg, Hanne-Dorthe Emborg, Yvonne Agerso, Lars S. Larsen, Steen Nordentoft, Stefan S. Olsen, Tove Ejlersen, Hanne Holt, Eva Moller Nielsen, Anette M. Hammerum, Trends in occurrence of antimicrobial resistance in *Campylobacter jejuni* isolates from broiler chickens, broiler chicken meat, and human domestically acquired cases and travel associated cases in Denmark, *International Journal of Food Microbiology*, Volume 131, Issues 2-3, 31 May 2009, Pages 277-279, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.03.006.

(<http://www.sciencedirect.com/science/article/B6T7K-4VW54YC-1/2/d666dbcbda7763b0678dfa5d93af192f5>)

Abstract:

Campylobacter jejuni is a frequent cause of bacterial gastroenteritis. Often it causes self-limiting disease but severe or prolonged cases may require antimicrobial treatment. The agricultural use of antimicrobial agents selects for resistance among *C. jejuni* which is transmitted to humans via food. In Denmark, the use of fluoroquinolones in animal husbandry has been restricted since 2003. The purpose of the present study was to look at trends in occurrence of resistance among *C. jejuni* from broiler chickens, broiler chicken meat and human domestically acquired or travel associated

cases. From 1997 through 2007, *C. jejuni* isolates were obtained from The Danish Integrated Antimicrobial Resistance Monitoring and Research Programme (DANMAP) and susceptibility tested for ciprofloxacin, erythromycin, nalidixic acid, and tetracycline. Erythromycin resistance was at a low level in all the reservoirs during the study period. Resistance to ciprofloxacin, nalidixic acid and tetracycline was significantly higher in *C. jejuni* from imported broiler chicken meat compared to Danish broiler chicken meat. In domestically acquired human *C. jejuni* isolates, resistance to ciprofloxacin and nalidixic acid was for most years significantly higher compared to the level found in isolates from Danish broiler chicken meat, whereas the resistance level was similar to the level found in isolates from imported broiler chicken meat. Imported broiler chicken meat may therefore contribute to the high level of ciprofloxacin and nalidixic acid resistance in *C. jejuni* isolates from domestically acquired human infections. In 2006 and 2007, the occurrence of resistance to ciprofloxacin, nalidixic acid and tetracycline was significantly higher in travel associated *C. jejuni* isolates compared to isolates acquired domestically. Even though the use of fluoroquinolones is restricted for animal use in Denmark, Danes are still often infected by fluoroquinolone resistant *C. jejuni* from imported chicken meat or by travelling.

Keywords: Fluoroquinolones; Food animals; Zoonosis

R. Escriu, M. Mor-Mur, Role of quantity and quality of fat in meat models inoculated with *Listeria innocua* or *Salmonella Typhimurium* treated by high pressure and refrigerated stored, *Food Microbiology*, In Press, Corrected Proof, Available online 29 May 2009, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.05.011.

(<http://www.sciencedirect.com/science/article/B6WFP-4WD7B59-5/2/10cd668d024fea51e1d21e3379da8b3b>)

Abstract:

Several variables can influence the effects of high hydrostatic pressure processing (HPP), but the role of fat in the treated sample is still uncertain. We designed a model by which controlling the known variables we could elucidate that role. We applied 400 MPa for 2 min to minced chicken samples inoculated with *Listeria innocua* and *Salmonella Typhimurium* mixed with 10% and 20% of three fat types with different fatty acid composition. Microbial counts were performed during 60 days of refrigerated storage either at 2 [degree sign]C or 8 [degree sign]C.

Immediately after HPP bacterial growth was independent of the type and percentage of fat content, but a possible effect of type of fat could be observed after 60 days of cold storage.

Keywords: *Listeria*; *Salmonella*; Baroprotection; Fatty acid; High hydrostatic pressure

Jinlan Zhang, Guorong Liu, Pinglan Li, Yan Qu, Pentocin 31-1, a novel meat-borne bacteriocin and its application as biopreservative in chill-stored tray-packaged pork meat, *Food Control*, In Press, Corrected Proof, Available online 20 May 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.05.010.

(<http://www.sciencedirect.com/science/article/B6T6S-4WBC1NF-1/2/22606ea465db2f5db2f9500cc2feceaa>)

Abstract:

Pentocin 31-1 was produced by *Lactobacillus pentosus* 31-1, isolated from the traditional China fermented Xuan-Wei Ham. In this work, study on its application as biopreservative in chill-stored nonvacuum-tray-packaged pork meat was carried out. Pentocin 31-1 was prepared by pH-adsorption in 5 l stainless steel fermentor. Each 200 ml semi-purified bacteriocin was obtained from one fermentation, and the specific activity was 1280 AU/ml. The effects of pentocin 31-1 on microbiological counts, physicochemical change and sensory quality of chilled pork in the period of preservation at 4 [degree sign]C was investigated. Results showed that pentocin 31-1 could substantially inhibit the accumulation of VBN and generally suppress the growth of microflora, especially *Listeria* and *Pseudomonas*, during chilled pork storage. Microbiological counts, physicochemical parameters and sensory characteristics of the treatments (40 AU/ml pentocin 31-

1 or 75 AU/ml nisin) had exceeded the limitation of Chinese hygienic standard for fresh meat of livestock by day 15. 80 AU/ml pentocin could extend the shelf life to 15 days and the meat showed good sensory characteristics. These results suggest the potential of pentocin 31-1 as a biopreservative in tray-packaged chilled pork storage.

Keywords: Pentocin; Biopreservative; Chilled pork

Maria V. Santos, Noemi Zaritzky, Alicia Califano, A control strategy to assure safety conditions in the thermal treatment of meat products using a numerical algorithms, Food Control, In Press, Corrected Proof, Available online 15 May 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.05.009.

(<http://www.sciencedirect.com/science/article/B6T6S-4W99VWY-5/2/e98fcb49c3f9c12a7bd4bbd99161551>)

Abstract:

A finite element computational code was programmed in Matlab language to establish time-temperature specifications, in order to assure thermal inactivation of *Escherichia coli* O157:H7 in black sausages, produced in small scale plants. Even though the heating system in these plants may have a temperature control operating on the gas burners, the immersion water temperature can decrease significantly if the load ratio (sausage/water mass) increases; the thermal inertia of the system makes it difficult to re-establish this temperature instantaneously. The effect of the ratio between the amount of thermally treated sausages and the heat capacity of the system, on the temperature drop in the water bath, was mathematically simulated and experimentally validated. Computer simulations were performed by coupling the numerical solution of the microscopic heat conduction equation in the product with the macroscopic heat balance, which considers the heat flux of the gas burners. The model satisfactorily predicted experimental time-temperature results (mean error less than 5%) and constitutes a useful tool for meat processors and plant operators since it allows to determine adequate time-temperature conditions as a function of load ratio and initial water temperature, combining the microbial lethality kinetics with the main program.

Keywords: Finite element method; *Escherichia coli* O157:H7; Microbial inactivation; Black sausage; Thermal processing; Meat products; Process simulation

L. Lefaucheur, A second look into fibre typing - Relation to meat quality, Meat Science, In Press, Corrected Proof, Available online 10 May 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.05.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4W85MF0-1/2/0b5e03ac79b487f4d15d4ca628c76d0c>)

Abstract:

Despite intensive research, a large variation in meat quality is still observed in most meat producing species. It is widely accepted that myofibre type composition is an important source of variation in meat quality. However, the identification of specific and universal relationships between myofibre characteristics, growth performance and meat quality traits remains a challenge. After the presentation of recent knowledge underlying fibre typing, this review describes the involvements of Ca²⁺-dependent mechanisms, and the energy state of the myofibres in the control of contractile and metabolic properties, with a special attention to the AMP-activated protein kinase pathway and mitochondrial compartment. In order to identify muscle components which could mask specific relationships between fibre type composition and meat quality, an analysis of the interactions between myofibres and other muscle cellular components is presented. After a brief description of myogenesis, the significance of the total number of fibres, myofibre cross-sectional area and fibre type composition for growth performance and meat quality is presented. Then, some genetic and environmental factors are proposed as possible tools to control meat quality through the modulation of fibre type characteristics. Finally, a conclusion makes the point on bottlenecks still preventing the identification of specific relationships between fibre

characteristics, growth performance and meat quality, and suggests future perspectives such as direct selection on fibre traits and study of correlated responses, the development of in vitro approaches using cell cultures, manipulation of myogenesis during the fetal period, and the production and use of genetically modified animals.

Keywords: Muscle fibres; Myosin heavy chain; Energy metabolism; Growth; Meat quality

Kris Audenaert, Klaas D'Haene, Kathy Messens, Tony Ruysen, Peter Vandamme, Geert Huys, Diversity of lactic acid bacteria from modified atmosphere packaged sliced cooked meat products at sell-by date assessed by PCR-Denaturing Gradient Gel Electrophoresis, Food Microbiology, In Press, Accepted Manuscript, Available online 4 May 2009, ISSN 0740-0020, DOI: 10.1016/j.fm.2009.04.006.

(<http://www.sciencedirect.com/science/article/B6WFP-4W6Y35C-2/2/c1142739cc14a18adb7ceab78846ee26>)

Abstract:

The predominant lactic acid bacteria (LAB) microbiota associated with three types of modified atmosphere packaged (MAP) sliced cooked meat products (i.e. ham, turkey and chicken) was analyzed at sell-by date using a combination of culturing and molecular population fingerprinting. Likewise routine analyses during industrial MAP production, meat samples were plated on the general heterotrophic Plate Count Agar (PCA) and on the LAB-specific de Man, Rogosa, Sharpe (MRS) agar under different temperature and atmosphere conditions. Subsequently, community DNA extracts were prepared from culturable bacterial fractions harvested from both media and used for PCR targeting the V3 hyper-variable region of the 16S rRNA gene followed by denaturing gradient gel electrophoresis (DGGE) of PCR amplicons (PCR-DGGE). Irrespective of aerobic or anaerobic incubation conditions, V3-16S rDNA DGGE fingerprints of culturable fractions from PCA and MRS medium displayed a high level of similarity indicating that LAB constituted the most dominant group in the culturable bacterial community. Comparison of DGGE profiles of fractions grown at 20, 28 or 37 [degree sign]C indicated that part of the culturable community consisted of psychrotrophs. Four DGGE bands were common among cooked ham, turkey and chicken products, suggesting that these represent the microbiota circulating in the plant where all three MAP product types were sliced and packaged. Based on band sequencing and band position analysis using LAB reference strains, these four bands could be assigned to *Lactobacillus sakei* and/or the closely related *Lactobacillus fuchuensis*, *Lactobacillus curvatus*, *Carnobacterium divergens* and *Leuconostoc carnosum*. In conclusion, the PCR-DGGE approach described in this study allows to discriminate, identify and monitor core and occasional LAB microbiota of MAP sliced cooked meat products and provides valuable complementary information to the current plating procedures routinely used in industrial plants.

W. Ding, L. Kou, B. Cao, Y. Wei, Meat Quality Parameters of Descendants by Grading Hybridization of Boer Goat and Guanzhong Dairy Goat, Meat Science, In Press, Accepted Manuscript, Available online 4 May 2009, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2009.04.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4W6XYKC-1/2/32476def60c881c7da5d6a5b871f5c35>)

Abstract:

Chemical composition, cholesterol levels, fatty acid profile, meat taste, and quality parameters were evaluated in 48 buck kids from goats of the Guanzhong Dairy breed (Group G) and their crosses (Group F1: 1/2 Boer x 1/2 Guanzhong Dairy ?; Group F2: 3/4 Boer x 1/4 Guanzhong Dairy?; Group F3: 7/8 Boer x 1/8 Guanzhong Dairy?) at different ages of slaughter (6, 8 and 10 months). Results indicated that grading hybridization ($P < 0.05$) affected meat nutritive value. The muscle of hybrid goats had lower crude fat and cholesterol, higher crude protein, and greater proportion of C18:2 and C18:3 than that of Group G at each age. Group F1 goats had better ($P < 0.05$) desirable fatty acid (DFA) and polyunsaturated fatty acid (PUFA) to saturated fatty acid

(SFA) ratios and greater (C18:0+C18:1/C16:0) ratios ($P<0.01$) than those of the other genotypes. Furthermore, the muscles of hybrid goats were more tender and juicier compared to Group G. In all four groups, cholesterol levels increased ($P<0.01$), muscle color became redder ($P<0.05$) and tenderness decreased ($P<0.05$) with increasing age. The low level of lipids and cholesterol, good meat quality, and the higher ratio of unsaturated to SFA in Group F1 indicate better quality for human consumption.

Keywords: Boer goat; Guanzhong dairy goat; Meat quality; Fatty acid profile

L. Delhalle, C. Saegerman, F. Farnir, N. Korsak, D. Maes, W. Messens, L. De Sadeleer, L. De Zutter, G. Daube, Salmonella surveillance and control at post-harvest in the Belgian pork meat chain, *Food Microbiology*, Volume 26, Issue 3, May 2009, Pages 265-271, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.12.009.

(<http://www.sciencedirect.com/science/article/B6WFP-4VB01SN-2/2/99f6e7e6618d40274c88b68c657794fc>)

Abstract:

Salmonella remains the primary cause of reported bacterial food borne disease outbreaks in Belgium. Pork and pork products are recognized as one of the major sources of human salmonellosis. In contrast with the primary production and slaughterhouse phases of the pork meat production chain, only a few studies have focussed on the post-harvest stages. The goal of this study was to evaluate Salmonella and Escherichia coli contamination at the Belgian post-harvest stages. E. coli counts were estimated in order to evaluate the levels of faecal contamination. The results of bacteriological analysis from seven cutting plants, four meat-mincing plants and the four largest Belgian retailers were collected from official and self-monitoring controls. The prevalence of Salmonella in the cutting plants and meat-mincing plants ranged from 0% to 50%. The most frequently isolated serotype was Salmonella typhimurium. The prevalence in minced meat at retail level ranged from 0.3% to 4.3%. The levels of Salmonella contamination estimated from semi-quantitative analysis of data relating to carcasses, cuts of meat and minced meat were equal to -3.40 ± 2.04 log CFU/cm², -2.64 ± 1.76 log CFU/g and -2.35 ± 1.09 log CFU/g, respectively. The E. coli results in meat cuts and minced meat ranged from 0.21 ± 0.50 to 1.23 ± 0.89 log CFU/g and from 1.33 ± 0.58 to 2.78 ± 0.43 log CFU/g, respectively. The results showed that faecal contamination still needs to be reduced, especially in specific individual plants.

Keywords: Salmonella; Escherichia coli; Pork; Meat; Post-harvest

Saeed Akhtar, Daniel Paredes-Sabja, J. Antonio Torres, Mahfuzur R. Sarker, Strategy to inactivate Clostridium perfringens spores in meat products, *Food Microbiology*, Volume 26, Issue 3, May 2009, Pages 272-277, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.12.011.

(<http://www.sciencedirect.com/science/article/B6WFP-4VB01SN-3/2/67b401226e414d64b83b584c554465b7>)

Abstract:

The current study aimed to develop an inactivation strategy for Clostridium perfringens spores in meat through a combination of spore activation at low pressure (100-200 MPa, 7 min) and elevated temperature (80 [degree sign]C, 10 min); spore germination at high temperatures (55, 60 or 65 [degree sign]C); and inactivation of germinated spores with elevated temperatures (80 and 90 [degree sign]C, 10 and 20 min) and high pressure (586 MPa, at 23 and 73 [degree sign]C, 10 min). Low pressures (100-200 MPa) were insufficient to efficiently activate C. perfringens spores for germination. However, C. perfringens spores were efficiently activated with elevated temperature (80 [degree sign]C, 10 min), and germinated at temperatures lethal for vegetative cells (≥ 55 [degree sign]C) when incubated for 60 min with a mixture of L-asparagine and KCl (AK) in phosphate buffer (pH 7) and in poultry meat. Inactivation of spores (~ 4 decimal reduction) in meat by elevated temperatures (80-90 [degree sign]C for 20 min) required a long germination period (55 [degree sign]C for 60 min). However, similar inactivation level was reached with shorter

germination period (55 [degree sign]C for 15 min) when spore contaminated-meat was treated with pressure-assisted thermal processing (568 MPa, 73 [degree sign]C, 10 min). Therefore, the most efficient strategy to inactivate *C. perfringens* spores in poultry meat containing 50 mM AK consisted: (i) a primary heat treatment (80 [degree sign]C, 10 min) to pasteurize and denature the meat proteins and to activate *C. perfringens* spores for germination; (ii) cooling of the product to 55 [degree sign]C in about 20 min and further incubation at 55 [degree sign]C for about 15 min for spore germination; and (iii) inactivation of germinated spores by pressure-assisted thermal processing (586 MPa at 73 [degree sign]C for 10 min). Collectively, this study demonstrates the feasibility of an alternative and novel strategy to inactivate *C. perfringens* spores in meat products formulated with germinants specific for *C. perfringens*.

Keywords: *C. perfringens*; Food poisoning; Spore germination; Spore inactivation; High pressure processing

Karina Rossini, Caciano P.Z. Norena, Florencia Cladera-Olivera, Adriano Brandelli, Casein peptides with inhibitory activity on lipid oxidation in beef homogenates and mechanically deboned poultry meat, *LWT - Food Science and Technology*, Volume 42, Issue 4, May 2009, Pages 862-867, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.11.002.

(<http://www.sciencedirect.com/science/article/B6WMV-4TYJV54-1/2/fb4e4a282ad384dd27a3baa6664f90d8>)

Abstract:

Bioactive peptides obtained by enzymatic hydrolysis of casein may have antioxidant activity. In this work, casein peptides were obtained using the proteolytic enzymes Alcalase and Flavourzyme. Casein was hydrolyzed for 4 h at 50 [degree sign]C and pH 8, and the resulting peptides were analyzed. The enzymatic hydrolysis with Flavourzyme resulted in higher concentration of soluble protein and free amino acids, and produced peptides with lower molecular mass than those obtained with Alcalase, as observed by gel permeation chromatography and polyacrylamide gel electrophoresis. Casein peptides obtained with Flavourzyme also exhibited greater antioxidant capacity using the ABTS radical method. Casein peptides (20 mg ml⁻¹) effectively inhibited lipid peroxidation in ground beef homogenates and mechanically deboned poultry meat. Casein peptides may be useful in meat processing as another naturally occurring antioxidant, helping to prevent off-flavor formation in meat products and increasing shelf life.

Keywords: Casein peptides; Enzymatic hydrolysis; Antioxidant; Ground beef; Mechanically deboned poultry meat (MDM)

A. Dalle Zotte, Z. Princz, Sz. Metzger, A. Szabo, I. Radnai, E. Biro-Nemeth, Z. Orova, Zs. Szendro, Response of fattening rabbits reared under different housing conditions. 2. Carcass and meat quality, *Livestock Science*, Volume 122, Issue 1, May 2009, Pages 39-47, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.07.021.

(<http://www.sciencedirect.com/science/article/B7XNX-4T9BXS6-1/2/33c54a0d37552b4ec61866347c09760f>)

Abstract:

This 2 x 2 x 2 factorial experiment was conducted to study the effects of housing system (pair caged - cage - : 2 rabbits/0.122 m² vs open top pen housed - pen - : 13 rabbits/0.86 m²; same stocking density), floor type (wire mesh vs plastic net), and environmental enrichment (with vs without gnawing stick) on the meat quality of Pannon White growing rabbits (n = 64). The housing system significantly influenced slaughter weight (2590 vs 2531 g in cage or pen, respectively; P < 0.01), reference carcass (RC) weight (1266 vs 1234 g; in cage or pen, respectively; P < 0.05), and the hind leg meat to bone ratio (6.11 vs 5.62 in cage or pen, respectively, P < 0.001). The animals reared in pens showed paler meat with lower pHu than that of those reared paired in cages. Hind leg meat dry matter and protein content were also influenced by the housing system (26.3 vs 25.9%, 21.9 vs 21.6%; in cage or pen, respectively; P < 0.05). Pen housed rabbits had

significantly heavier femur and tibia bone weight and higher fracture toughness than pair caged rabbits. Floor type affected the fore part/RC weight ratio (29.2 vs 29.6% of the RC on plastic net or wire mesh, respectively). Gnawing stick presence increased slaughter yield (59.0 vs 58.3%; $P < 0.05$), RC weight (1266 vs 1236 g; $P < 0.05$) and the forepart/RC ratio (29.6 vs 29.2% RC; $P < 0.05$) while significantly reducing the meat colour b^* value and increasing m. Longissimus dorsi shear force (0.60 vs 0.50 kg/cm²; $P < 0.01$). The hind leg meat fatty acid profile was only slightly influenced by experimental factors. Although this study showed pair caged rabbits to have increased carcass weight with better meatiness and other meat quality traits, hind leg bone strength was shown to be higher in pen housed rabbits.

Keywords: Rabbits; Housing system; Floor type; Gnawing stick; Meat quality

M.C. Carrilho, M.M. Campo, J.L. Olleta, J.A. Beltran, M. Lopez, Effect of diet, slaughter weight and sex on instrumental and sensory meat characteristics in rabbits, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 37-43, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4V3HHK3-3/2/dff635f662823b7c42314f23d124a4f3>)

Abstract:

The effect of the fattening diet, slaughter weight and sex on meat quality was studied in a total of 156 hybrid rabbits. After weaning, rabbits were divided into three groups of 52 animals each (50% male and 50% female), that were allocated for three weeks to one of three commercial diets containing low (14.28%, A), medium (18.04%, B) and high (20.48%, C) fibre content with decreasing energy levels. Animals were slaughtered at 2.0 and 2.3 kg after the consumption of a common pre-slaughter non-medicated concentrate and pH, colour, water-holding capacity (WHC), Warner-Bratzler shear test and sensory analysis were all measured. Meat from animals fed with low fibre and high energy was the least luminous. Rabbits slaughtered at 2.0 kg showed more yellowness than at 2.3 kg at 0 min. In both traits, these differences did not prevail after 15 min of blooming. Globally, meat from males was more coloured than that of the females, both at 0 and 15 min of blooming. No significant differences were found for pH, WHC or shear test for the individual effects. In the sensory analysis, rabbit and grass odours were more intense at 2.0 kg than at 2.3 kg of slaughter weight.

Keywords: Rabbit; Meat quality; Fibre diet; Weight; Sex

Bulent Ekiz, Alper Yilmaz, Mustafa Ozcan, Cuneyt Kaptan, Hulya Hanoglu, Ismail Erdogan, Hulya Yalcintan, Carcass measurements and meat quality of Turkish Merino, Ramlic, Kivircik, Chios and Imroz lambs raised under an intensive production system, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 64-70, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4V4KR05-2/2/1ed85aace58cf5b9965a1002e35dbd6d>)

Abstract:

Effect of breed on carcass measurements and meat quality characteristics were investigated by using 46 lambs from Turkish Merino, Ramlic, Kivircik, Chios and Imroz breeds. Chios and Imroz carcasses had smaller values for carcass quality characteristics. Breed had no significant effect on pH at 45 min and 24 h post-mortem, water holding capacity and cooking loss. Kivircik and Imroz lambs had lower Warner Bratzler shear force values than those of Ramlic and Turkish Merino lambs ($P < 0.01$). Meat samples from Kivircik lambs had the highest redness value. Differences among breeds for sensory characteristics, except tenderness were not significant. Tenderness scores given to meat samples of Kivircik lambs were significantly higher ($P < 0.01$) than those of Turkish Merino, Ramlic and Imroz lambs. Indigenous Kivircik breed, which had high carcass quality as those of improved breeds, might be considered for production of better quality meat in Marmara Region of Turkey.

Keywords: Breed effect; Carcass measurements; Meat quality; Eating quality; Lamb

G. Liste, M. Villarroel, G. Chacon, C. Sanudo, J.L. Olleta, S. Garcia-Belenguer, S. Alierta, G.A. Maria, Effect of lairage duration on rabbit welfare and meat quality, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 71-76, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4V74VMP-1/2/0fcedbcb92fb76cc7bc496e5a59ec929>)

Abstract:

This study determined whether short (2 h) or long (8 h) lairage at an abattoir had an effect on plasma stress indicators (haematocrit, glucose, lactate, creatine phosphokinase and corticosterone), instrumental meat quality (pH₂₄, water holding capacity, colour, raw and cooked texture) and sensory meat quality (using a trained sensory panel) in rabbits. The effect of the position of the animals on a multifloor rolling cage stand during lairage was also assessed. Lairage time had a significant effect on blood stress indicators, but only a slight effect on meat quality traits. A lairage duration of 6-8 h is recommended.

Keywords: Rabbit; Animal welfare; Meat quality; Lairage

E. Rius-Vilarrasa, L. Bunger, C. Maltin, K.R. Matthews, R. Roehe, Evaluation of Video Image Analysis (VIA) technology to predict meat yield of sheep carcasses on-line under UK abattoir conditions, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 94-100, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4V75YY7-2/2/1a7abdcdfdd3adb1ac1470af89644b8c>)

Abstract:

The Meat and Livestock Commission's (MLC) EUROP classification based scheme and Video Image Analysis (VIA) system were compared in their ability to predict weights of primal carcass joints. A total of 443 commercial lamb carcasses under 12 months of age and mixed gender were selected by their cold carcass weight (CCW), conformation and fat scores. Lamb carcasses were classified for conformation and fatness, scanned by the VIA system and dissected into primal joints of leg, chump, loin, breast and shoulder. After adjustment for CCW, the estimation of primal joints using MLC EUROP scores showed high coefficients of determination (R²) in the range of 0.82-0.99. The use of VIA always resulted in equal or higher R². The precision measured as root mean square error (RMSE) was 27% (leg), 13% (chump), 1% (loin), 11% (breast), 5% (shoulders) and 13% (total primals) higher using VIA than MLC carcass information. Adjustment for slaughter day and gender effects indicated that estimations of primal joints using MLC EUROP scores were more sensitive to these factors than using VIA. This was consistent with an increase in stability of the prediction model of 28%, 11%, 2%, 12%, 6% and 14% for leg, chump, loin, breast and shoulder and total primals, respectively, using VIA compared to MLC EUROP scores. Consequently, VIA was capable of improving the prediction of primal meat yields compared to the current MLC EUROP carcass classification scheme used in the UK abattoirs.

Keywords: Lamb; Carcass; Meat yield; Video Image Analysis; Subjective assessment

I. Nastasijevic, R. Mitrovic, S. Buncic, The occurrence of *Escherichia coli* O157 in/on faeces, carcasses and fresh meats from cattle, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 101-105, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4V752ST-1/2/2f166690d6700a5363a174bd7f12307b>)

Abstract:

The aim of this study was to investigate whether *Escherichia coli* O157 is present in/on raw beef in Serbia. Correlated faecal and carcasses samples from 115 slaughtered cattle plus 26 uncorrelated carcass samples were examined. *E. coli* O157 detection and identification was performed using

selective enrichment and immunomagnetic separation followed by selective media-plating and biochemical tests.

The *E. coli* O157 occurrences were 2.6% in faeces and 2.8% on carcasses. The *E. coli* O157 occurrences were 0%, 6.2% and 2.1%, respectively, in 106 samples of beef trimmings, 48 samples of minced beef and 48 samples of batter intended for production of raw, fermented sausages. The results confirmed that faecal contamination is very important for the occurrence of *E. coli* O157 on beef carcasses. Furthermore, the present study revealed occasional presence of the pathogen in raw materials used for producing raw, fermented beef sausages.

Keywords: *Escherichia coli* O157; Beef; Faeces; Carcass; Trimmings; Fermented sausages

X. Xande, J. Mouro, H. Archimede, J.L. Gourdine, D. Renaudeau, Effect of sugarcane diets and a high fibre commercial diet on fresh meat and dry-cured ham quality in local Caribbean pigs, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 106-112, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4VB5K56-1/2/9211dce5e6711d8e8fcf6e310f0ccd3>)

Abstract:

The effects sugar cane (SC) diets and a milling by product diet on meat quality characteristics of fresh meat and dry-cured ham were studied on a total of 48 Creole (CR) pigs. Pigs were fed with a control soya-bean meal corn diet (C1), a soya-bean meal wheat diet (C2), a SC fresh juice diet (SC-J), or a ground cane diet (SC-G). Average BW gain was 657, 530, 546, and 200 g/d for diets C1, C2, SC-J and SC-G, respectively. Lean cuts (i.e., ham and loin) were significantly higher in SC-G than in C1 pigs (472 vs. 424 g/kg; $P < 0.01$); intermediate values were found for C2 and SC-J pigs (427 and 412 g/kg, respectively). The ultimate pH in LD muscle was lower in SC-J than the other groups (5.44 vs. 5.65; $P < 0.01$). The intra muscular fat (IMF) content in LD was significantly higher in SC-J diet and lower in SC-G diet (1.9% and 1.0%, respectively); intermediates values were found for C1 and C2 diets (1.4% on average). Ham weight losses during 6 months drying period were lower for SC-G fed pigs (9.7% vs. 12.4%; $P < 0.05$) whereas weight losses during the 12 months drying period were not affected by diet. The TBA value in dry-cured ham was not affected by diet ($P > 0.05$) whereas the fatty acids profiles of subcutaneous fat in SC-J and SC-G pigs contained more mono-unsaturated and less polyunsaturated fatty acids than in C1 and C2 groups. Significant effects of dietary treatment were found for dry-cured ham sensory quality parameters.

Keywords: Pig; Creole pig; Sugarcane; Meat quality; Fresh meat; Dry-cured meat

M. Al-Bachir, R. Zeinou, Effect of gamma irradiation on microbial load and quality characteristics of minced camel meat, *Meat Science*, Volume 82, Issue 1, May 2009, Pages 119-124, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.12.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4VB01XD-1/2/03645f4223a7fd527264286515cdd0ed>)

Abstract:

The effect of gamma irradiation on microbial load, chemical and sensory characteristics of camel meat has been evaluated. Camel meat was irradiated at doses of 0, 2, 4 and 6 kGy of gamma irradiation. Irradiated and non-irradiated meat was kept in a refrigerator (1-4 [degree sign]C). General composition and sensory evaluation of camel meat was done two days after irradiation, whereas, microbiological and chemical analysis was done immediately after irradiation and throughout the storage periods. The results indicated that all doses of gamma irradiation reduced the total mesophilic aerobic plate counts (TPCs) and total coliforms of camel meat. Thus, the microbiological shelf-life of camel meat was significantly extended from less than 2 weeks (control) to more than 6 weeks (samples irradiated with 2, 4 or 6 kGy). No significant differences in moisture, protein, fat, thiobarbituric acid (TBA) values, total acidity and fatty acids of camel meat

were observed due to irradiation. There were slight effects of gamma irradiation in both total volatile basic nitrogen (VBN) and lipid oxidation values in camel meat. Sensory evaluation showed no significant differences between irradiated and non-irradiated camel meats.

Keywords: Camel meat; Gamma irradiation; Microbiological load; Sensory evaluation; Shelf-life

Nigel Williams, Meat eating on the block, *Current Biology*, Volume 19, Issue 8, 28 April 2009, Pages R305-R306, ISSN 0960-9822, DOI: 10.1016/j.cub.2009.04.008.

(<http://www.sciencedirect.com/science/article/B6VRT-4W5DPDK-1/2/7eb300a8f98617e3ddd776e7ff869317>)

Abstract: Summary

The row is growing over the contribution of humans' eating preferences to damage to the environment. Nigel Williams reports.

B. Janoszka, U. Blaszczyk, A. Damasiewicz-Bodzek, M. Sajewicz, Analysis of heterocyclic amines (HAs) in pan-fried pork meat and its gravy by liquid chromatography with diode array detection, *Food Chemistry*, Volume 113, Issue 4, 15 April 2009, Pages 1188-1196, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.08.005.

(<http://www.sciencedirect.com/science/article/B6T6R-4T5TPSB-5/2/26b81a007f441132c5fdff54621907aa>)

Abstract:

Aminoazaarenes (heterocyclic amines, HAs) contents were investigated in pan-fried pork meat as well as in gravies generated during frying. The clean-up procedure included alkaline hydrolysis, tandem solid phase extraction on columns filled with Extrelut - diatomaceous earth, cation exchanger (propyl sulfonic acid) and chemically bounded phase - C18. Identification and quantitative analysis of HAs fraction was carried out using a HPLC system with DAD-type detector. Separation was achieved by using TSK-gel ODS 80-TM column and a mixture of 5% acetonitrile and 95% triethylamine phosphate buffer (pH 3.3) as a mobile phase. Six compounds were determined: 2-amino-1,6-dimethylimidazo[4,5-b]pyridine (DMIP), 2-amino-3-methylimidazo[4,5-f]quinoline (IQ), 2-amino-3,8-dimethylimidazo[4,5-f]quinoxaline (8-MeIQx), 2-amino-3,4-dimethylimidazo[4,5-f]quinoline (MeIQ), 2-amino-3,4,8-trimethylimidazo[4,5-f]quinoxaline (4,8-DiMeIQx), 2-amino-1-methyl-6-phenyl-imidazo[4,5-b]pyridine (PhIP). Two types of dishes prepared at home according to common recipes used in Poland were investigated. The total content of aminoazaarenes determined in collar was 7.2 and in chop samples 18.0 ng g⁻¹ of cooked meat. The total contents of investigated HAs in gravy samples were 10.2 and 15.1 ng g⁻¹ of cooked meat for collars and chops, respectively.

Keywords: Food analysis; Heterocyclic amines; SPE; HPLC; DAD

D. Tejerina, M.M. Lopez-Parra, S. Garcia-Torres, Potential used of near infrared reflectance spectroscopy to predict meat physico-chemical composition of guinea fowl (*Numida meleagris*) reared under different production systems, *Food Chemistry*, Volume 113, Issue 4, 15 April 2009, Pages 1290-1296, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.08.044.

(<http://www.sciencedirect.com/science/article/B6T6R-4T9M66G-2/2/e87635dbc08dd81bbf84c83b70bd3407>)

Abstract:

Near infrared reflectance spectroscopy (NIRS) was evaluated as a tool to predict the physico-chemical composition of samples of Guinea fowl (*Numida meleagris*) breast and thigh meat. Two different production systems were studied (confinement versus free-range) using 60 animals. The breast and thigh pieces were extracted from the carcass of each animal and analysed according to the official reference methods to determine the content in ash, fat, protein, WHC (water holding capacity), and DM (dry matter). All the samples were scanned to obtain their near infrared reflectance spectrum, using a 19-filter device that reads in the wavelength range of 1445-2348 nm.

Multiple linear correlation (MLR) was used as a statistical model to predict the physico-chemical composition. The best prediction equations were obtained for the fat and protein calibrations, with $SEc = 0.310$ and for fat, and $SEc = 0.640$ and for protein. The validation of the equations was also good for fat and protein ($SEvc = 0.2179$ and 1-variance ratio (VR) = 0.8342, $SEvc = 1.9609$ and 1-VR = 0.7609, respectively). The worst prediction equations were for the WHC and ash content, with $SEc = 1.49$, $SEvc = 4.1711$, 1-VR = 0.392, and $SEc = 0.030$, $SEvc = 0.3421$, 1-VR = 0.4631, respectively.

Keywords: Guinea fowl; *Numida meleagris*; NIRS; Meat quality; Production system

Line Thorsen, Birgitte Bjorn Budde, Anette Granly Koch, Trine Dano Klingberg, Effect of modified atmosphere and temperature abuse on the growth from spores and cereulide production of *Bacillus weihenstephanensis* in a cooked chilled meat sausage, International Journal of Food Microbiology, Volume 130, Issue 3, 15 April 2009, Pages 172-178, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.01.009.

(<http://www.sciencedirect.com/science/article/B6T7K-4VDY7V9-1/2/3e2d5dda689dbaa1356abfcad9a7bebd>)

Abstract:

The effect of modified atmosphere packaging (MAP) on the germination and growth of toxin producing psychrotolerant *Bacillus* spp is not well described. A model agar system mimicking a cooked meat product was used in initial experiments. Incubation at refrigeration temperature of 8 [degree sign]C for 5 weeks of 26 *Bacillus weihenstephanensis* including two emetic toxin (cereulide) producing strains showed that *B. weihenstephanensis* is sensitive to MAP containing CO₂. The sensitivity to 20% CO₂ was dependent on strain and oxygen level, being increased when oxygen was excluded from the MAP. Growth from spores was observed at the earliest within 2 weeks when 20% CO₂ was combined with 2% O₂ and in 3 weeks when combined with 0% O₂ (the remaining atmosphere was made up from N₂). Results were validated in a cooked meat sausage model for two non-emetic and one emetic *B. weihenstephanensis* strain. The packaging film oxygen transfer rates (OTR) were 1.3 and 40 ml/m²/24 h and the atmospheres were 2% O₂/20% CO₂ and 0% O₂/20% CO₂. Oxygen availability had a large impact on the growth from spores in the MAP meat sausage, only the most oxygen restricted condition (OTR of 1.3 ml/m²/24 h and 0% O₂/20% CO₂) inhibited growth of the three strains during 4 weeks storage at 8 [degree sign]C. Cereulide production was undetectable during storage at 8 [degree sign]C irrespective of choice of the MAP (quantified by liquid chromatography mass spectrometry/mass spectrometry). MAP storage at 8 [degree sign]C for 1 and 3 weeks followed by opening of packages and temperature abuse for 1.5 h daily at 20 [degree sign]C during 1 week resulted in increased cell counts and variable cereulide production in the meat sausage. A pre-history at 8 [degree sign]C for 1 week in MAP with OTR of 1.3 or 40 ml/m²/24 h and 2% O₂ resulted in cereulide concentrations of 0.816 - 1.353 [micro sign]g/g meat sausage, while a pre-history under the most oxygen restricted condition (OTR of 1.3 ml/m²/24 h, 0% O₂/20% CO₂) resulted in minimal cereulide production (0.004 [micro sign]g/g meat sausage) at abuse condition. Extension of MAP storage at 8 [degree sign]C for 3 weeks followed by abuse resulted in a substantially reduced cereulide production.

Data demonstrates that MAP can be used to inhibit growth of a psychrotolerant toxin producing *Bacillus* spp. during chill storage at 8 [degree sign]C, and substantially reduce the risk of emetic food poisoning at abuse condition. Results are of relevance for improving safety of ready to eat processed chilled foods of extended durability.

Keywords: *Bacillus weihenstephanensis*; *Bacillus cereus*; Cereulide; Temperature abuse; Modified atmosphere; Ready to eat

Petros A. Maragkoudakis, Konstantinos C. Mountzouris, Dimitris Psyrras, Silvia Cremonese, Jana Fischer, Mette D. Cantor, Effie Tsakalidou, Functional properties of novel protective lactic acid

bacteria and application in raw chicken meat against *Listeria monocytogenes* and *Salmonella enteritidis*, *International Journal of Food Microbiology*, Volume 130, Issue 3, 15 April 2009, Pages 219-226, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.01.027.

(<http://www.sciencedirect.com/science/article/B6T7K-4VH89YX-1/2/e69ac7fddc186e2115e13354865eae7e>)

Abstract:

In this study 635 lactic acid bacteria of food origin were evaluated for their potential application as protective cultures in foods. A stepwise selection method was used to obtain the most appropriate strains for application as protective cultures in chicken meat. Specifically, all strains were examined for antimicrobial activity against various Gram positive and Gram negative pathogenic and spoilage bacteria. Strains exhibiting anti-bacterial activity were subsequently examined for survival in simulated food processing and gastrointestinal tract conditions, such as high temperatures, low pH, starvation and the presence of NaCl and bile salts. Selected strains were then examined for basic safety properties such as antibiotic resistance and haemolytic potential, while their antimicrobial activity was further investigated by PCR screening for possession of known bacteriocin genes. Two chosen strains were then applied on raw chicken meat to evaluate their protective ability against two common food pathogens, *Listeria monocytogenes* and *Salmonella enteritidis*, but also to identify potential spoilage effects by the application of the protective cultures on the food matrix. Antimicrobial activity in vitro was evident against Gram positive indicators, mainly *Listeria* and *Brochothrix* spp., while no antibacterial activity was obtained against any of the Gram negative bacteria tested. The antimicrobial activity was of a proteinaceous nature while strains with anti-listerial activity were found to possess one or more bacteriocin genes, mainly enterocins. Strains generally exhibited sensitivity to pH 2.0, but good survival at 45 [degree sign]C, in the presence of bile salts and NaCl as well as during starvation, while variable survival rates were obtained at 55 [degree sign]C. None of the strains was found to be haemolytic while variable antibiotic resistance profiles were obtained. Finally, when the selected strains *Enterococcus faecium* PCD71 and *Lactobacillus fermentum* ACA-DC179 were applied as protective cultures in chicken meat against *L. monocytogenes* and *S. enteritidis* respectively, a significantly reduced growth of these pathogenic bacteria was observed. In addition, these two strains did not appear to have any detrimental effect on biochemical parameters related to spoilage of the chicken meat.

Keywords: Lactic acid bacteria; Protective; Antimicrobial; Chicken; Salmonella; Listeria

B. Berrag, M. Ouzir, J. Cabaret, A survey on meat sheep farms in two regions of morocco on farm structure and the acceptability of the targeted selective treatment approach to worm control, *Veterinary Parasitology*, In Press, Corrected Proof, Available online 15 April 2009, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2009.04.019.

(<http://www.sciencedirect.com/science/article/B6TD7-4W2W5N6-F/2/477d79c65a7bafcc26ef8e10e6a9983d>)

Abstract:

Sheep production is very important in Morocco and two regions (Chaouia plain and semi-mountainous Middle-Atlas) play a significant role in this production. Ten farms were investigated for nematode species and resistance each region. Pooled material from each region provided evidence of benzimidazole resistance in *Teladorsagia* in both regions; *Haemonchus contortus* was resistant in the Chaouia only. Forty eight farms in Chaouia and 27 farms in Middle-Atlas were given questionnaires in order to characterize farms and sheep production and to investigate interest in anthelmintic targeted selective treatments (TST) against digestive-tract strongyles. TST is intended to restrict the use of anthelmintics to animals with high infection or presenting clinical signs. The acceptance of TST (67 and 81% of farmers at Chaouia plain and Middle-Atlas respectively) was strongly associated with availability of guidance for infection or clinical markers for selecting sheep in need of treatment. TST interest is associated with health indicators (Gower

coefficient nearly one) and the lower cost of TST is highly attractive. The farmers showing an interest in TST have a larger number of ewes, use pasture under forest and have higher number of lambs consumed or sold per ewe. They tend to have collective ownership, acceptable hygienic conditions in the sheepfold and contracted workers. They turn to their neighbours regarding sick animals and get advice on drug selection from veterinarians. The structure of the farm is then linked to the potential use of TST.

Keywords: Sheep; Targeted selective treatment; Digestive-tract strongyle; Anthelmintic; Resistance; Morocco

J. Cabaret, M. Benoit, G. Laignel, C. Nicourt, Current management of farms and internal parasites by conventional and organic meat sheep French farmers and acceptance of targeted selective treatments, *Veterinary Parasitology*, In Press, Corrected Proof, Available online 15 April 2009, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2009.04.018.

(<http://www.sciencedirect.com/science/article/B6TD7-4W2W5N6-G/2/2cef8479f790de4b43f3466b41f26be2>)

Abstract:

Sheep meat production in France is characterized by large flocks and a limited supply of labour. Digestive-tract strongyles are considered as one of the main health problems and control relies mostly on the use of anthelmintics, although resistance to at least the benzimidazoles is increasing. We conducted interviews on nine conventional and seven organic farms regarding whether an anthelmintic targeted selective treatment program could fit within the operations of the farms. In addition, necropsies of lambs were performed on three organic farms, and faecal egg counts and small lungworm counts were performed on all farms in autumn in ewes. Each interview consisted of an open discussion on sheep health and was terminated with comments on digestive-tract helminth infection as detected in parallel with the interview. Factors likely to affect the adoption of the targeted selective treatment approach were subjected to cluster analysis. Conventional farms were mostly advised by veterinarians and relied on systematic planning of anthelmintic treatments. The frequency of treatments was up to once a month for lambs and two to three times a year for ewes. The concept of selecting animals to be treated according to a scheme of targeted selective treatments based on phenotypic markers (e.g., anaemia, diarrhoea, weight gains) was not seen as feasible by these farmers. Conversely, organic farmers, with greater use of advisors and a restricted range of anthelmintic treatments were more susceptible to integrating phenotypic markers into their practices for controlling digestive-tract strongyles.

Keywords: Meat sheep; Targeted selective treatments; Organic production; Digestive-tract strongyles; Resistance; Anthelmintic

Jessica Stockburger, Britta Renner, Almut I. Weike, Alfons O. Hamm, Harald T. Schupp, Vegetarianism and food perception. Selective visual attention to meat pictures, *Appetite*, Volume 52, Issue 2, April 2009, Pages 513-516, ISSN 0195-6663, DOI: 10.1016/j.appet.2008.10.001.

(<http://www.sciencedirect.com/science/article/B6WB2-4TPX0HC-1/2/360d716ec2fe7701e4963dc0ab41f46a>)

Abstract:

Vegetarianism provides a model system to examine the impact of negative affect towards meat, based on ideational reasoning. It was hypothesized that meat stimuli are efficient attention catchers in vegetarians. Event-related brain potential recordings served to index selective attention processes at the level of initial stimulus perception. Consistent with the hypothesis, late positive potentials to meat pictures were enlarged in vegetarians compared to omnivores. This effect was specific for meat pictures and obtained during passive viewing and an explicit attention task condition. These findings demonstrate the attention capture of food stimuli, deriving affective salience from ideational reasoning and symbolic meaning.

Keywords: Eating behavior; Vegetarianism; Meat; Emotion; Affect; Event-related potentials; LPP

Weibin Bai, Wentao Xu, Kunlun Huang, Yanfang Yuan, Sishuo Cao, Yunbo Luo, A novel common primer multiplex PCR (CP-M-PCR) method for the simultaneous detection of meat species, *Food Control*, Volume 20, Issue 4, April 2009, Pages 366-370, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.05.021.

(<http://www.sciencedirect.com/science/article/B6T6S-4STB0CS-1/2/b65e176b23f79b8acaf90f3f4b81e777>)

Abstract:

A novel common primer multiplex PCR (CP-M-PCR) was applied to detect four kinds of meats (chicken, cattle, pig and horse) as raw materials. A common adapter was designed in the 5'-end of species-specific reverse primers which matched with the species-specific DNA sequences for each species and also used as the common primer (CP). CP-M-PCR primers were designed to uncover different length fragments of 239, 292, 412, and 451 bp from chicken, cattle, pig and horse meats, respectively. The bands of specific DNA fragments amplified by CP-M-PCR method still appeared until the concentration of species-specific primers diluted to 0.015 pmol and primer sensitivity was increased by 100 times compared with conventional multiplex PCR without CP. CP-M-PCR detection limit of the DNA samples was 0.1 ng (36.4 copies) for single kind of meat as well as four kinds of meats. CP-M-PCR method simplified the PCR reaction system and conquered the disparate amplified efficiency from different primers. The CP-M-PCR method could be widely applied in practical detection for simultaneous identification of other meat species and their products.

Keywords: Multiplex PCR; Meat species; Detection; Common primer

Benard O. Abong'o, Maggy N.B. Momba, Prevalence and characterization of *Escherichia coli* O157:H7 isolates from meat and meat products sold in Amathole District, Eastern Cape Province of South Africa, *Food Microbiology*, Volume 26, Issue 2, April 2009, Pages 173-176, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.10.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4TTMJRP-1/2/e05a75b54cefb4197a603eebdc8a2acf>)

Abstract:

Meat and meat products have been implicated in outbreaks of *Escherichia coli* O157:H7 in most parts of the world. In the Amathole District Municipality of the Eastern Cape Province of South Africa, a large number of households consume meat and meat products daily, although the microbiological quality of these types of food is questionable. The present study investigated the prevalence of *E. coli* O157:H7 isolated from selected meat and meat products (45 samples each of biltong, cold meat, mincemeat, and polony) sold in this area. Strains of *E. coli* O157:H7 were isolated by enrichment culture and confirmed by polymerase chain reaction (PCR). Also investigated were the antibiogram profiles of the *E. coli* O157:H7 isolates. Five (2.8%) out of 180 meat and meat products examined were positive for *E. coli* O157:H7 that carried the *fliCH7*, *rfbEO157*, and *eaeA* genes. Two of the *E. coli* O157:H7 isolates were resistant against all the eight antibiotics tested. To prevent *E. coli* O157:H7 infections, meat and meat products such as biltong, cold meat, mincemeat and polony should be properly handled, and packed in sterile polyvinyl wrappers.

Keywords: Prevalence; *Escherichia coli* O157:H7; *fliCH7*; *rfbEO157*; *eaeA*

Teck Lok Wong, Stuart MacDiarmid, Roger Cook, *Salmonella*, *Escherichia coli* O157:H7 and *E. coli* biotype 1 in a pilot survey of imported and New Zealand pig meats, *Food Microbiology*, Volume 26, Issue 2, April 2009, Pages 177-182, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.10.002.

(<http://www.sciencedirect.com/science/article/B6WFP-4TPHRNM-1/2/594a1fdf406b0afa54a378f04bacb107>)

Abstract:

A pilot survey for the pathogens *Salmonella* and *Escherichia coli* O157:H7, and *E. coli* biotype 1 was conducted on 100 New Zealand-produced (domestic) pig carcasses and 110 imported pig meat samples over an 8-month period to assess the likelihood of introduction of novel pathogen strains into New Zealand (NZ), and as a guide for development of a domestic pork National Microbiological Database programme. *Salmonella* was not isolated from domestic pig carcasses or from pig meat imported from Canada and the USA. The prevalence of *Salmonella* in imported pig meat was 3.6% (95% CI 1.0-9.0) with positive samples detected from Australian pig meat. The prevalence of *E. coli* O157:H7 on domestic pig carcasses was 1% (95% CI 0.03-5.4) while the overall prevalence of *E. coli* O157:H7 in imported pig meat was 1.8% (95% CI 0.2-6.4), detected mainly from Australian but not from Canadian or US pork. All except three samples have an *E. coli* biotype 1 count of <100 CFU cm⁻² or g⁻¹, indicating good hygiene quality of domestic and imported pig meat. The results demonstrated that importation of uncooked pig meat is a potential route for the introduction of new clones of *Salmonella* and *E. coli* O157:H7 into New Zealand.

Keywords: *Salmonella*; *E. coli* O157:H7; Prevalence; Pig meats

Yasser H. Al-Tarazi, Mohamad A. Albetar, Akram R. Alaboudi, Biotyping and enterotoxigenicity of *Staphylococci* isolated from fresh and frozen meat marketed in Jordan, *Food Research International*, Volume 42, Issue 3, April 2009, Pages 374-379, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.01.005.

(<http://www.sciencedirect.com/science/article/B6T6V-4VBDK2S-1/2/430feed10b69a9c3ffcd298f5dcf7cd2>)

Abstract:

A total of 286 fresh and processed meat samples marketed in Jordan were collected for isolation and typing of *Staphylococci*. Devriese's system was followed for biotyping of the isolated *Staphylococcus aureus* subsp. *aureus* and enterotoxigenicity of the isolates was also determined. *S. aureus* subsp. *aureus* was found in 80.8% of the samples. Means counts for meats of the various sources ranged from 5.3 x 10² to 4.3 x 10⁴ cfu/g. However, only 33.6% of the samples had coagulase positive *Staphylococci*. Biotyping of *S. aureus* subsp. *aureus* isolates revealed that 12%, 24%, 8%, and 27% are human, bovine, ovine and non-host specific biovars, respectively. Only 28% of these isolates, of unknown type, were isolated from goat's meat. Enterotoxigenic *S. aureus* subsp. *aureus* isolates accounted for 13.5% of a total of 231 *Staphylococci*. The non-*S. aureus* enterotoxigenic isolates were identified as *Staphylococcus epidermidis*, *Staphylococcus sciuri* and *Staphylococcus intermedius*. *Staphylococci* enterotoxin types A, C, and B accounted for 57%, 36% and 7% of the isolated *S. aureus* subsp. *aureus*, respectively. This study showed that the enterotoxigenic *Staphylococci* represent a potential hazard in meat and the Devriese's biotyping system needs to be extended to accommodate the isolates of unknown type.

Keywords: *Staphylococci*; *Staphylococcus aureus*; Biotyping; Enterotoxin; Meat; Jordan

Matthew Kuffa, Teresa J. Priesbe, Christian G. Krueger, Jess D. Reed, Mark P. Richards, Ability of dietary antioxidants to affect lipid oxidation of cooked turkey meat in a simulated stomach and blood lipids after a meal, *Journal of Functional Foods*, Volume 1, Issue 2, April 2009, Pages 208-216, ISSN 1756-4646, DOI: 10.1016/j.jff.2009.01.010.

(<http://www.sciencedirect.com/science/article/B9848-4VVN529-1/2/23dc3c30c0a013eab954800cd1cd8efd>)

Abstract:

Oxidized lipids that form during digestion of a meal have the potential to promote reactions that incur vascular disease. A grape seed extract (1% of the meat weight) and butylated hydroxytoluene (0.2% of the lipid weight) were each effective at preventing formation of lipid oxidation products for 3 h during co-incubation with cooked turkey meat in simulated gastric fluid (SGF). Grape seed extract (GSE) at 0.1% of the meat weight accelerated lipid peroxide formation in SGF. Increasing concentrations of GSE decreased the ability of iron to partition into isolated

microsomes. Swine trials were conducted in which cooked meat or cooked meat with added antioxidants were fed (seven meals during seven days). Lipid oxidation products were measured in chylomicrons from blood samples that were withdrawn 3 and 4 h after the last meal. Each of the antioxidant treatments that prevented lipid oxidation in SGF also inhibited formation of conjugated dienes in blood chylomicrons ($P < 0.05$). Mechanisms of polyphenol effects are discussed.

Keywords: Polyphenolics; Dietary lipids; Fats; Poultry; Nutraceuticals; Nutrition; Health; Atherosclerosis

Nancy Jerez-Timaure, Nelson Huerta-Leidenz, Effects of breed type and supplementation during grazing on carcass traits and meat quality of bulls fattened on improved savannah, *Livestock Science*, Volume 121, Issues 2-3, April 2009, Pages 219-226, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.06.015.

(<http://www.sciencedirect.com/science/article/B7XNX-4T3KTKV-1/2/614da93f44949ef0153726cd74d19bf2>)

Abstract:

Seventy-one bulls representing six breed types: Brahman (BR), F1-Romosinuano (F1ROMO), F1-Limousin (F1LIMO), F1-Angus (F1ANG), F1-Gelbvieh (F1GELB) and 3/4 Bos taurus (BT) were used to study the effect of breed type and supplementation on carcass traits and meat quality. Slaughter weight endpoint was at approximately 500 kg. In the non-supplemented group, carcasses of F1ANG and BR surpassed the 56% dressing value, whereas those from F1ROMO, F1LIMO and BT dressed less than 56%. However, F1ROMO and BT groups improved their carcass dressing in two percentage points approximately ($P < 0.05$), with supplementation. Carcass weight was only affected by supplementation treatments ($P < 0.05$). At slaughter, the supplemented group dressed higher (56.1%) and produced heavier, less mature, better shaped carcasses than the control group. F1 GELB and F1LIMO showed larger ($> 68 \text{ cm}^2$) longissimus muscle area (LMA) whereas F1ANG and BR carcasses had better external fat finishing scores and thicker 12th-rib fat thickness ($< 1.3 \text{ mm}$). Breed types significantly differed in the yield of most-valuable boneless cuts. Carcasses from supplemented bulls yielded 0.8% more trimmed fat and 1.5% less total retail product.

The supplementation x breed type interaction was significant for Warner-Bratzler shear force (WBSF) and overall tenderness. Steaks from BR, F1GELB and BT resulted with higher WBSF values and lower scores for overall tenderness when animals were supplemented ($P < 0.05$) whereas the highest tenderness score and lowest WBSF value were obtained by non-supplemented BT bulls. The small differences found between BR and crossbred types allows for describing a similar carcass/beef quality performance under the present grazing conditions. Supplementation on pasture, as designed herein, proved to be a useful practice to improve carcass dressing and overall carcass finish but had detrimental effects on bull meat quality. Other management strategies such as castration, and (or) implants, combined with alternate fattening regimes on tropical savannahs, must be designed to improve meat quality of Zebu-influenced bulls.

Keywords: Breed type; Beef cattle; Carcass; Brahman; Bulls; Supplementation

D. Habier, K.-U. Gotz, L. Dempfle, Genetic parameters for performance and meat quality traits of crossbred pigs housed in two test environments, *Livestock Science*, Volume 121, Issues 2-3, April 2009, Pages 275-280, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.06.026.

(<http://www.sciencedirect.com/science/article/B7XNX-4T5S4T0-2/2/47685ddb24a7b2e0e85a0e7605746bc>)

Abstract:

Genetic parameters were estimated for crossbred progeny of Bavarian Pietrain sires housed in two test environments on the two Bavarian test stations. The data contained 13,980 pigs housed in traditional pens for 2 pigs and 3,454 pigs housed in big pens for 10-14 pigs with automatic feeding

system recorded between 2000 and 2004. In total, 584 sires having progeny in both housing systems were available to estimate genetic correlations between the two test environments. The analysis showed that the housing of pigs in big pens is more demanding with respect to the test design than in 2-pig pens. Further, the results show differences in both phenotypic performance and genetic parameters between the two environments. Daily gain is lower and lean meat content is higher in big pens with automatic feeding system. Therefore, it is suspected that pigs develop slower in the new housing due to a different feed intake behavior in comparison to 2-pig pens. This might be the main reason for the moderate genetic correlations among fattening performance traits (0.5-0.7 +/- 0.13), which result in re-rankings of selection candidates depending which kind of information is utilized. Genetic correlations of slaughter and meat quality traits, however, are close to 1. Differences between the variance components in the two test stations have been found and simple pooling of data is problematic with respect to the breeding value estimation.

Keywords: Genetic parameters; Test station; Crossbred pigs; Pietrain; Genotype-environment interaction

M. Juarez, I. Clemente, O. Polvillo, A. Molina, Meat quality of tenderloin from Iberian pigs as affected by breed strain and crossbreeding, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 573-579, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4TTMNJ5-1/2/53fb2216d83f2577c48ce70efe4a2e55>)

Abstract:

In 2007, a new National Quality Standard was published in Spain to regulate the products derived from the Iberian pig carcass, including for the first time fresh meat. In the same way, four different Iberian strains were recognized as official (Lampino, Entrepelado, Retinto and Torbiscal). A batch (n = 10) of each pig strain was selected using neutral DNA markers, and another batch of the most common crossbreeding pigs (Iberian x Duroc) was included into the study as a control. The main meat quality parameters of tenderloin, the most expensive meat cut for fresh consumption, from those five pig groups were analysed. Retinto and Lampino strains showed the closest phenotypic distances, followed by Entrepelado strain. Meat from crossed and Torbiscal pigs had lower water holding capacity, L* and a*, and higher SFA than meat from the other three strains. Crossbred pigs had the lowest protein, intramuscular fat and PUFA contents.

Keywords: Fatty acid; m. Psoas major; Genetic line; Microsatellites; Pork

M. Guillevic, M. Kouba, J. Mourot, Effect of a linseed diet on lipid composition, lipid peroxidation and consumer evaluation of French fresh and cooked pork meats, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 612-618, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4TSD9HV-3/2/3c567678329fc190f212b6e0be0c2fb0>)

Abstract:

Twenty castrated pigs [(Large-White x Landrace) x (Pietrain)] (52.9 +/- 5.1 kg initial body weight) were fed a control or a linseed diet containing 4.2% of extruded linseed. Animals were slaughtered at 106.6 +/- 3.7 kg live weight. There was no effect of diet on pig performance. Feeding the linseed diet increased the contents of n-3 polyunsaturated fatty acids (PUFA) in chops (raw and cooked), chitterlings sausages, country style pate, garlic sausages, liver pate, and smoked belly. However, docosahexaenoic acid (DHA) level was not affected by the linseed diet. The linseed diet produced a robust decrease in the n-6/n-3 and linoleic acid (LA)/[alpha]-linolenic acid (ALA) ratios (<4). Feeding pigs with a high n-3 PUFA diet led to a decrease in the oxidative stability of chops, in contrast to smoked bellies for which thiobarbituric acid-reactive substances (TBARS) values were not affected by the diet. However, there was no deleterious effect on consumer overall appreciation of the meat.

Keywords: Pig; Linseed; n-3 Fatty acid; Lipid peroxidation; Consumer's evaluation; Chops; Pate; Belly

J. Wang, D.K. Shanmugam, Cutting meat with bone using an ultrahigh pressure abrasive waterjet, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 671-677, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4TYR096-1/2/dd6583b2a174c61dd78697aa8bd7a85c>)

Abstract:

An experimental study of abrasive waterjet (AWJ) cutting of beef, pork and lamb meat with and without bone is presented. Salt particles were used as the abrasives. It has been found that an AWJ could significantly increase the depth of cut with much improved cut quality in cutting pure meat as compared to plain (or pure) waterjet cutting, while a plain waterjet was incapable of cutting bone satisfactorily. The study shows that AWJ cutting produced a very narrow kerf of less than 1 mm and hence resulted in much less meat loss than the traditional cutting processes, and meat can be cut at room temperature to eliminate the freezing or chilling costs. It is shown that a traverse speed of 20 mm/s can be used to cut through 44 mm thick beef rib bones with good cut quality. When slicing pure meat of 150 mm thickness, the traverse speed of 66.67 mm/s can yield very good cut quality. It is suggested that AWJ cutting is a viable technology for meat cutting. Plausible trends for the depth of cut, cutting rate and cut quality with respect to the process variables are discussed. Recommendations are finally made for the selection of the most appropriate process parameters for cutting meat of a given thickness.

Keywords: Abrasive waterjet; AWJ; Meat cutting; Non-contact cutting; Meat processing

G. Vignola, L. Lambertini, G. Mazzone, M. Giammarco, M. Tassinari, G. Martelli, G. Bertin, Effects of selenium source and level of supplementation on the performance and meat quality of lambs, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 678-685, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4TYJV3R-1/2/4fe89526f7efc9fa3bb79afae00c3764>)

Abstract:

Objective of this study was to evaluate the performance, the quality and oxidative stability of meat, the total Se and specific selenoamino-acids content of muscle of lambs that were fed diets supplemented from different Se sources and at different levels. Forty-eight Apennine lambs 30 day old (12.78 +/- 0.94 kg) received, during a 63 day period, a total mixed ration (TMR) which was either Se unsupplemented (Control group - background only- 0.13 mg/kg Se) or supplemented with Na selenite (0.30 mg/kg Se as sodium selenite) or selenium enriched yeast (0.30 mg/kg and 0.45 mg/kg Se as Se-yeast).

Growth performance, feed to gain ratio, carcass and meat quality (pH, drip and cooking losses, colour, GSH-Px activity and chemical analysis) did not show any difference between the treatments. Meat colour and oxidative stability during 9 days of refrigerated storage were unaffected by dietary supplementation, suggesting that, at the levels of Se used in this experiment, dietary Se, even from an organic source, had limited potential for reducing lipid oxidation. Selenium supplementation raised the Se content in muscle ($P < 0.001$) with the greatest increase when Se-yeast was fed. Although selenite increased total Se, it did not influence total or specific selenoamino-acids in this tissue. On the contrary, Se-yeast supplementation led to an increase in muscle Se-methionine content. We conclude that Se supplementation can increase significantly muscle Se levels and produce, particularly when Se-yeast is fed, a source of Se enriched meat as Se-methionine.

Keywords: Lamb; Selenium; Meat quality; Oxidative stability; Selenomethionine

Markus Zell, James G. Lyng, Denis A. Cronin, Desmond J. Morgan, Ohmic cooking of whole beef muscle - Optimisation of meat preparation, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 693-698, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4TYYTD8-2/2/4b0ff04e44a90a7380956b94cde0561d>)

Abstract:

Uniform ohmic heating of solid foods primarily depends on the uniformity of electrolyte distribution within the product. Different preparation techniques were tested in an attempt to ensure an even salt dispersion within a full beef muscle (biceps femoris). Meat pieces were soaked, injected and tumbled using a range of procedures before ohmic cooking at pasteurization temperatures. A final preparation method (multi-injection (five points) with a 3% salt solution followed by 16 h tumbling) was validated. Selected quality parameters of the ohmically cooked products were compared to steam cooked products. Ohmically heated meat had a significantly ($P < 0.05$) uniform lighter and less red colour. Cook loss was significantly lower ($P < 0.05$) in ohmic samples and in relation to tenderness ohmic heated samples were tougher ($P < 0.05$) though the difference was only 5.08 N. Comparable cook values were attained in the ohmic and conventionally cooked products.

Keywords: Ohmic heating; Salt distribution; Biceps femoris; Meat preparation; Quality; Cook values

N.R. Lambe, E.A. Navajas, L. Bunger, A.V. Fisher, R. Roehe, G. Simm, Prediction of lamb carcass composition and meat quality using combinations of post-mortem measurements, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 711-719, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4V1TXWF-1/2/f8bef01abde9f388ab75904dc6557765>)

Abstract:

Various post-mortem measurements (carcass weights, conformation and fatness classes, external carcass dimensions, eye muscle dimensions, subcutaneous fat depth, pH and temperature) were recorded on 197 Texel (TEX) and 200 Scottish Blackface (SBF) lamb carcasses. The potential use of these measurements to predict carcass composition and key meat quality traits was investigated, to enable categorisation of carcasses in the abattoir and/or for use in genetic improvement programmes. By combining different measurements, accurate predictions of dissected carcass muscle weight (adjusted R^2 0.93 in TEX, 0.88 in SBF) and fat weight (adjusted R^2 0.84 in TEX, 0.87 in SBF) were achieved, and moderate predictions of intra-muscular fat (adjusted R^2 0.56 in TEX, 0.48 in SBF), whilst shear force was predicted with low to moderate accuracy (adjusted $R^2 < 0.33$ across breeds and cuts). Sex, eye muscle dimensions and subcutaneous fat depth improved predictions of carcass composition and intra-muscular fat, whilst pH or temperature provided little additional benefit for these traits, but increased prediction accuracies for shear force. These results could contribute to the development of automated carcass grading systems or help inform breeding decisions.

Keywords: Lamb; Carcass composition; Meat quality; Breed

M.R.F. Lee, P.R. Evans, G.R. Nute, R.I. Richardson, N.D. Scollan, A comparison between red clover silage and grass silage feeding on fatty acid composition, meat stability and sensory quality of the M. Longissimus muscle of dairy cull cows, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 738-744, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4V2HKJ6-1/2/61cdefe8e2eb9781cb8cc67f326373d9>)

Abstract:

Sixteen Holstein-Friesian dairy cull cows were offered either ad libitum grass (G) or red clover (RC) silage for 12 weeks. Dry matter (DM), total nitrogen, and pH was higher for the RC than the

G silage and organic matter, water-soluble carbohydrate, fibre, DM digestibility, ammonia-N, vitamin E and acetic acid higher for the G silage ($P < 0.05$). Fatty acid compositions were different ($P < 0.05$) with G silage having higher levels of C12:0, C14:0, C16:1cis-9, C18:3n-3 and total fatty acids whereas RC had higher levels of C18:0, C18:2n-6 and C20:0. Daily liveweight gain was high and not different between groups (average 1.22 kg/d). Body condition score and back fat thickness at slaughter along with conformation, fat grade and slaughter weight were not different between groups. Animals offered the G silage produced larger *M. longissimus* length ($P < 0.01$) and a trend ($P < 0.1$) for width. RC fed animals had higher proportions of C18:3n-3 ($P < 0.001$), total n-3 fatty acids ($P < 0.01$) and total PUFA compared to animals offered the G silage despite greater intakes of these fatty acids on G ($P < 0.001$). Vitamin E concentration and stability of aged meat during simulated retail display, were lower ($P < 0.05$) from animals offered RC than animals offered G. Shear force and ultimate pH, however were not different in steaks and sensory attributes were similar; the only difference being a higher score ($P < 0.01$) for fishy in the RC steaks. The results suggest that feeding high DMD silage to dairy cull cows can result in a high standard of finish and liveweight gain. Furthermore RC silage as opposed to G silage can increase the beneficial fatty acid profile of the resultant meat.

Keywords: Cull cows; Fatty acids; Grass silage; Red clover silage; Meat quality

Robert Glogowski, Michal Panas, Efficiency and proximate composition of meat in male and female nutria (*Myocastor coypus*) in an extensive feeding system, *Meat Science*, Volume 81, Issue 4, April 2009, Pages 752-754, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.11.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4TWVX3D-2/2/9d2c8244e237518227f9ae3d4fe8c9c0>)

Abstract:

The major carcass traits and chemical composition of muscle samples were evaluated in three age groups (6, 9 and 13 months) of nutria (*Myocastor coypus*). A total of 18 males and 18 females were weighed and slaughtered on the farm, then pelted, eviscerated and frozen. Intramuscular meat samples were taken from the loin and thigh muscles. The carcass yield (CY) was calculated and the total protein (TP), crude fat (CF) and crude ash (CA) content were determined in the laboratory on a dry matter basis. The average CY, without the head, was 53.3%, and was highest for 9-month-old animals (53.6%). In females, the average CY was slightly higher (52.9%) than for males (51.8%). The mean TP content in meat was approximately 21.7% in the loin and 21.1% in thigh muscles. The intramuscular CF content was higher in thigh samples. Older animals had a higher CF content and the CF content was lower in males than in females.

Keywords: Nutria; Slaughter traits; Meat composition

Patrick Presi, Katharina D.C. Stark, Roger Stephan, Eric Breidenbach, Joachim Frey, Gertraud Regula, Risk scoring for setting priorities in a monitoring of antimicrobial resistance in meat and meat products, *International Journal of Food Microbiology*, Volume 130, Issue 2, 31 March 2009, Pages 94-100, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.12.022.

(<http://www.sciencedirect.com/science/article/B6T7K-4V8G9Y8-5/2/5caecabdea0e62e9764b22d606dcf434>)

Abstract:

Meat and meat products can be contaminated with different species of bacteria resistant to various antimicrobials. The human health risk of a type of meat or meat product carry by emerging antimicrobial resistance depends on (i) the prevalence of contamination with resistant bacteria, (ii) the human health consequences of an infection with a specific bacterium resistant to a specific antimicrobial and (iii) the consumption volume of a specific product. The objective of this study was to compare the risk for consumers arising from their exposure to antibiotic resistant bacteria from meat of four different types (chicken, pork, beef and veal), distributed in four different product categories (fresh meat, frozen meat, dried raw meat products and heat-treated meat products).

A semi-quantitative risk assessment model, evaluating each food chain step, was built in order to get an estimated score for the prevalence of *Campylobacter* spp., *Enterococcus* spp. and *Escherichia coli* in each product category. To assess human health impact, nine combinations of bacterial species and antimicrobial agents were considered based on a published risk profile. The combination of the prevalence at retail, the human health impact and the amount of meat or product consumed, provided the relative proportion of total risk attributed to each category of product, resulting in a high, medium or low human health risk.

According to the results of the model, chicken (mostly fresh and frozen meat) contributed 6.7% of the overall risk in the highest category and pork (mostly fresh meat and dried raw meat products) contributed 4.0%. The contribution of beef and veal was of 0.4% and 0.1% respectively. The results were tested and discussed for single parameter changes of the model. This risk assessment was a useful tool for targeting antimicrobial resistance monitoring to those meat product categories where the expected risk for public health was greater.

Keywords: Risk assessment; Monitoring system; Antimicrobial resistance; Meat; Meat products

Micha Horacek, Elisabeth Eisinger, Wolfgang Papesch, Reliability of stable isotope values from meat juice for the determination of the meat origin, *Food Chemistry*, In Press, Corrected Proof, Available online 30 March 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.03.090.

(<http://www.sciencedirect.com/science/article/B6T6R-4VYDG29-2/2/ad8e209255d1eec1530c4b8c20958bb6>)

Abstract:

For the determination of the origin of foods, analysis of the oxygen and hydrogen isotope composition of the food water often is of great importance, because of the differences in the isotope signature of water between different regions. However, it was reported previously that the changes in $[\delta^{18}\text{O}]$ during storage of meat are of such magnitude that existing variations between regions and countries are obscured. We have investigated the $[\delta^2\text{H}]$ and $[\delta^{18}\text{O}]$ changes in meat juice after slaughtering during storage under real cold storage conditions. Our results disagree with a previous publication as we did not observe heavy isotope enrichment of meat juice during industrial cold storages. Additionally we investigated possible changes in $[\delta^{18}\text{O}]$ of the meat juice during the roasting process.

Keywords: Origin; Meat; $[\delta^{18}\text{O}]$; $[\delta^2\text{H}]$; Meat water; IRMS

B. Byrne, J.G. Lyng, G. Dunne, D.J. Bolton, Radio frequency heating of comminuted meats - considerations in relation to microbial challenge studies, *Food Control*, In Press, Corrected Proof, Available online 21 March 2009, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.03.003.

(<http://www.sciencedirect.com/science/article/B6T6S-4VWHW02-1/2/c4276b042eb291cab418e70d1258b1da>)

Abstract:

Bacillus cereus and *Clostridium perfringens* vegetative cell and spore cocktails in maximum recovery diluent (MRD) were inoculated into pork luncheon meat to challenge a previously developed radio frequency (RF) cooking protocol. After RF cooking and cooling microbial enumeration results showed a reduction in *B. cereus* vegetative cell and spores of 5.4 and 1.8 log₁₀ cfu g⁻¹, respectively while the corresponding reduction for *C. perfringens* vegetative cells and spores were 6.8 and 4.1 log₁₀ cfu g⁻¹, respectively. However, post cooking temperatures within the product were lower than anticipated. Subsequent analysis of product thermal and dielectric properties indicated that MRD addition and compositional variations within meat ingredients altered thermal and dielectric properties which in turn contributed to reduced and less uniform temperatures. The study shows that for RF microbial challenge studies, adjustment of product formulation prior to MRD addition is critical to ensure a similar composition to the normal product and a true picture of microbial inactivation.

Keywords: Radio frequency cooking; *B. cereus*; *C. perfringens*; Dielectric and thermal properties

D.T. Juniper, R.H. Phipps, E. Ramos-Morales, G. Bertin, Effects of dietary supplementation with selenium enriched yeast or sodium selenite on selenium tissue distribution and meat quality in lambs, *Animal Feed Science and Technology*, Volume 149, Issues 3-4, 16 March 2009, Pages 228-239, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.06.009.

(<http://www.sciencedirect.com/science/article/B6T42-4T5S4FR-1/2/78cb5309de9fc2b032998591f10cd188>)

Abstract:

The objective was to determine the concentration of total selenium (Se) and the proportion of total Se comprised as selenomethionine (SeMet) and selenocysteine (SeCys), as well as meat quality in terms of oxidative stability in post-mortem tissues of lambs offered diets with an increasing dose rate of selenized enriched yeast (SY), or sodium selenite (SS). Fifty lambs were offered, for a period of 112 d, a total mixed ration which had either been supplemented with SY (0, 0.11, 0.21 or 0.31 mg/kg DM to give total Se contents of 0.19, 0.3, 0.4 and 0.5 mg Se/kg DM for treatments T1, T2, T3 and T4, respectively) or SS (0.11 mg/kg DM to give 0.3 mg Se/kg DM total Se [T5]). At enrolment and at 28, 56, 84 and 112 d following enrolment, blood samples were taken for Se and Se species determination, as well as glutathione peroxidase (GSH-Px) activity. At the end of the study lambs were euthanased and samples of heart, liver, kidney, and skeletal muscle were retained for Se and Se species determination. Tissue GSH-Px activity and thiobarbituric acid reactive substances (TBARS) were determined in Longissimus Thoracis. The incorporation into the diet of ascending concentrations of Se as SY increased whole blood total Se and the proportion of total Se comprised as SeMet, and erythrocyte GSH-Px activity. Comparable doses of SS supplementation did not result in significant differences between these parameters. With the exception of kidney tissue, all other tissues showed a dose dependant response to increasing concentrations of dietary SY, such that total Se and SeMet increased. Selenium content of Psoas Major was higher in animals fed SY when compared to a similar dose of SS, indicating improvements in Se availability and retention. There were no significant treatment effects on meat quality assessments GSH-Px and TBARS, reflecting the lack of difference in the proportion of total Se that was comprised as SeCys. However, oxidative stability improved marginally with ascending tissue Se content, providing an indication of a linear dose response whereby TBARS improved with ascending SY inclusion.

Keywords: Lamb; Meat quality; Selenium; Selenocysteine; Selenomethionine; Tissues

A.M. Herrero, M.I. Cambero, J.A. Ordonez, L. de la Hoz, P. Carmona, Plasma powder as cold-set binding agent for meat system: Rheological and Raman spectroscopy study, *Food Chemistry*, Volume 113, Issue 2, 15 March 2009, Pages 493-499, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.07.084.

(<http://www.sciencedirect.com/science/article/B6T6R-4T3M6DR-3/2/40ee34a93b29ba749a22a38227857c96>)

Abstract:

The effect of plasma powder addition, with or without NaCl, to meat emulsion has been studied. The Raman spectroscopy and rheological characteristics of four model systems [plasma powder (PP), rehydrated plasma powder (PPW), meat emulsion (ME) and meat emulsion with addition of rehydrated plasma powder (MEPPW)] were evaluated. The MEPPW system showed the highest ($p < 0.05$) hardness, springiness and breaking force. A decrease ($p < 0.05$) in hardness and an increase ($p < 0.05$) in adhesiveness with the addition of NaCl were observed in the ME and MEPPW systems. The addition of PPW to meat emulsion (MEPPW system) produced a decrease of $[\alpha]$ -helix and an increase of turns and unordered structure ($p < 0.05$). A decrease in the 1450 cm^{-1} and 2935 cm^{-1} band intensities (related with hydrophobic interactions) associated to PPW addition to ME was observed. Correlations ($p < 0.05$) between meat protein structural changes and rheological properties of meat systems were found.

Keywords: Meat system; Plasma powder; Cold-set binder; Rheology; Raman spectroscopy

Inmaculada M. Buendia, Francisco J. Fernandez, Jose Villasenor, Lourdes Rodriguez, Feasibility of anaerobic co-digestion as a treatment option of meat industry wastes, *Bioresource Technology*, Volume 100, Issue 6, March 2009, Pages 1903-1909, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.10.013.

(<http://www.sciencedirect.com/science/article/B6V24-4V1D7M1-2/2/c06c066ad8b4ad087e3666026ff99879>)

Abstract:

The anaerobic biodegradability of meat industry wastes was investigated in mesophilic batch reactors and combined with a mathematical model for describing their biodegradable fractions. The characteristics and methane yield achieved when digesting waste sludge, suggested the use of this as co-substrate for enhancing the biodegradability of the other wastes. The co-digestion experiments showed that it would be feasible to co-digest cow manure or ruminal waste with waste sludge, but biodegradability of pig/cow slurries was not improved, being strongly influenced by the ammonium concentration of co-digestion mixture. By applying the mathematical model, it was observed that when increasing the amount of waste sludge in the co-digestion mixtures, the amount of inert and slowly biodegradable fractions decreased leading to an increase in readily biodegradable fractions, volatile solid removal efficiencies and methane yields. These results suggest that using readily biodegradable wastes as co-substrate, the anaerobic biodegradability of complex organic wastes can be improved.

Keywords: Ammonia inhibition; Anaerobic biodegradability; Biodegradable fractions; Co-digestion; Meat industry wastes

N. Soldatou, A. Nerantzaki, M.G. Kontominas, I.N. Savvaidis, Physicochemical and microbiological changes of 'Souvlaki' - A Greek delicacy lamb meat product: Evaluation of shelf-life using microbial, colour and lipid oxidation parameters, *Food Chemistry*, Volume 113, Issue 1, 1 March 2009, Pages 36-42, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.07.006.

(<http://www.sciencedirect.com/science/article/B6T6R-4SYCR00-4/2/c59ca944c4ec58a2cbd9f750e8c0520a>)

Abstract:

Fresh Souvlaki-type lamb meat was packaged under vacuum (VP) and modified atmospheres (MAs) and stored under refrigeration (4 [degree sign]C) for a period of 13 days. The following gas mixtures were used: M1: 30%/70% (CO₂/N₂) and M2: 70%/30% (CO₂/N₂). Identical samples were aerobically-packaged and used as control samples. Quality evaluation of product stored under the above packaging conditions was conducted using physicochemical and microbiological analyses. Of the chemical parameters determined, pH values of product showed no significant differences for all packaging treatments as a function of storage time. Lipid oxidation of lamb meat was enhanced by aerobic storage and gas mixture M1, whereas VP and gas mixture M2 controlled lipid oxidation to a greater extent. Souvlaki colour stability (as determined by a*, b* and L* values) was not negatively affected by either VP or MA conditions during the 13 days of storage. Of the two MAs and VP used, gas mixture M2 and VP were the most effective treatments for the inhibition of total viable counts (TVC), *Pseudomonas* spp., yeasts and *Brochothrix thermosphacta* in Souvlaki meat. Lactic acid bacteria (LAB) and Enterobacteriaceae were also found in the microbial flora of Souvlaki and increased during storage under all packaging conditions used. Based on microbiological analysis data and on the proposed a* values, the use of VP and MAP (M2: 70%CO₂/30N₂) extended the shelf-life of 'Souvlaki' meat stored at 4 [degree sign]C by approximately 4-5 days compared to aerobic packaging.

Keywords: Greek food; Lamb; Packaging; Shelf-life; Souvlaki

Barana C. Jayawardana, Ken-ichiro Shimada, Michihiro Fukushima, Mitsuo Sekikawa, Study on presence/absence of central nervous tissues as BSE specified risk material in processed and raw meat products in Japan, *Food Control*, Volume 20, Issue 3, March 2009, Pages 187-190, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.04.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4S98TVG-1/2/287d4f433988366e23be1cbf8a0028e7>)

Abstract:

Various countries including Japan issued the complete removal of brain and spinal cord (SC) tissues from meat products due to BSE risk factor. In this study using commercially available Ridascreen(R) risk material test kit, we tried to evaluate the efficiency of removing specific risk material (SRM) from meat products. Brain and SC tissues were added to grind meats in different concentrations and respective absorption values were obtained using Ridascreen(R) test kit. The kit detected both brain and SC at 0.1%, below its claimed sensitivity level, for brain and SC combined. Thus, using this commercial test kit, we tested cross-section of samples sold in Obihiro area, Japan. In the test standard controls 0, 0.2%, 1% and 2% were practiced. All most all the tested samples absorption values near to standard 0, and it is concluded that all the samples that we tested were absence or at a very minimal levels of SRM.

Keywords: CNS tissues; Meat products; BSE; Japan

Berta Schnettler, Ricardo Vidal, Roberto Silva, Lisete Vallejos, Nestor Sepulveda, Consumer willingness to pay for beef meat in a developing country: The effect of information regarding country of origin, price and animal handling prior to slaughter, *Food Quality and Preference*, Volume 20, Issue 2, European Conference on Sensory Science of Food and Beverages 2006, European Conference on Sensory Science of Food and Beverages 2006, March 2009, Pages 156-165, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2008.07.006.

(<http://www.sciencedirect.com/science/article/B6T6T-4T4Y5T1-1/2/dea4465c55974a10420a8cc8e2900179>)

Abstract:

Considering the importance that animal welfare has attained in developed countries, a personal interview of 770 regular meat buyers in the Bio-Bio and Araucania regions of Chile was conducted to determine the importance of information regarding animal treatment prior to slaughter in the decision-making process when buying beef, to discover the willingness to pay more for this attribute and to distinguish different buyer segments. Using a conjoint analysis design, those surveyed were asked to put eight products in order according to their preference, given the following alternatives: domestic or imported beef, with or without information on animal treatment prior to slaughter and two price options. Origin and information regarding animal treatment were more important than price. Animal welfare is perceived as a desirable condition, but consumers are not willing to pay significantly more when buying meat in order to gain information about animal handling. Through a cluster analysis, four segments were distinguished in each region, with consumers who consider origin as the most important attribute predominating.

Keywords: Animal welfare; Beef; Origin; Market segmentation; Conjoint analysis

Louise Emy Kurozawa, Kil Jin Park, Miriam Dupas Hubinger, Effect of maltodextrin and gum arabic on water sorption and glass transition temperature of spray dried chicken meat hydrolysate protein, *Journal of Food Engineering*, Volume 91, Issue 2, March 2009, Pages 287-296, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.09.006.

(<http://www.sciencedirect.com/science/article/B6T8J-4TGS788-2/2/d56ed7fb682c3c97aead8fc4bcbf9a63>)

Abstract:

The water adsorption isotherm and glass transition temperatures (T_g) of chicken protein hydrolysate powder, with and without maltodextrin or gum Arabic, were studied in order to

investigate their stability. The hydrolysate powder, pure and formulated with 10%, 20% and 30% (w/w) of additive, was obtained by spray drying. The sorption isotherm was determined by the gravimetric method. A differential scanning calorimeter was used to determine the T_g of samples equilibrated with several water activities. As results, the BET model fitted the data for the sorption isotherm of the protein hydrolysate well. A strong plasticizing effect of water on the T_g was found, with a great reduction in this value with increase in water activity. The data for T_g versus solids content gave a satisfactory correlation with the Gordon-Taylor model. The addition of carrier agents increased the T_g of the hydrolysate, decreasing its hygroscopicity and, consequently, increasing its storage stability.

Keywords: Isotherms; Calorimetry; BET model; GAB model; Gordon-Taylor model; Stability

S. Balasubramanian, S. Panigrahi, C.M. Logue, H. Gu, M. Marchello, Neural networks-integrated metal oxide-based artificial olfactory system for meat spoilage identification, *Journal of Food Engineering*, Volume 91, Issue 1, March 2009, Pages 91-98, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.08.008.

(<http://www.sciencedirect.com/science/article/B6T8J-4T7XGJK-2/2/9804e4aa8d4c1801153c39ecfe0fda97>)

Abstract:

A custom-built metal oxide-based olfactory sensing system was used to analyze the headspace from beef strip loins (*M. Longissimus lumborum*) stored at 4 [degree sign]C and 10 [degree sign]C. Area-based features were extracted from the raw signals using various signal processing techniques. Classification models using radial basis function neural networks were developed using the extracted features and performance tested using leave-1-out cross validation method. The developed models classified the beef samples into two groups; 'unspoiled' (<6.0 log₁₀ cfu/g) and 'spoiled' ([greater-or-equal, slanted]6.0 log₁₀ cfu/g) based on the microbial population. Maximum total classification accuracies above 90% were obtained for the samples stored at the two temperatures. Scaling the signals did have a positive influence in improving the classification accuracies obtained. Back propagation neural network prediction model using the pooled data (containing the area scaled feature) resulted in a R-squared of >0.70 between predicted and actual spoilage population from the 10 [degree sign]C and 4 [degree sign]C stored samples.

Keywords: Electronic nose; Artificial neural networks; Radial basis function; Back propagation neural network; Meat spoilage; Classification; Prediction

I. Siro, Cs. Ven, Cs. Balla, G. Jonas, I. Zeke, L. Friedrich, Application of an ultrasonic assisted curing technique for improving the diffusion of sodium chloride in porcine meat, *Journal of Food Engineering*, Volume 91, Issue 2, March 2009, Pages 353-362, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.09.015.

(<http://www.sciencedirect.com/science/article/B6T8J-4TJ6F5T-1/2/48117f12e5cb69e18d3271e9e1182819>)

Abstract:

Pork loins (*Longissimus dorsi*) were immersed in sodium chloride brine (40 g L⁻¹) and treated at 5 [degree sign]C with one of the three following brining treatments: (1) static brining, (2) vacuum tumbling, or (3) ultrasonic brining at low-frequency (20 kHz) and low-intensity (2-4 W cm⁻²). The effect of ultrasonic and tumbling assisted curing technology on porcine tissue microstructure, protein denaturation, water-binding capacity (WBC), water-holding capacity (WHC), sodium chloride diffusion coefficient (D) and on meat textural profile (TPA) was investigated. Results showed that both ultrasonic treatment and tumbling caused favourable microstructural changes in meat tissue. Water-holding capacity and textural properties were improved by ultrasonic treatment compared to both tumbled and static brined samples. However, these positive effects were highly dependent on ultrasonic intensity. Higher intensities and/or longer treatment times caused denaturation of proteins. The constant diffusion coefficient model was able to describe precisely

the NaCl diffusion kinetics during brining. Ultrasonic treatment significantly enhanced the diffusion of salt compared to samples brined under static conditions and diffusion coefficient exponentially increased with increased ultrasonic intensity.

Keywords: Ultrasound; Curing; Diffusion coefficient; Tumbling; Tenderness; Porcine meat

Alfonso Totosaus, M. Lourdes Perez-Chabela, Textural properties and microstructure of low-fat and sodium-reduced meat batters formulated with gellan gum and dicationic salts, *LWT - Food Science and Technology*, Volume 42, Issue 2, March 2009, Pages 563-569, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.07.016.

(<http://www.sciencedirect.com/science/article/B6WMMV-4T5CH1W-2/2/226a894940ea7994f39bca463603b21a>)

Abstract:

Instrumental texture characteristics of low-fat, reduced-sodium meat batters formulated with other salts (KCl and MgCl₂ or CaCl₂) with gellan gum were evaluated. Fat and sodium reduction through incorporation of gellan gum and either of the dicationic salts produced less rigid, more ductile structures. Inclusion of magnesium chloride resulted in better performance, whereas addition of calcium chloride resulted in less desirable properties. The dicationic salts level used probably inhibited the gellan gum thermoreversible properties, affecting its water holding properties. Microstructural differences between the dicationic salt treatments were apparently due to the effect of dicationic salt concentration on myofibrillar protein extraction and solubilization, and gellan gum gelation properties. Use of magnesium chloride in tandem with gellan gum in the studied low-fat, reduced-sodium meat batters effectively compensated for the structural differences caused by fat and sodium reduction.

Keywords: Low-fat; Reduced-sodium; Sausages; Gellan gum; Texture; Microstructure

Renyong Tang, Bing Yu, Keying Zhang, Daiwen Chen, Effects of supplemental magnesium aspartate and short-duration transportation on postmortem meat quality and gene expression of [micro sign]-calpain and calpastatin of finishing pigs, *Livestock Science*, Volume 121, Issue 1, March 2009, Pages 50-55, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.015.

(<http://www.sciencedirect.com/science/article/B7XNX-4TSC444-1/2/f3db0d7b0028c59d6342511147715bca>)

Abstract:

Twenty-four crossbred (Duroc x Large White x Yorkshire) finishing pigs (halothane-negative, mean live weight of 90 kg) were used to determine the effects of supplementing swine finishing diets with magnesium aspartate (MgAsp) and short-duration transportation stress on blood parameters, pork quality and [mu]-calpain and calpastatin mRNA levels in muscle of pigs. Transportation increased serum concentrations of calcium (Ca) ($P < 0.05$), phosphorus (P) ($P < 0.01$), glucose ($P < 0.01$) and cortisol ($P < 0.01$). Supplementation of MgAsp increased concentration of serum Mg ($P = 0.057$). Transportation decreased L* value ($P < 0.05$) of biceps femoris (BF) at 45 min and 24 h, and b* value of longissimus thoracis (LT) at 45 min ($P = 0.073$) after slaughter, and increased pH value of BF at 45 min ($P < 0.05$) and LT at 45 min ($P = 0.098$) after slaughter. However, transportation increased Warner-Bratzler shear force (WBSF) value of BF ($P < 0.05$) at aging 72 h and LT ($P < 0.01$) at aging 24 h and 72 h. Supplementation of MgAsp reduced L* value ($P < 0.05$) of LT at 45 min, and BF at 45 min and at 24 h after slaughter, increased a* value ($P < 0.05$) of BF at 45 min and had a trend to decline WBSF values of BF and LT at aging 24 h compared with the treatments fed the control diet. Transportation improved mRNA level of calpastatin of muscle ($P < 0.05$). Meanwhile, supplementation of MgAsp increased mRNA level of [mu]-calpain of muscle ($P = 0.079$). These results suggested that transportation stress increased postmortem color and pH value of pork and decreased tenderness of pork, and supplemental MgAsp improved color of pork and had a trend to decline WBSF, but did not influence drip loss and pH value of pork.

Keywords: Magnesium aspartate; Short-duration transportation stress; Pork quality; μ -Calpain; Calpastatin

Utaiwan Chattong, Arunee Apichartsrangkoon, Dynamic viscoelastic characterisation of ostrich-meat yor (Thai sausage) following pressure, temperature and holding time regimes, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 426-432, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4THSX89-1/2/799750521716987bec43b66ab0075deb>)

Abstract:

Ostrich-meat yor (Thai sausage) was pressurized at 200, 400 and 600 MPa, with 40 and 50 [degree sign]C for 40 or 60 min, subsequently, the products were assessed by stress control rheometry. Two types of viscoelastic measurement were made. The first was an oscillatory analysis performed at a frequency range of 0.01-10 Hz using a stress of 30 Pa. Secondly, creep and recovery testing was performed with an initial load of 30 Pa for 300 s, unloaded recovery 900 s. Finally, the products were subjected to sensory evaluation using a 9-point hedonic scale. To support the rheological measurement, SDS-PAGE electrophoretic analysis was also applied.

The viscoelastic characterisation of all treated ostrich-meat yor showed that G' was larger than G'' with small $\tan \delta$ values (0.23) and the difference between G' and G'' of each plot was relatively one log cycle. These indicated solid-like behaviour with the predominance of an elastic component. Whereas all creep curves of the treated samples were best characterised by a four-element 'Burgers' model in which the J_0 data and retardation time ($[\lambda]_{ret}$) suggested that increasing pressure levels, temperature and holding time significantly affected the viscoelastic properties of the samples. The electrophoregrams indicated that these structural changes which might be associated with the formation of hydrophobic interactions and disulphide bonding. Most sensory attributes of the pressure treated products received higher scores than conventionally steamed products.

Keywords: High pressure; Ostrich-meat sausage; Viscoelastic behaviour; SDS-PAGE

Akihiro Okitani, Naoki Ichinose, Jun Itoh, Yuika Tsuji, Yayoi Oneda, Keiko Hatae, Koshiro Migita, Masanori Matsuishi, Liberation of actin from actomyosin in meats heated to 65 [degree sign]C, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 446-450, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4TJX1W6-2/2/6bae6eeac6e1e5f00d36c79b7399cecf>)

Abstract:

This study investigated whether actin liberation from myofibrils occurs during the heating of various muscles, as well as squid mantle muscle at temperatures, such as 60 [degree sign]C, employed for vacuum cooking of meats. Actin liberation was demonstrated in scallop striated adductor muscle, but not in beef, pork, or chicken, using the detection method previously employed with squid muscle, in which liberated actin was detected with SDS-PAGE, in the supernatant obtained by centrifugation of the homogenate of heated muscle in 0.2 M KCl at a neutral pH. However, actin liberation was demonstrated in beef, pork and chicken by a new detection method, in which heated muscle was homogenized in 0.6 M KCl or NaCl at a slightly alkaline pH and maintained at 4 [degree sign]C for 16 h with stirring, after which the homogenate was diluted three times with water and centrifuged to obtain the supernatant containing the liberated actin. This new method indicated that actin liberation in beef, pork, and chicken was marked by heating at 65 [degree sign]C, but scarcely induced at 80 [degree sign]C. Thus, the liberation of actin from myofibrils may contribute to the greater tenderness of vacuum-cooked meat (meat heated at a low temperature for long time), as compared with meat prepared by cooking at a higher temperature.

Keywords: Vacuum cooking; Actin liberation; Actomyosin dissociation; Meat cooking

D. Alvarez, M. Castillo, F.A. Payne, Y.L. Xiong, A novel fiber optic sensor to monitor beef meat emulsion stability using visible light scattering, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 456-466, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4TJ1HS6-1/2/a27e937fba62d66c22af86bae426fb9>)

Abstract:

Accurate control of the meat emulsification process for a consistent product quality entails the development of an on-line optical sensor technology to determine the optimum chopping end-point yielding minimum cooking loss and a fine texture. Previous studies suggested that light backscatter measurements can be used to monitor physical-chemical changes during emulsification in comminuted meat products if appropriate spacing between the emitting and detecting optical fibers is used. Light backscatter intensity from beef emulsions manufactured with different fat/lean ratio (0.075, 0.250, and 0.330) and chopping duration (2, 5, and 8 min) were obtained using a dedicated fiber optic prototype. Optical measurements were collected at three radial distances (2, 2.5, and 3 mm) from the light source using a fiber optic spectrometer (300-1100 nm). Light backscatter intensity decreased logarithmically with increasing fiber optic spacing. Light propagation through the emulsion decreased significantly with increasing chopping duration and fat concentration. Cooking loss increased with increasing fat/lean ratio and with under- or over-chopping. The maximum emulsion stability was observed at 5 min of chopping. Several optically derived parameters were found to be significantly correlated with fat loss during cooking. Typically, those correlations were observed to increase with decreasing fiber distance. Based on these findings, an optical configuration is proposed that would compensate for the emulsion heterogeneity, maximizing the existing correlation between the optical signal and the emulsion quality metrics.

Keywords: Beef meat; Chopping process; Fat/lean ratio; Emulsification; Light backscatter; Sensor technology; Fiber optic; Monitoring

G. Drabik-Markiewicz, K. Van den Maagdenberg, E. De Mey, S. Deprez, T. Kowalska, H. Paelinck, Role of proline and hydroxyproline in N-nitrosamine formation during heating in cured meat, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 479-486, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4TN0M1F-1/2/e66a503b4474308fd254a91178508f37>)

Abstract:

N-Nitrosamines are formed in a multi-step reaction of nitrite with free amino acids and amines in the meat products. The aim of this study was to determine the role of proline and hydroxyproline in N-nitrosamines formation during heating of cured meat. A lean meat model was used with different nitrite concentrations (0, 120, and 480 mg/kg), and addition of proline and hydroxyproline (1000 mg/kg), followed by heating at different temperatures. Volatile nitrosamines were analyzed with GC-TEA.

The nitrosamine content never exceeded 10 [μ]g/kg and stayed <LOQ as long as the nitrite level of 120 mg/kg was not surpassed. The importance of proline as a precursor for N-nitrosamine formation was confirmed. In contrast, hydroxyproline inhibited NPYR formation (N-nitrosopyrrolidine) because no traces were found after addition of hydroxyproline. NPYR formation was not related to nitrite, but was significantly influenced by temperature (≥ 200 [$^{\circ}$]C) and proline. NDMA-presence (N-nitrosodimethylamine) in heated meat products was influenced by nitrite and temperatures >120 [$^{\circ}$]C.

Keywords: GC-TEA; Hydroxyproline; N-Nitrosamine formation; N-Nitrosopyrrolidine; Nitrite

R. Bornez, M.B. Linares, H. Vergara, Effects of stunning with different carbon dioxide concentrations and exposure times on suckling lamb meat quality, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 493-498, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4TN82NC-2/2/acf98cf9a5c30a686f1848e182bc51d2>)

Abstract:

Forty-nine Manchega breed male suckling lambs were used to determine the effect of different stunning methods (using two different CO₂ concentrations and exposure times) on lamb meat quality. The lambs were allocated to five stunning treatments including four CO₂ treatments [80% CO₂ for 90 s (G1); 90% CO₂ for 90 s (G2); 90% CO₂ for 60 s (G3); 80% CO₂ for 60 s (G4)] and an electrically stunned control group (G5). The gas-stunning treatments did not cause neither haematomas nor blood splash in the carcasses. Meat quality was evaluated by testing pH, colour (L*, a*, b*, chroma, hue values), water holding capacity (WHC), cooking loss (CL), shear force (SF), drip loss (DL) and total aerobic bacteria. Statistical differences in pH at 24 h post-mortem, colour, WHC and CL were not found among groups. After 7 days post-mortem, there were statistical differences among groups in pH (highest in G4 and G5) and in DL (highest in G1). There were differences in SF due to stunning method evident after 72 h and 7 days ageing. The statistical differences (P < 0.01) among groups on total aerobic bacteria at 24 h (lower and higher values in G2 and G5, respectively) disappeared at 7 days post-mortem. As G2 as G3, could be recommended to stunning suckling lambs since a highest stability with ageing time on meat quality was found using 90% CO₂.

Keywords: Stunning; Carbon dioxide; Suckling lamb; Meat quality

P.E. Strydom, L. Frylinck, J.L. Montgomery, M.F. Smith, The comparison of three [beta]-agonists for growth performance, carcass characteristics and meat quality of feedlot cattle, *Meat Science*, Volume 81, Issue 3, March 2009, Pages 557-564, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.10.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4TPF4NK-3/2/79cf957e5eeb51fbf81c360bfdbaa5cb>)

Abstract:

Forty-eight Bonsmara steers were assigned to three treatment groups and one control group consisting of 12 animals each. The control (C) received no [beta]-agonist, while the three treatment groups received zilpaterol (6 ppm) (Z), ractopamine (30 ppm) (R) or clenbuterol (2 ppm) (Cl) for the last thirty days on feed. Growth performance (final 30 days), USDA quality and yield grades and meat quality (shear force, chemical, histological and biochemical) were compared for the three [beta]-agonist and control groups. Animals responded negatively to Cl treatment during initial stages of supplementation, which was evident in lower feed consumption and initial growth rates. For carcass growth and yield, Cl had greater and more efficient growth rates, higher dressed out yields (proportional), lower USDA yield grades, and reduced marbling compared with C (P < 0.05). For meat quality measurements, the M. longissimus (LL) and M. semitendinosus (ST) were sampled. Cl had the greatest effect (P < 0.05) on WBSF, especially on the LL, followed by Z. Variation in tenderness and ageing effects corresponded with variation in calpastatin activity and myofibrillar fragmentation between treatment groups. While zilpaterol and ractopamine are currently the only products registered for cattle in different countries, it seems that zilpaterol has an advantage in carcass growth efficiency and yield without showing any adaptation problems for animals such as experienced by the more aggressive [beta]-agonist clenbuterol.

Keywords: [beta]-Agonist; Beef; Tenderness; Drip loss; Beef; Calpain; Myofibril fragment length

M.P. Montet, S. Christieans, D. Thevenot, V. Coppet, S. Ganet, M.L. Delignette Muller, L. Duniere, S. Miszczycha, C. Vernozy-Rozand, Fate of acid-resistant and non-acid resistant Shiga toxin-producing *Escherichia coli* strains in experimentally contaminated French fermented raw meat

sausages, *International Journal of Food Microbiology*, Volume 129, Issue 3, 28 February 2009, Pages 264-270, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.12.002.

(<http://www.sciencedirect.com/science/article/B6T7K-4V3HF5K-1/2/5166235ece1d64696896f38f4d3da157>)

Abstract:

Both pathogenic and nonpathogenic *E. coli* exhibit a stress response to sublethal environmental stresses. Several studies have reported acid tolerance and survival characteristics of *E. coli* O157:H7 in foodstuffs, but there are few reports about the tolerance of non-O157 serogroups (STEC) to organic acids in foods.

The purpose of this study was to examine the effect of the manufacturing process of French fermented raw meat sausages on the growth and survival of acid-resistant (AR) and non-acid resistant (NAR) STEC strains. The six strains, 3 AR and 3 NAR, were inoculated separately into raw sausage mixture at a level of 10⁴-10⁵ CFU/g. A total of 19 batches of sausages were manufactured. A rapid and similar decrease in the number of both AR and NAR STEC strains, from less than 1 to 1.5 log₁₀ CFU/g, was observed during the first 5 days of fermentation at 20-24 [degree sign]C. This rapid decrease was followed by a more gradual but continuous decrease in STEC counts after drying at 13-14 [degree sign]C, up to day 35. The STEC counts were < 10 CFU/g after 35 days for the NAR strains and the same concentration for the AR strains on the best before date (day 60). It was not possible to detect any NAR STEC after 60 days. The present study shows that the process used in the manufacture of French sausages results in a complete destruction of NAR STEC strains after 60 days, but it does not have the same effect on the AR STEC strains.

Keywords: Shiga-toxin *Escherichia coli*; French sausages; Acid resistance; Survival

M.S. Yarmand, A. Homayouni, Effect of microwave cooking on the microstructure and quality of meat in goat and lamb, *Food Chemistry*, Volume 112, Issue 4, 15 February 2009, Pages 782-785, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.06.033.

(<http://www.sciencedirect.com/science/article/B6T6R-4STYV3R-1/2/81e500c266e2f52239f40f45aaf3c0b0>)

Abstract:

Fat cell distribution in the structure of semimembranosus muscle of goat and lamb was studied. The effect of various heating methods including conventional, domestic and industrial microwave were investigated using fluorescent light microscopy. Frequency used for microwave heating was 2450 MHz with two wattages levels of 700 (domestic microwave) and 12000 (industrial microwave). All samples were heated to internal temperature of 70 [degree sign]C. The roasted samples in conventional oven were compared with microwave cooking. Fat distribution was different in various heat treatments. The roasted samples had greater fat retention in semimembranosus muscle. Results showed that uneven distribution of fat in muscle system influenced fat loss during cooking. The fat cells in the interior of muscle were lost more slowly compared to the fat located near the surface of the muscle. The overall migration of fat globules during microwave cooking was higher than conventional cooking.

Keywords: Microwave; Semimembranosus muscle; Quality; Microstructure; Fluorescent microscopy

Maarten Nauta, Andy Hill, Hanne Rosenquist, Sigrid Brynestad, Alexandra Fetsch, Peter van der Logt, Aamir Fazil, Bjarke Christensen, Elly Katsma, Birgitte Borck, Arie Havelaar, A comparison of risk assessments on *Campylobacter* in broiler meat, *International Journal of Food Microbiology*, Volume 129, Issue 2, 15 February 2009, Pages 107-123, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.12.001.

(<http://www.sciencedirect.com/science/article/B6T7K-4V3HF5K-2/2/61c82236882fc2ecd9c648e2a390c998>)

Abstract:

In recent years, several quantitative risk assessments for *Campylobacter* in broiler meat have been developed to support risk managers in controlling this pathogen. The models encompass some or all of the consecutive stages in the broiler meat production chain: primary production, industrial processing, consumer food preparation, and the dose-response relationship. The modelling approaches vary between the models, and this has supported the progress of risk assessment as a research discipline. The risk assessments are not only used to assess the human incidence of campylobacteriosis due to contaminated broiler meat, but more importantly for analyses of the effects of control measures at different stages in the broiler meat production chain. This review paper provides a comparative overview of models developed in the United Kingdom, Denmark, the Netherlands and Germany, and aims to identify differences and similarities of these existing models. Risk assessments developed for FAO/WHO and in New Zealand are also briefly discussed.

Although the dynamics of the existing models may differ substantially, there are some similar conclusions shared between all models. The continuous introduction of *Campylobacter* in flocks implies that monitoring for *Campylobacter* at the farm up to one week before slaughter may result in flocks that are falsely tested negative: once *Campylobacter* is established at the farm, the within-flock prevalence increases dramatically within a week. Consequently, at the point of slaughter, the prevalence is most likely to be either very low (< 5%) or very high (> 95%). In evaluating control strategies, all models find a negligible effect of logistic slaughter, the separate processing of positive and negative flocks. Also, all risk assessments conclude that the most effective intervention measures aim at reducing the *Campylobacter* concentration, rather than reducing the prevalence. During the stage where the consumer handles the food, cross-contamination is generally considered to be more relevant than undercooking. An important finding, shared by all, is that the tails of the distributions describing the variability in *Campylobacter* concentrations between meat products and meals determine the risks, not the mean values of those distributions.

Although a unified model for risk assessment of *Campylobacter* in the broiler meat production would be desirable in order to promote a European harmonized approach, it is neither feasible nor desirable to merge the different models into one generic risk assessment model. The purpose of such a generic model has yet to be defined at a European level and the large variety in practices between countries, especially related to consumer food preparation and consumption, complicates a unified approach.

Keywords: Quantitative microbial risk assessment; *Campylobacter*; Broiler meat

E. Marquez-Rios, V.M. Ocano-Higuera, A.N. Maeda-Martinez, M.E. Lugo-Sanchez, M.G. Carvallo-Ruiz, R. Pacheco-Aguilar, Citric acid as pretreatment in drying of Pacific Lion's Paw Scallop (*Nodipecten subnodosus*) meats, Food Chemistry, Volume 112, Issue 3, 1 February 2009, Pages 599-603, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.06.015.

(<http://www.sciencedirect.com/science/article/B6T6R-4SSY910-2/2/6dd5d13336a358c055fbe9e2afc71f61>)

Abstract:

Pacific Lion's Paw Scallop meats were dried at 50, 60, and 70 [degree sign]C after pretreatment in citric acid at pH 3 during zero (control), one, and three hours. Immersion in the acid solution reduced the scallop pH from 6.20 to 5.99 (1 h) and 5.88 (3 h) and directly affected the drying times. At 50 [degree sign]C drying times were 22, 10 and 8.5 h, at 60 [degree sign]C they were 15, 9.5 and 8 h, and at 70 [degree sign]C they were 13, 8 and 6 h for control, 1 h, and 3 h of acid treatment. Drying times were considerably reduced as acid immersion time increased. The drying temperature had no significant effect (p [greater-or-equal, slanted] 0.05) on colour and texture, whereas the acid treatment had a significant effect (p < 0.05), with the control scallops having greater hardness and a more intense dark colouration than those treated with acid (p < 0.05). The

citric acid treatment in drying meats of scallops is a good option to decrease the drying times and therefore the process cost. Moreover, the final product has a better colour because the acid treatment reduces Maillard reaction.

Keywords: Scallop; Isoelectric point; Maillard reactions; Acid immersion

Fiach O'Mahony, Rebecca A. Green, Chris Baylis, Richard Fernandes, Dmitri B. Papkovsky, Analysis of total aerobic viable counts in samples of raw meat using fluorescence-based probe and oxygen consumption assay, *Food Control*, Volume 20, Issue 2, February 2009, Pages 129-135, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.03.003.

(<http://www.sciencedirect.com/science/article/B6T6S-4S39MMB-1/2/a2b2c3d3f89fda00844784900e964f30>)

Abstract:

A simple test for determining total aerobic viable counts in raw meat is presented. Homogenates of meat samples are prepared in full PBW medium, dispensed in the wells of 96-well plate together with the oxygen-sensing probe, Redlight, covered with oil and monitored on a fluorescent reader at 30 [degree sign]C. The probe produces characteristic sigmoidal profiles of fluorescence reflecting depletion of sample dissolved oxygen, with onset time indicating the initial microbial load. The test provides rapid and accurate results (1 and 12 h for contamination levels of 10⁸ and 10³ cfu/g, respectively) and correlates well with the ISO:4833:2003 method ($r = 0.86$), which make it useful as alternative to conventional culture methods for the quick, high throughput determination of TVC (30 [degree sign]C) in meat samples.

Keywords: Food safety; Total aerobic viable counts; Raw meat; Rapid assay; Oxygen consumption; Microbial contamination

Masashi Kanki, Junko Sakata, Masumi Taguchi, Yuko Kumeda, Masanori Ishibashi, Takao Kawai, Kentaro Kawatsu, Wataru Yamasaki, Kiyoshi Inoue, Michiko Miyahara, Effect of sample preparation and bacterial concentration on *Salmonella enterica* detection in poultry meat using culture methods and PCR assaying of preenrichment broths, *Food Microbiology*, Volume 26, Issue 1, February 2009, Pages 1-3, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.07.010.

(<http://www.sciencedirect.com/science/article/B6WFP-4T8HHDC-6/2/80093d7a5e48641f6013d294f60e94ee>)

Abstract:

We evaluated the sensitivity of a PCR assay in the detection of *Salmonella enterica* at the broth preenrichment step of poultry meat. A total of 162 retail poultry meat samples, which were prepared by manual massaging, stomacher or no homogenization were compared for *Salmonella* recovery. Using these homogenization methods, the PCR assay at the broth preenrichment step detected *Salmonella* in, respectively, 48.9%, 62.2% and 50.0% of meat and gible samples detected as *Salmonella*-positive using the culture method. In ground chicken, however, *Salmonella* was detected in 21.7% of samples treated by stomacher homogenization, compared to 40.7% and 48% of untreated and hand-massaged samples, respectively. These results suggest that stomaching of ground chicken causes excessive effusion of food constituents, which affects PCR results. Using the most probable number (MPN) technique, *Salmonella* was detected at under 1.0 CFU/g in 12 ground chicken samples and under 10³ CFU/ml of broth in seven of the 12 broth-enriched samples, which considered the minimum concentration detectable by PCR assay. These results show that *Salmonella* detection using routine PCR assays is difficult in poultry meat, and in particular ground chicken, due to low amounts of *Salmonella* and the presence of inhibitors.

Keywords: *Salmonella*; PCR; Poultry; Chicken

Ana Rivas-Canedo, Estrella Fernandez-Garcia, Manuel Nunez, Volatile compounds in fresh meats subjected to high pressure processing: Effect of the packaging material, *Meat Science*, Volume 81, Issue 2, February 2009, Pages 321-328, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.08.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4T72X2F-6/2/c961300f00248b83f0731e256cca4260>)

Abstract:

The effect of high pressure treatment (400 MPa, 10 min at 12 [degree sign]C) on the volatile profile of minced beef and chicken breast, packaged with or without aluminum foil in a multilayer polymeric bag, was investigated. The analysis of the volatile fraction was carried out by dynamic headspace extraction coupled to gas chromatography-mass spectrometry. Pressurization produced significant changes in the levels of some volatile compounds presumably coming from microbial activity. Some alcohols and aldehydes decreased, while other compounds, such as 2,3-butanedione and 2-butanone, were more abundant in high pressure processed meats. A significant migration of compounds from the plastic material was observed, mainly branched-chain alkanes and benzene compounds. Two functions built by the principal component analysis explained a high percentage of the variance and could be used to separate the samples into four distinct groups, according to high pressure treatment and packaging material.

Keywords: High pressure processing; Packaging material; Volatile compounds; Beef; Chicken breast

N. Mach, A. Bach, C.E. Realini, M. Font i Furnols, A. Velarde, M. Devant, Burdizzo pre-pubertal castration effects on performance, behaviour, carcass characteristics, and meat quality of Holstein bulls fed high-concentrate diets, *Meat Science*, Volume 81, Issue 2, February 2009, Pages 329-334, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.08.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4T72X2F-3/2/6aacb99aeb7d41b71c599a4fbe77c01b>)

Abstract:

The effects of Burdizzo pre-pubertal castration on performance, behaviour, carcass, and meat quality of Holstein bulls fed high-concentrate diets were evaluated. Two hundred bulls (8.0 +/- 0.42 months old) were randomly assigned to control (CTR) or Burdizzo castration (BURD). After 121 d, ADG, BW, and HCW were greater in CTR animals than in BURD animals, as well as, the agonistic and sexual behaviour. However, carcass fatness and intramuscular LT (longissimus thoracis) fat percentage were greater in BURD animals than in CTR animals. Additionally, CTR animals showed lower L*, a*, and b* than BURD. The WBSF was smaller ($P < 0.01$) in BURD than in CTR bulls at all ageing days, and in both treatments decreased ($P < 0.01$) from 0 to 7 d of ageing. Additionally, at day 0 of ageing, meat from BURD animals showed similar WBSF to meat from CTR bulls after 7 d of ageing. However, 23% of BURD animals did not have a complete testicular atrophy, suggesting that the method of castration was not completely effective.

Keywords: Beef; Castration; Performance; Behaviour; Meat quality

N. Atti, M. Mahouachi, Effects of feeding system and nitrogen source on lamb growth, meat characteristics and fatty acid composition, *Meat Science*, Volume 81, Issue 2, February 2009, Pages 344-348, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.08.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4TBGF0V-1/2/9ccafabfade8c7ea8629f76f3a772c88>)

Abstract:

For this study, 28 lambs were allocated to four groups: two groups were raised in stalls and fed a hay-concentrate ration. The two remaining groups were reared on dry pasture and received concentrate in stalls. In each feeding system, two iso-nitrogen concentrates were used, soya bean and soya plus faba bean. At the end of the growth trial (77 days), all lambs were slaughtered. Samples of longissimus dorsi muscle were used for muscle analysis and fatty acid (FA) composition determination. Average daily gain (134 g) was similar for all treatments. Stall lambs deposited significantly ($p < 0.001$) more fat per day (13 vs 5 g) and slightly more muscle (41 vs 35 g) than pasture grazing ones; the first had more fat tissue (5.2 kg) than the later (4.6 kg). All these

parameters were not influenced by nitrogen source. FA profile and meat characteristics were similar for all dietary treatments. It could be concluded that dry pasture did not affect meat quality but lead to the leaner lambs.

Keywords: Sheep; Dry pasture; Stall; Soya; Faba bean; Carcass characteristics; Fatty acids

A. Serra, M. Mele, F. La Comba, G. Conte, A. Buccioni, P. Secchiari, Conjugated Linoleic Acid (CLA) content of meat from three muscles of Massese suckling lambs slaughtered at different weights, *Meat Science*, Volume 81, Issue 2, February 2009, Pages 396-404, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4TFM7M8-1/2/efa092081d99c3494342f4fbce93b516>)

Abstract:

Eighteen Massese male lambs, fed mainly maternal milk were slaughtered at 11, 14 and 17 kg. Samples of Longissimus Dorsi (LD), Triceps Brachii (TB) and Semimembranosus (Sm) muscles were collected. Milk from the lamb's dams was sampled weekly. Fatty acid composition of milk and meat was determined.

TB was the fattest muscle, Sm the leanest one and LD showed an intermediate value of total lipids, while the weight at slaughter did not influence total intramuscular fat content in any muscle. Although slaughter weight slightly affected overall fatty acid composition of muscles, rumenic acid and total CLA content in TB and Sm, but not in LD, significantly increased with slaughter weight. As regard milk fatty acid composition, the contents of total CLA, RA and others minor CLA isomers decreased during the first four weeks after lambing and then increased at the last control (five weeks). The animals slaughtered at a live weight of 14 and 17 kg showed a greater SCD enzyme activity (estimated by product/substrate ratio) and a higher rumen activity (estimated by means of branched chain and odd chain fatty acid content in meat) than animals slaughtered at 11 kg. Cis-7, trans-9 CLA content significantly increased with the slaughter age in TB and SM, while trans-7, trans-9 CLA, only increased in TB, and cis-8, cis-10 CLA, only increased in SM. Further studies are needed in order to verify whether the different behaviour of RA in LD muscle may be due to differences in muscle metabolism or fatty acid utilisation.

Keywords: Lamb; Meat; Massese breed; Fatty acid; CLA; Muscle

Ph. Gatellier, V. Sante-Lhoutellier, Digestion study of proteins from cooked meat using an enzymatic microreactor, *Meat Science*, Volume 81, Issue 2, February 2009, Pages 405-409, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.09.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4TG35NK-1/2/ee422279f052f4b816310fd00f32675c>)

Abstract:

A semi automatic flow procedure with photometric detection was developed for the study of meat protein digestion. This system comprised two independent flow pathways, gathered by two compartments. The gastric compartment was simulated by an ultrafiltration cell fitted with a 10 KDa cut off membrane and the intestinal compartment was simulated by a 1 KDa cut off dialysis membrane. The pathways were filled with solutions simulating digestive conditions. The proposed system was employed in digestion studies of whole protein extracts from raw and cooked (100 [degree sign]C) meat. A mathematical modelling for the determination of the digestive kinetic constants was established. The results show that meat cooking leads to an important decrease of protein digestibility by proteases of the digestive tract.

Keywords: Meat; Cooking; Protein; Digestibility

Joop de Boer, Jan J. Boersema, Harry Aiking, Consumers' motivational associations favoring free-range meat or less meat, *Ecological Economics*, Volume 68, Issue 3, 15 January 2009, Pages 850-860, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.07.001.

(<http://www.sciencedirect.com/science/article/B6VDY-4T4108R-2/2/1d95ee75b435e4e77184ae83b05b6d4a>)

Abstract:

The present paper analyzed the motivational orientations of consumers who choose to eat (1) small portions of meat or (2) ethically distinctive meat, such as free-range meat, in relation to the motivational orientations of their opposites. Going beyond the conventional approach to consumer behavior, our work builds on recent insights in motivational psychology about the ways in which people may approach matches or avoid mismatches to the desired end-state of 'getting enough nourishment by eating the right food'. Consumers who tend to approach matches are often focused on choosing the best alternatives from their choice set (chronic promotion focus). Consumers who tend to avoid mismatches are often focused on rejecting unacceptable alternatives from their choice set (chronic prevention focus). Distinguishing these two motivational orientations provides a scientific basis for the aim to foster more sustainable food consumption and production patterns. Our approach involves a systematic analysis of consumers' goal orientations regarding meat choices. We examined how a sample of Dutch consumers (n = 939) described their chronic motivational orientations regarding food, their own meat choices and, about two weeks later, their promotion- and prevention-oriented associations favoring either small portions of meat and free-range meat or their opposites. Largely in line with our hypotheses we found that consumers with a chronic prevention orientation avoided the mismatch of 'large portions'. Also, those of them who paid the premium price of free-range meat considered eating 'meat produced by intensive farming' a mismatch. Conversely, if consumers with a chronic promotion orientation paid the premium price of free-range meat, they considered this the best alternative from their choice set. Accordingly, choosing a small portion of meat was often approached with a prevention orientation and choosing free-range meat with either a prevention or a promotion orientation. These differences in motivational orientation underline that the pursuit of sustainability requires careful consideration of not just undesirable but also of desirable alternatives.

Keywords: Food choices; Sustainability; Free-range meat; Promotion and prevention orientations

Abdulatif Mrghni Ahhmed, Rumiko Kuroda, Satoshi Kawahara, Kazuyoshi Ohta, Koji Nakade, Takayoshi Aoki, Michio Muguruma, Dependence of microbial transglutaminase on meat type in myofibrillar proteins cross-linking, *Food Chemistry*, Volume 112, Issue 2, 15 January 2009, Pages 354-361, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.05.078.

(<http://www.sciencedirect.com/science/article/B6T6R-4SMWFKC-7/2/d934b1537aa9e04d2dbf1f39e31a13c4>)

Abstract:

The objectives of this study were to determine the factors that cause differences in the improvements of gel strength and [epsilon]([gamma]-glutamyl)lysine (G-L) content in chicken and beef (Japanese black cattle) myofibrillar proteins after adding microbial transglutaminase (MTG). As the amount of MTG added increased, the breaking strength increased progressively ($p < 0.01$) in chicken and beef samples, with the exception of chicken samples treated at 40 [degree sign]C. The values of elasticity in the chicken samples were lower than those of the beef samples ($p < 0.01$). Surprisingly, the elasticity level, [epsilon]([gamma]-glutamyl)lysine contents and myosin heavy chain (MHC) band sizes of chicken and beef at all levels of MTG were significantly different ($p < 0.01$). The results of this study suggest that MTG activity was affected by MTG inhibitors; that MTG develops the texture of myofibrils differently in different species. However, the activity is limited and inconstant among meat proteins, as suggested by the data collected from the chicken samples. As a result, when the transferable amino acid residues are depleted (cross-linked) by MTG activity, the function of MTG will be insignificant. The correlation between MTG and different sources of meat protein is quite unstable but it is strong, which was observed when chicken and beef responded differently to MTG because their chemical and physiological properties were

different. The remarkable rate of formation of cross-linked proteins and the discrepancy between the expected and observed amount of dipeptide raises the possibility that there are enzymes capable of reversing the reaction induced by transglutaminase in chicken and beef myofibrils. In summary, our results suggest that access of MTG to chicken and beef myofibrils is different because it depends on physiological (muscles and their fibre types), biological (substrates) and biochemical (inhibitors and amino acids) variables.

Keywords: Meat proteins; Myofibrils; Transglutaminase; Breaking strength; [epsilon]([gamma]-Gultamyl)lysine content

Dereje T. Asefa, Ragnhild O. Gjerde, Maan S. Sidhu, Solveig Langsrud, Cathrine F. Kure, Truls Nesbakken, Ida Skaar, Moulds contaminants on Norwegian dry-cured meat products, *International Journal of Food Microbiology*, Volume 128, Issue 3, 15 January 2009, Pages 435-439, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.09.024.

(<http://www.sciencedirect.com/science/article/B6T7K-4TN82C5-1/2/dc6e327f7a062b9c353bc7d36877f91f>)

Abstract:

Dry-cured meat production has a long tradition in Norway. However, uncontrolled mould growth on the surface of the dry-cured meat products is causing significant quality problems. As some moulds are mycotoxigenic, their growth on the dry-cured meat products could also pose a serious health risk. Such quality problems and potential health risks can be better handled if the types of moulds growing on the products are known. In total, 161 samples were collected from the ripening and packaging stages of production with the aim of identifying moulds contaminating smoked and unsmoked Norwegian dry-cured meat products. Moulds were isolated either by transferring aerial mycelium of each visible mould colonies on the products or by directly plating pieces of meat on suitable agar media. The isolates were identified at a species level by a polyphasic approach. In total, 264 isolates belonging to 20 species and four fungal genera were identified. The genus *Penicillium* covered 88.3% of the total isolates. This genus contributed to the isolates of smoked and unsmoked products by 91% and 84% respectively. *Penicillium nalgiovense* was the dominant species isolated from both smoked and unsmoked products and covered 38% of the total isolates. *Penicillium solitum* and *P. commune* were the next most frequently isolated species with a contribution of 13% and 10% respectively. Species of *Cladosporium* and *Eurotium* contributed to the total isolates by 6% and 4.9% respectively. Smoking seems to affect the growth of these dominating species differently. An increase in the isolation frequency of *P. nalgiovense* accompanied by the reduction in the occurrence of *P. solitum*, *P. commune* and species of *Cladosporium* was observed on smoked products. The survey showed that the species of *Penicillium* are associated with Norwegian dry-cured meat products in general. *Penicillium nalgiovense*, the dominating mould species, is a potential producer of penicillin and its presence could represent a threat to allergic consumers.

Keywords: Associated mycobiota; Dry-cured meat products; Moulds; Mycotoxins

Xianqin Yang, Sampathkumar Balamurugan, Colin O. Gill, Substrate utilization by *Clostridium estertheticum* cultivated in meat juice medium, *International Journal of Food Microbiology*, Volume 128, Issue 3, 15 January 2009, Pages 501-505, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.10.024.

(<http://www.sciencedirect.com/science/article/B6T7K-4TTHW7B-4/2/7f07b6b5e59f67ebf0003c2dad594541>)

Abstract:

Blown pack spoilage of vacuum packaged beef, which results in packs being grossly distended with gas, is caused by the psychrophile *Clostridium estertheticum*. To determine what substrates are utilized by *C. estertheticum* during growth on beef, *C. estertheticum* subsp. *estertheticum* ATCC 51377, the type strain for that organism, and two isolates from blown pack spoiled beef that

were identified as *C. estertheticum* by 16 S rRNA gene sequencing were grown in meat juice medium at 10 [degree sign]C for up to 14 days. Analysis of the growth media showed that all three organisms grew exponentially on glucose with simultaneous hydrolysis of glycogen. Growth ceased when glucose in the media was depleted; but hydrolysis of glycogen continued at a reduced rate, and lactate was consumed rapidly. The pH values of media fell during growth of the organisms, but rose as the concentrations of lactate subsequently decreased. The major products of fermentation during utilization of glucose were butyrate and acetate, with butyrate greatly predominating. During fermentation of lactate the major products were butyrate and butanol, which were produced in similar amounts. The findings suggest that growth of *C. estertheticum* on vacuum packaged beef may be limited by the availability of glucose, as is the growth of other organisms that usually predominate in the flora of vacuum packaged meat. However, production of gas by fermentation of lactate will likely continue after growth ceases.

Keywords: *Clostridium estertheticum*; Blown pack spoilage; Meat juice medium; Substrate utilization; Fermentation products

S. Luostarinen, S. Luste, M. Sillanpaa, Increased biogas production at wastewater treatment plants through co-digestion of sewage sludge with grease trap sludge from a meat processing plant, *Bioresource Technology*, Volume 100, Issue 1, January 2009, Pages 79-85, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.06.029.

(<http://www.sciencedirect.com/science/article/B6V24-4T719RY-1/2/f0b704c6d977cad273722e7fe9aacd12>)

Abstract:

The feasibility of co-digesting grease trap sludge from a meat-processing plant and sewage sludge was studied in batch and reactor experiments at 35 [degree sign]C. Grease trap sludge had high methane production potential (918 m³/tVS added), but methane production started slowly. When mixed with sewage sludge, methane production started immediately and the potential increased with increasing grease trap sludge content. Semi-continuous co-digestion of the two materials was found feasible up to grease trap sludge addition of 46% of feed volatile solids (hydraulic retention time 16 d; maximum organic loading rate 3.46 kgVS/m³ d). Methane production was significantly higher and no effect on the characteristics of the digested material was noticed as compared to digesting sewage sludge alone. At higher grease trap sludge additions (55% and 71% of feed volatile solids), degradation was not complete and methane production either remained the same or decreased.

Keywords: Anaerobic digestion; Biogas; Co-digestion; Grease trap sludge; Sewage sludge

D.H. Kim, P.N. Seong, S.H. Cho, J.H. Kim, J.M. Lee, C. Jo, D.G. Lim, Fatty acid composition and meat quality traits of organically reared Korean native black pigs, *Livestock Science*, Volume 120, Issues 1-2, January 2009, Pages 96-102, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.004.

(<http://www.sciencedirect.com/science/article/B7XNX-4SSGCTN-1/2/3964fd374798eb26698d9e0c40599acd>)

Abstract:

Current study investigated the effect of feeding systems (conventional vs organic rearing) on carcass characteristics, meat quality and fatty acid composition of *Musculus longissimus dorsi* of Korean native black barrows (KNP). Thirty pigs were reared under a conventional feeding system at indoor area of 1 m² per head, while another thirty pigs were fed an indoor area with organic sawdusts of 1 m² and an outdoor area with free ranges of 1 m² for each pig for organic system. Diet for the organic rearing was also provided according to the guideline for organic pork products. Warner-Bratzler shear force was lower and water holding capacity was higher for pork produced under the organic guidelines. However, pork produced by an organic system did not affect sensory traits compared to pork produced by a conventional one. In addition, longissimus muscle from organically reared pigs had significantly ($P < 0.05$) higher myoglobin content and consequently

higher CIE a*-values compared with those for the conventionally-reared pigs ($P < 0.05$). The organic pork resulted in significantly ($P < 0.05$) higher polyunsaturated fatty acid (PUFA) and unsaturated fatty acid contents, as well as a higher n-3 PUFA than the conventional one ($P < 0.05$).

Keywords: Pigs; Rearing system; Organic; Fatty acid composition; Meat quality

M. Blanco, D. Villalba, G. Ripoll, H. Sauerwein, I. Casasus, Effects of early weaning and breed on calf performance and carcass and meat quality in autumn-born bull calves, *Livestock Science*, Volume 120, Issues 1-2, January 2009, Pages 103-115, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.003.

(<http://www.sciencedirect.com/science/article/B7XNX-4SV12WY-1/2/19e03b5252a8721dd100070fb5876bf4>)

Abstract:

This study assessed the effects of age at weaning (early weaning at 90 d or traditional weaning at 150 d) and breed (Parda de Montana or Pirenaica) on calf performance and carcass and meat quality in autumn-calving beef cattle. At calving, 14 Parda de Montana and 14 Pirenaica cow-calf pairs were randomly assigned to one of two weaning treatments, and kept indoors during lactation. After weaning, calves were fed an intensive diet until slaughter at 450 kg. The interaction between age at weaning and breed was not significant for any of the parameters studied. From 90 d to 150 d, early weaned calves had greater ADG ($P = 0.001$) and IGF-I concentrations ($P = 0.001$) than traditionally weaned calves, but their leptin concentrations were similar ($P = 0.15$). During the finishing phase, performance, daily feed intake, and efficiency did not differ between treatments. Early weaning did not affect age at slaughter, carcass weight, fatness score, fat colour, and meat quality, but improved carcass conformation ($P = 0.04$). Early weaned calves had greater total DMI ($P = 0.002$) with greater concomitant feed costs ($P = 0.001$) and yielded a slightly greater income than traditionally weaned calves; therefore, economic margins did not differ. Parda de Montana calves tended to have greater ADG from birth to 90 d and were heavier at 90 d ($P = 0.01$) than were Pirenaica calves. From 90 d to 150 d, performance and IGF-I and leptin concentrations did not differ between breeds; thus, Parda de Montana calves remained heavier at 150 d. During the finishing phase, at times, weight gains of Parda de Montana and Pirenaica calves differed, but the overall performance, feed intake, and efficiency of the two breeds were similar. Pirenaica calves had heavier carcasses ($P = 0.04$) with greater conformation scores ($P = 0.04$) than Parda de Montana calves; thus, income per carcass was greater for the former than the latter ($P = 0.007$). As feed costs were similar for both breeds, the economic margin of Pirenaica calves was greater than that of Parda de Montana calves ($P = 0.01$). In conclusion, in both breeds weaning strategies had similar effects on performance and carcass and meat quality; however, from an economic point of view, and considering only the costs associated with the calf, raising Pirenaica calves would be more profitable, at either age at weaning.

Keywords: Age at weaning; Breed; Performance; Carcass quality; Meat quality; Beef cattle

D. Micol, M.P. Oury, B. Picard, J.F. Hocquette, M. Briand, R. Dumont, D. Egal, R. Jailler, H. Dubroeuq, J. Agabriel, Effect of age at castration on animal performance, muscle characteristics and meat quality traits in 26-month-old Charolais steers, *Livestock Science*, Volume 120, Issues 1-2, January 2009, Pages 116-126, ISSN 1871-1413, DOI: 10.1016/j.livsci.2008.05.002.

(<http://www.sciencedirect.com/science/article/B7XNX-4SV0T24-1/2/ebecc6e9b8c02474b5c17f8d417b80d2>)

Abstract:

Thirty-eight Charolais steers castrated at 2 or 10 months of age were used to study the effect of age at castration on animal performance, muscle characteristics and meat quality traits in two consecutive trials. Steers were reared at pasture during the summer and at barn with high quality hay during the winter. The slaughter occurred at 26 months of age and 402 kg of carcass weight.

The quality of meat from *M. rectus abdominis* (RA) and *M. triceps brachii* (TB) after 14 days of ageing was evaluated by sensory analysis using three descriptors: tenderness, juiciness and flavour. The physicochemical characteristics, such as collagen amount and solubility, intramuscular fat content, [micro sign]-calpain and 27 K proteasome sub-unit contents, myosin heavy chain isoform (I, IIa and IIx) proportions, metabolic enzyme activities (isocitrate and lactate dehydrogenase, cytochrome-c oxydase), fibre area and type (SO, FOG and FG), were also measured. No significant differences in live weights and average daily gains appeared according to castration age. Between birth and weaning, steers castrated at 10 months had a higher weight gain (1056 vs 1012 g/d), whereas this tendency was reversed after castration. The weight gain of 10-month castrated steers decreased between 10 and 14 months (668 vs 746 g/d) and between 14 and 20 months (918 vs 974 g/d) than the weight gain of 2-month castrated steers. FOG fibres of 10-month castrated steers had a larger area in *M. rectus abdominis* (3801 vs 2983 [micro sign]m²), whereas the other fibres areas were not affected by castration age. The proportions of FOG fibres in 10-month castrated steers were higher (8.5 vs 8.1 and 22.2 vs 16.7% respectively for RA and TB muscles) whereas the FG fibres proportions were lower (52.2 vs 55.8 and 50.1 vs 54.9% respectively for RA and TB muscles). Castration age had no impact on myosin heavy chain proportions. The oxidative and glycolytic metabolisms were also not affected by castration age. The intramuscular fat content was not modified by castration age. Delaying castration age led to an increase in collagen content ($p = 0.04$) with no impact on collagen solubility ($p = 0.73$). The [micro sign]-calpain and the 27 K proteasome sub-unit contents were significantly lower for 10-month castrated steers than for 2-month castrated ones (75 vs 96% and 76 vs 95% respectively). Meat quality traits of tenderness, juiciness and flavour were equivalent for the two groups of steers in the two muscles.

Keywords: Castration; Age; Steer; Muscle; Meat; Quality

M.S. Brewer, Irradiation effects on meat flavor: A review, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 1-14, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4T1944J-2/2/6f8015b573bb2a4484a351090749a7d9>)

Abstract:

Irradiating fresh meat, even at low doses, can result in off-odors and flavors which have been described as rotten egg, bloody, fishy, barbecued corn, burnt, sulfur, metallic, alcohol or acetic acid. The odors vary with the type of meat, temperature during irradiation, oxygen exposure during and/or after the irradiation process, packaging and presence of antioxidative substances. Irradiation can induce formation of isooctane-soluble carbonyl compounds in the lipid fraction and low molecular weight, acid-soluble carbonyls in the protein fraction of meat. Increasing irradiation dose increases these compounds however, cooking reduces them. Among the volatile components, 1-heptene and 1-nonene are influenced most by irradiation dose, and aldehydes (propanal, pentanal, hexanal) are influenced most by packaging type (aerobic vs vacuum). Sulfur-containing volatiles formed from sulfur-containing compounds (primarily amino acids) also contribute to irradiation odor. Dimethyltrisulfide is one of the most potent off-odor compounds, contributing fishy, putrid odors, followed by bismethylthiomethane (sulfurous). Reducing the temperature during the irradiation process reduces the effects on odor/flavor because free radical generation and dispersion are reduced. Ultimately, radiolysis of water into free radical species (OH, H, H₃O⁺,) may be the initiators of both lipid oxidation breakdown products and sulfur-containing volatiles responsible for irradiation odor. Methods to decrease the detrimental effects of irradiation include oxygen exclusion (vacuum packaging), replacement with inert gases (nitrogen), addition of protective agents (antioxidants), and post-irradiation storage to allow flavor to return to near-normal levels (re-packaging or double packaging in oxygen permeable film).

Keywords: Irradiation; Meat flavor; Meat odor; Oxidation

J. Leps, R. Fries, Incision of the heart during meat inspection of fattening pigs - A risk-profile approach, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 22-27, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4T0MMP0-2/2/b0a1c2f769370c9aab72bb18a6f6d5f5>)

Abstract:

Meat inspection in the EU is based on Regulation (EC) 854/2004. Accordingly a risk based meat inspection should be implemented. In this paper, the incision of the heart in pig meat inspection is discussed with respect to efficacy.

The incision especially can reveal the presence of endocarditis. Here, *Erysipelothrix rhusiopathiae* (*E. rhusiopathiae*) and/or *Streptococcus suis* (*S. suis*) are of particular concern. Both agents are regarded to be zoonotic agents. There is some evidence for infection of humans via an alimentary pathway. Hence, the occurrence of *E. rhusiopathiae* and *S. suis* is a concern of public health (PH) as well as veterinary public health (VPH). However, other measures, including on-farm disease prevention and diagnosis, seem to be more important for food safety. It is concluded that the incision and inspection of the heart is not justifiable with respect to PH aspects.

Keywords: Meat-inspection; Heart; Pig

P.G. Dunne, F.J. Monahan, F.P. O'Mara, A.P. Moloney, Colour of bovine subcutaneous adipose tissue: A review of contributory factors, associations with carcass and meat quality and its potential utility in authentication of dietary history, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 28-45, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4SVC5SS-1/2/7be0fb37489e09cffb495d33bdae89f7>)

Abstract:

The colour of bovine subcutaneous (sc) adipose tissue (carcass fat) depends on the age, gender and breed of cattle. Diet is the most important extrinsic factor but its influence depends on the duration of feeding. Cattle produced under extensive grass-based production systems generally have carcass fat which is more yellow than their intensively-reared, concentrate-fed counterparts and this is caused by carotenoids from green forage. Although yellow carcass fat is negatively regarded in many countries, evidence suggests it may be associated with a healthier fatty acid profile and antioxidant content in beef, synonymous with grass feeding. Nonetheless, management strategies to reduce fat colour of grass-fed cattle are sought after. Current research suggests that yellow colour of this tissue is reduced if pasture-fed cattle are converted to a grain-based diet, which results in accretion of adipose tissue and dilution of carotenoids. Colour changes may depend on the initial yellow colour, the carotene and utilisable energy in the finishing diet, the duration of finishing, the amount of fat accumulated during finishing and the rate of utilisation of carotene from body fat. Differences in nutritional strategies which cause differences in fatty acid composition may be reflected by differences in fat colour and carotenoid concentration. Fat colour and carotenoids are prominent among a panoply of measurements which can aid the authentication of the dietary history and thus to some extent, the origin of beef, although this potential utility is complicated by the simultaneous rather than discrete use of forages and concentrates in real production systems.

Keywords: Colour; Bovine; Subcutaneous adipose tissue; Carcass fat; Carotenoids

W. Branscheid, M. Judas, R. Horeth, The morphological detection of bone and cartilage particles in mechanically separated meat, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 46-50, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4SWN0VK-1/2/ff1d1275e28ed7d06fc8a18b0aa560d4>)

Abstract:

The calcium content of mechanically separated meat (MSM) is a common indicator of elevated bone contents due to the separation process, e.g. as applied in EU regulations. But a direct morphological proof of bone material is needed, especially to identify undeclared MSM additives to meat products. We present a new morphological method for the detection of both bone and cartilage particles, because elevated cartilage contents may be indicative of MSM additives also. The method is based on simultaneous staining with Alizarin Red and Alcian Blue. We investigated MSM, commercially produced from breast of veal, for elevated particle contents. In addition, we determined the rate of recovery for minced pork mixed with 0-5% bone or cartilage. The results show that staining with Alizarin Red and Alcian Blue is suited to the efficient and simultaneous detection of bone and cartilage material in meat mixtures. The morphological staining is simpler than previously applied methods. Preparations can be assessed macroscopically, and they can be quantified gravimetrically. Manual sorting and weighing of particles appears to underestimate MSM contents if particles are ground very finely.

Keywords: Mechanically separated meat; Mechanically recovered meat; Bone detection; Cartilage detection; Alizarin Red; Alcian Blue

Carlos Orellana, F. Pena, A. Garcia, J. Perea, J. Martos, V. Domenech, R. Acero, Carcass characteristics, fatty acid composition, and meat quality of Criollo Argentino and Braford steers raised on forage in a semi-tropical region of Argentina, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 57-64, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4SVC5SS-3/2/b53169fa813205abe3eb5db8133384f0>)

Abstract:

The purpose of this study was to characterize and compare the carcass characteristics, cholesterol concentration, fatty acid composition of intramuscular fat and subcutaneous fat, and meat quality of Criollo Argentino and Braford steers reared in an extensive system, without supplementation, and slaughtered at approximately 400 kg live weight. The Braford steers had greater ($P < 0.05$) carcass weight, yield, conformation score, marbling degree, fat thickness and fatness score than Criollo Argentino steers. The tissue composition of the 10th rib was: 68.1% vs. 63.6% muscle, 23.9% vs. 20.4% bone and 8.2% vs. 16.3% fat for the Criollo Argentino and Braford breeds, respectively. The meat of Longissimus muscle from Braford steers was lighter, redder, yellower and more tender than that from Criollo Argentino steers. The meat of Longissimus muscle from Braford steers had a higher fat content, similar protein and ash contents and a lower (P [less-than-or-equals, slant] 0.001) cholesterol concentration than that from Criollo Argentino steers.

The subcutaneous depot was the most saturated, while the intramuscular fat had the most polyunsaturated fatty acids. Intramuscular fat showed the highest [summation operator]h fatty acids, and PUFA/SFA and n-6/n-3 ratios and for MUFA/SFA, 16:0/18:0 and h/H ratios were not significantly different between adipose tissue depots.

The influence of breed on the fatty acid profile varies among adipose tissues. In general, both intramuscular fat and subcutaneous fat from Criollo steers contained more unsaturated fatty acids and less saturated fatty acids, than did fat from Braford steers.

Keywords: Braford; Carcass; Criollo Argentino; Meat; Intramuscular and subcutaneous fatty acid profiles

W. Minchin, F. Buckley, D.A. Kenny, F.J. Monahan, L. Shalloo, M. O'Donovan, Effect of grass silage and concentrate based finishing strategies on cull dairy cow performance, carcass and meat quality characteristics, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 93-101, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4T0FFB8-1/2/7109c77812959f0cd9b897011d013eb3>)

Abstract:

Sixty-eight spring calving Holstein-Friesian dairy cows on completion of lactation were randomly assigned to one of four dietary treatments. The experiment commenced on 17th December 2005 and was completed on 27th June 2006. Pre-experimental live weight and BCS were 605 kg (s.d. 68.9) and 2.7 (s.d. 0.28), respectively. The four treatments were: ad-lib grass silage (GS), GS + 3 kg concentrate (GS + 3), GS + 6 kg concentrate (GS + 6) and GS + 9 kg concentrate (GS + 9). All cows were finished to a live weight > 620 kg and a BCS > 3.5. Live animal, carcass and meat quality characteristics were measured. Mean (s.d.) total feed utilized was similar, at 1.5 (0.05) tonnes DM/cow across all treatments. There was a linear ($P < 0.001$) increase in ADG (kg/day) for the first three dietary treatments, GS (0.71), GS + 3 (0.91), GS + 6 (1.14) with no additional response to the final increment, GS + 9 (1.15). As concentrate proportion in the diet increased there was a linear decrease ($P < 0.001$) in days to slaughter. Cows on the GS + 9 treatment (84 days) finished on average 12, 25 and 38 days earlier than those on the GS + 6, GS + 3, and GS treatments. The GS + 9 treatment had lower carcass fat yellowness ('b' value) than the GS treatment but the GS + 3 and GS + 6 treatments did not differ from either GS or GS + 9. There was no effect of treatment ($P > 0.05$) on muscle redness ('a' value) following exposure to oxygen. When cull cows are finished to pre-defined slaughter criteria, similar carcass classifications and carcass quality can be achieved with diets ranging from GS to GS + 9, however significant difference in physical performance and days to slaughter will result.

Keywords: Carcass and meat quality; Concentrate; Cull dairy cows; Grass silage

A. Ramos, M.C. Cabrera, M. del Puerto, A. Saadoun, Minerals, haem and non-haem iron contents of rhea meat, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 116-119, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4T0MMP0-4/2/ddc00f2f30123b36d95dbd8173df8cc2>)

Abstract:

Mineral contents, haem and non-haem iron of rhea (*Rhea americana*) muscles Obturatorius medialis (OM), Iliotibialis lateralis (IL) and Iliofibularis (I) were determined. No differences between the three muscles were observed for calcium, phosphorus, magnesium and sodium. There is more potassium, zinc and copper in IL muscle than in OM and I muscles. For Manganese, OM and IL muscles show a higher content in comparison with I muscle. For selenium, IL and I muscles show the highest content compared to OM muscle. For total, haem and non-haem iron, the IL muscle shows the highest content respect to the other muscles. When compared to other meats, the minerals content of rhea meat show an elevated level in phosphorus, selenium and total and haem iron. The human health concern due to the deficient diet in selenium and iron, and their high contents in rhea meat will be of great importance in the promotion of this meat.

Keywords: Rhea meat; Mineral composition; Selenium; Haem iron; *Rhea americana*

G. Luciano, F.J. Monahan, V. Vasta, L. Biondi, M. Lanza, A. Priolo, Dietary tannins improve lamb meat colour stability, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 120-125, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4T0WK0Y-1/2/8e1f6c62bce2212a2280c7148048ae20>)

Abstract:

Fourteen male Comisana lambs were divided into two groups at 45 days of age: lambs fed a concentrate diet (C), or lambs fed the same concentrate with the addition of quebracho (*Schinopsis lorentzii*) tannins (T). Sheep were slaughtered at 105 days of age. Lipid oxidation, colour coordinates, haem pigment concentration, and metmyoglobin percentages were measured on minced semimembranosus muscle (SM) over 14 days of refrigerated storage in a high oxygen modified atmosphere. Tannin supplementation increased ($P < 0.01$) a* values and reduced ($P <$

0.01) b* values of the SM when compared to C. Lower hue angles ($P < 0.001$) and metmyoglobin formation ($P = 0.07$) were observed in lamb from T-fed compared to C-fed sheep during the 14-days storage period. Furthermore, feeding T resulted in greater ($P < 0.001$) haem pigment concentrations in the SM during refrigerated storage; however, diet had no ($P = 0.28$) effect on lipid oxidation. Therefore, including quebracho tannins in sheep diets can improve meat colour stability of fresh lamb during extended refrigerated storage.

Keywords: Lamb; Lipid oxidation; Colour stability; Dietary tannins

M. Lanza, C. Landi, M. Scerra, V. Galofaro, P. Pennisi, Meat quality and intramuscular fatty acid composition of Sanfratellano and Haflinger foals, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 142-147, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4T0WK0Y-3/2/453a65529386089f64aa8f411ab0a921>)

Abstract:

The goal of the trial was to evaluate meat quality, with an emphasis on intramuscular fatty acid composition, of Sanfratellano foals, compared to that from Haflinger foals, both slaughtered at 18 months of age. Thirty foals, half of Sanfratellano breed and half of Haflinger breed, naturally weaned at 7-8 months, were divided into two homogeneous groups at 15 months of age and fed a finishing diet based on polyphite hay and concentrate. The finishing period lasted three months. Sanfratellano foals showed higher slaughter weight ($P < 0.05$) as well carcass weight ($P < 0.05$) compared to Haflinger foals. Meat physical and proximate analyses did not discriminate the two groups. Normal pH values (5.6-5.7) measured at 4-6 day post mortem were recorded in meat from both groups. Shear force values accounted (range 55-58 N) for a favourable tenderness in both groups. The intramuscular fat level was low in both groups (<2.5%) supporting the healthy image of this meat. The proportion of linolenic acid was higher ($P < 0.01$) in Haflinger meat than in Sanfratellano one, thus causing a higher ($P < 0.05$) total n-3 fatty acid content. Overall meat from both groups showed a favourable repartition among saturated (36-37% total FAME's), monounsaturated (33% total FAME's) and polyunsaturated fatty acids (30-31% total FAME's).

Keywords: Horse; Sanfratellano; Haflinger; Meat quality; Intramuscular fatty acid composition

N. Gerber, M.R.L. Scheeder, C. Wenk, The influence of cooking and fat trimming on the actual nutrient intake from meat, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 148-154, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4T1944J-3/2/218bc0ab8e2b35df62d367834ea0ca20>)

Abstract:

The effects of cooking and trimming of visible fatty tissue on the content of fat, fatty acids, minerals and vitamins was studied in six meat cuts (beef rib-eye and brisket, pork neck steak and belly, veal chop and rolled breast) in order to improve the estimates of the actual nutrient intake from meat. Cooking decreased the absolute fat content by about 17.9-44.4% and therefore concomitantly influenced the content of different fatty acids. The trimming of visible fatty tissue additionally decreased the fat content by about 23.8-59.1%. Calcium, sodium, potassium, magnesium and phosphorus decreased during cooking in all cuts and cooking processes, while iron and zinc were found to increase in beef. All vitamins decreased during cooking, with thiamine showing the highest losses, from 73% up to 100%. In conclusion, the cooking and trimming of meat cuts considerably affected the nutrients in various ways and to different degrees, which should be taken into account when the nutrient intakes of meat are estimated.

Keywords: Meat; Cooking; Trimming; Nutrient content; Losses

S. Jaturasitha, R. Norkeaw, T. Vearasilp, M. Wicke, M. Kreuzer, Carcass and meat quality of Thai native cattle fattened on Guinea grass (*Panicum maxima*) or Guinea grass-legume (*Stylosanthes*

guianensis) pastures, Meat Science, Volume 81, Issue 1, January 2009, Pages 155-162, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4T1Y402-1/2/10c0763b2b8d74df22fe8e892c907769>)

Abstract:

Carcass and meat quality of Thai native cattle, fattened for 2 years on Guinea grass (*Panicum maxima*) and Guinea grass-legume (*Stylosanthes guianensis*) pastures, were investigated in twelve 3-years old males. Groups had similar carcass quality except for kidney fat percentage (higher in cattle of the grass-legume group). This group also had a lighter meat (*Longissimus dorsi*, *Infraspinatus*) than the grass-only fed cattle. Shear force was generally at the borderline to tender meat, and was unaffected by treatment as were other texture-related properties except muscle fibre diameter. Meat of the grass-legume group was perceived less juicy ($P < 0.05$) but more tender ($P < 0.1$). The meat of the grass-legume-fed cattle also had more intramuscular fat (4.3% vs. 3.4%) and a slightly less favourable n-6:n-3 fatty acid ratio (2.2 vs. 2.0). In conclusion, the mostly weak differences in carcass and meat quality did not clearly favour one of the grazing systems.

Keywords: Cattle; Muscle fibre; Forage; Meat quality

K.L. Pearce, D.L. Hopkins, A. Williams, R.H. Jacob, D.W. Pethick, J.K. Phillips, Alternating frequency to increase the response to stimulation from medium voltage electrical stimulation and the effect on objective meat quality, Meat Science, Volume 81, Issue 1, January 2009, Pages 188-195, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4T2S8WM-3/2/7455d968ea5f2b2390c2b6c143350ead>)

Abstract:

The use of alternating frequencies during stimulation can increase stimulation response of a medium voltage electrical stimulation unit (MVS) by increasing the rate of pH decline. Various combinations of frequency modulation were tested in experiment 1 to determine the treatment resulting in the greatest stimulation response; the lowest initial pH, fastest rate of pH decline, highest temperature at pH 6 and the highest number of carcasses with a pH of 6 by 25 oC and the treatment achieving the highest number of carcasses in the pH temp window (temperature at pH 6 between 18-25 oC). The objective meat quality of these treatments compared to an unstimulated treatment was tested in experiment 2. Modulating the frequency (Hz) across the 6 segmented electrodes of the MVS by 10, 15, 25, 10, 15, 25 Hz (Treatment 6, using a pulse width: 2.5 ms, current: 1 A) resulted in the greatest stimulation response. This treatment may be suitable for abattoirs that hot bone sheepmeat and require fast pH declines to ensure minimal cold shortening of meat. However, this treatment did not result in the tenderer meat despite the higher stimulation response. This treatment may have induced a greater number of contractions overall and therefore a greater pH decline response but resulted in less myofibrillar disruption compared to the other treatments due to a concomitant decreased force of contraction thus reducing potential tenderisation. Maintaining a constant frequency of 15 Hz (Treatment 1; pulse width: 2.5 ms, current: 1 A) resulted in a higher number of carcasses in the pH temp window required (temperature at pH 6 between 18-25 oC) in part A ($P < 0.05$) and in addition to the higher tenderness levels this treatment may be more appropriate to satisfy the overall demands of abattoirs using these systems. This paper has also demonstrated electrical stimulation results in tenderer meat compared to unstimulated meat even after 30 d of ageing (2.53 +/- 0.4 compared to 2.85 +/- 0.1 for the loin (*M. longissimus thoracis et lumborum*) ($P < 0.01$) possibly due to a protective benefit of stimulation on meat tenderness. Overall, no detrimental effects of modulating frequency were observed on drip loss or retail colour display despite a greater rate of colour change observed with the modulated frequency treatment and the longer aged product.

Keywords: Electrical stimulation; Sheepmeat; Tenderness; Drip loss; pH; Tenderometer; Colour

Ines Essid, Maher Medini, Mnasser Hassouna, Technological and safety properties of *Lactobacillus plantarum* strains isolated from a Tunisian traditional salted meat, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 203-208, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4T2S8WM-5/2/f933ffc9ffb5c87a93c8700bca7ffcd3>)

Abstract:

A total of 17 strains of *Lactobacillus plantarum*, isolated from a Tunisian traditional salted meat and identified by biochemical and molecular methods, were characterized according to their technological properties including acidifying, antimicrobial and enzymatic activities as well as antibiotic resistance in order to select the most suitable for use as starter cultures for the production of fermented sausages. All the strains studied showed good acidifying activity and were able to reduce the pH to less than 4.3 in 72, 48 and 24 h at 15, 25 and 37 [degree sign]C respectively. The majority of strains displayed antimicrobial activities against *Salmonella arizonae*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Escherichia coli*, however characterization of the antimicrobial substances showed that none of the strains could produce bacteriocins. All the *L. plantarum* strains were able to hydrolyze casein, whereas none of them was found to possess lipolytic activity. The majority of strains of *L. plantarum* were resistant to tetracycline, erythromycin, rifampicin, ampicillin and penicillin G.

Keywords: Traditional salted meat; *Lactobacillus plantarum*; Acidifying activity; Antimicrobial activity; Enzymatic activity; Antibiotic resistance

Veronica Alonso, Maria del Mar Campo, Sonia Espanol, Pedro Roncales, Jose Antonio Beltran, Effect of crossbreeding and gender on meat quality and fatty acid composition in pork, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 209-217, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4T3M6DV-1/2/616cbfaf165f00cbd875303c12fcfbfb>)

Abstract:

This study considers the effect of crossbreeding and gender (barrows; gilts) on meat quality and intramuscular and subcutaneous fatty acid composition in pork. The sire lines included Large White (LW), Duroc (D) and Pietrain (P) and the dam line was Landrace (LR) x LW, producing LW x (LR x LW), D x (LR x LW) and P x (LR x LW). Pork samples were removed from *Longissimus dorsi* (LD) and *Semimembranosus* (SM) muscles and subcutaneous fat (SCF). There were no important differences in meat quality parameters but D x (LR x LW) had the highest percentage of intramuscular fat. Castrated males had more intramuscular fat and more intense meat colour than female pigs. The Large White and Duroc sire line had saturated fatty acids (SFA) in SM, whereas the Pietrain sire line was significantly higher than Duroc sire line in the concentration of polyunsaturated fatty acids (PUFA), PUFA/SFA (P/S) and the n-6/n-3 ratio. The concentrations of SFA and monounsaturated fatty acids (MUFA) in SCF were significantly higher in LW x (LR x LW) and P x (LR x LW), respectively. No differences were found in the percentage of PUFA, P/S and n-6/n-3 ratio between D x (LR x LW) and P x (LR x LW). Female pigs had the most polyunsaturated intramuscular and subcutaneous fat. The results demonstrate small differences in fatty acid compositions among sires.

Keywords: Crossbreeding; Gender; Fatty acid composition; Meat quality

X. Li, X. Yang, B. Shan, J. Shi, D. Xia, J. Wegner, R. Zhao, Meat quality is associated with muscle metabolic status but not contractile myofiber type composition in premature pigs, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 218-223, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4T4Y617-1/2/867dc0cafd174336930fd15c694b6410>)

Abstract:

Longissimus muscles were sampled from Erhualian (EHL) and Pietrain (PIE) pigs at 20 kg of body weight. No breed differences were detected in either the proportions or the mRNA/protein expression of respective MyHC isoforms, or the mRNA expression of PGC-1[alpha] (all $P > 0.10$). However, meat quality traits were already divergent between breeds, and were associated with distinct energy metabolic status, as reflected by dramatically lower AMPK activity yet higher CK and LDH activities (all $P < 0.01$) in longissimus muscle of EHL pigs. Moreover, mRNA expression of glucocorticoid receptor (GR) was found to be higher ($P < 0.05$) in longissimus muscle of EHL pigs. These results indicate that the differences in meat quality traits occur early in premature pigs, and these are attributed to skeletal muscle energy metabolism and not contractile myofiber type composition. Breed-specific GR expression in muscle may be related to the pattern of energy metabolism and meat quality, yet the mechanism awaits further investigation.

Keywords: Pork quality; Energy metabolism; MyHC; AMPK; PGC-1[alpha]; Glucocorticoid receptor

Emanuele Boselli, Maria Teresa Rodriguez-Estrada, Giorgio Fedrizzi, Maria Fiorenza Caboni, Cholesterol photosensitised oxidation of beef meat under standard and modified atmosphere at retail conditions, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 224-229, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4T3M6DV-2/2/ac127e816cdeda57082afc031a014d2f>)

Abstract:

The effect of the fluorescent light exposure and type of packaging (normal atmosphere and oxygen-rich atmosphere) was evaluated on the oxidation parameters (peroxides and cholesterol oxidation products) of raw beef slices placed in packed vessels and refrigerated. The concentration of COPs in meat treated under modified atmosphere ranged from 0.15 to 0.52 mg/100 g meat (average value of 0.27 mg COPs/100 g meat), which was twice as much as the average COPs content (0.14 mg/100 g) of meat packed under air (0.04-0.27 mg COPs/100 g meat). The main cholesterol oxide was 7k, which represented about one third of the total cholesterol oxides, followed by 7[beta]-OH (20-25% of total COPs), 7[alpha]-OH (about 20%) and [beta]-epoxy (12-18%). In normal atmosphere, photooxidation was a superficial process, since an inverse correlation between meat slice weight and COPs content on a lipid basis was observed, unlike in a high oxygen (32%) atmosphere.

Keywords: Photosensitised oxidation; Beef meat; Lipids; Modified atmosphere; Cholesterol oxidation

K. Taski-Ajdukovic, Z. Nikolic, M. Vujakovic, M. Milosevic, M. Ignjatov, D. Petrovic, Detection of genetically modified organisms in processed meat products on the Serbian food market, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 230-232, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.024.

(<http://www.sciencedirect.com/science/article/B6T9G-4T3M6DV-3/2/c96f0ab94243c3fc1769b5d49db1d231>)

Abstract:

The addition of soybean proteins to processed meat products has significantly increased in recent years due to the interesting functional and nutritional properties of these vegetable proteins. Since the Roundup Ready (RR) soybean is the only transgenic soybean line approved for market in EU this work was aimed at monitoring its presence in meat products on the Serbian food market. The extracted DNA was analyzed using duplex polymerase chain reaction (PCR) with primer pairs aimed at the lectin gene and 35S promoter. Samples positive for the presence of GM soybean were subjected to a real-time quantification of the percentage of RR soya. The results indicated

that out of fifty processed meat products examined, twelve gave positive results with 35S promoter and all contained RR soya below 0.1%.

Keywords: Genetically modified organism (GMO); Meat products; Roundup Ready (RR) soya

Lene Meinert, Kaja Tikk, Meelis Tikk, Per B. Brockhoff, Wender L.P. Bredie, Charlotte Bjerregaard, Margit D. Aaslyng, Flavour development in pork. Influence of flavour precursor concentrations in longissimus dorsi from pigs with different raw meat qualities, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 255-262, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.07.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4T72X2F-1/2/9ec1f03becc4ba7b40c27abd424b6779>)

Abstract:

Flavour development and overall eating quality of pan-fried pork chops of longissimus dorsi from eight different raw meat qualities aged for 4 and 15 days were assessed by a trained sensory panel. The raw meat qualities were obtained through combinations of strategic feeding/fasting (control vs. low glycogen concentration), slaughter live-weight (84 kg vs. 110 kg), and gender (female vs. castrate). The flavour development was investigated for possible correlation with the concentrations of selected individual flavour precursors present in the raw meat: monosaccharides, IMP and degradation products, fatty acids, lactate and thiamine. Differences in precursor concentrations between the raw meat qualities were observed with feeding/fasting and ageing as the main factors with the largest influence of all experimental factors. However, the concentrations of the precursors could not explain the differences in sensory perception of the pan-fried pork chops. Overall, the differences were small.

Keywords: Ageing; Carbohydrates; Feed; Fasting; Gender; Glycogen; IMP; Pork; Flavour precursor; Weight; Sensory analysis

G. Purcaro, S. Moret, L.S. Conte, Optimisation of microwave assisted extraction (MAE) for polycyclic aromatic hydrocarbon (PAH) determination in smoked meat, *Meat Science*, Volume 81, Issue 1, January 2009, Pages 275-280, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.08.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4T5JJ28-3/2/cc4c5586769173fe1ebe56aa6e473fad>)

Abstract:

A rapid extraction method involving microwave assisted extraction (MAE), followed by sample clean-up on a silica cartridge, reversed-phase high performance liquid chromatography (RP-HPLC) and spectrofluorimetric detection, was optimised for polycyclic aromatic hydrocarbon (PAH) determination in smoked meat. Compared to solvent extraction assisted by sonication, MAE, carried out with n-hexane on 2 g of lyophilised sample at 115 [degree sign]C for 15 min, allowed to obtain better extraction efficiencies. Limits of quantification (LOQ, s/n = 10) lower than 0.2 [mu]g/kg wet weight were found for all PAHs, except for FI (0.3 [mu]g/kg), P (0.6 [mu]g/kg) and IP (0.4 [mu]g/kg).

The optimised procedure, that presented good analytical performances (with recoveries ranging from 77% to 103%, and precision within 10% for most of the PAHs), was applied to determine PAH content in different smoked meat products from the Italian market.

Keywords: Smoked meat; Polycyclic aromatic hydrocarbons (PAHs); Microwave assisted extraction; Reversed-phase HPLC

Roberto Germano Costa, Ana Sancha Malveira Batista, Marta Suely Madruga, Severino Gonzaga Neto, Rita de Cassia Ramos do Egypto Queiroga, Jose Teodorico de Araujo Filho, Arturo Selaive Villarroel, Physical and chemical characterization of lamb meat from different genotypes submitted to diet with different fibre contents, *Small Ruminant Research*, Volume 81, Issue 1, January 2009, Pages 29-34, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.10.007.

(<http://www.sciencedirect.com/science/article/B6TC5-4V3S53D-1/2/61b5ec97959412935eee990b2f7e6214>)

Abstract:

The objective of the study was to evaluate the effect of genotype and the dietary fibre concentration in the chemical composition and physical properties of lamb meat. Samples from 54 animals from Morada Nova and Santa Ines native breeds and Dorpper x Santa Ines half-breed were analyzed, which received two diets, one with 41.7% and another with 33.6% fibre content, until reaching the average slaughter weight of 30 kg. The design used was fully randomized 3 x 2 factorial, three genotypes and two diets with nine replicates. Colour and pH in Semimembranosus muscle were determined, together with the analyses of the water retention capacity, loss of weight due to cooking, shearing force, and chemical composition in Longissimus dorsi muscle. The factor genotype influenced the chemical composition of meat, with Santa Ines lamb and crossbreed showing the highest protein percentages. The diet with 33.6% fibre content provided meat with higher moisture percentage and lower protein value, and the loss of weight due to cooking and shearing force parameters did not interfere in other variables. In addition, lambs receiving higher fibre content diet produced meat with lower shear force values, having indicated to be more tenderness. Despite these variations, the meat of lambs from all genotypes and under the diets evaluated can be considered of good quality.

Keywords: Lamb meat; Meat quality; Morada Nova; Santa Ines

A.K. Patra, R. Puchala, G. Animut, T.A. Gipson, T. Sahlu, A.L. Goetsch, Effects of acclimatization on energy expenditure by meat goats, *Small Ruminant Research*, Volume 81, Issue 1, January 2009, Pages 42-54, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.11.002.

(<http://www.sciencedirect.com/science/article/B6TC5-4V57Y2V-1/2/f9c0328ce2024b3326e74fba6a5c358>)

Abstract:

Eight Spanish and eight Boer yearling doelings were used to assess relationships between energy expenditure (EE) and ambient temperature (Ta), relative humidity (RH), and temperature-humidity index (THI). Four doelings of each genotype were housed in two 5.6 m x 3.1 m pens of an enclosed facility with a concrete floor without cooling and with heat provided only to prevent damage to waterers and water lines from freezing. EE was determined over 2-day periods 13 times during a 1 year period based on EE:heart rate (HR) of each doeling. Climate variables were averaged over 2, 4, 6, and 8 weeks preceding EE measurement. Doelings were fed to meet the maintenance energy requirement (MEM). Average mean, low, and high values during the 2 weeks preceding EE determination were 19.9, 7.9, and 31.8 [degree sign]C for Ta and 53.6, 36.1, and 62.5% for RH, respectively. Neither Ta nor THI were correlated with or had significant effects in regressions to predict the difference between EE at particular measurement times and the 1 year mean (EEdiff). Conversely, RH was correlated ($P < 0.01$) with EEdiff. When the 13 HR measurement times were assigned to cool and warm seasonal periods, EEdiff was affected ($P < 0.01$) by a genotype x period interaction. Nonetheless, the effect of RH in models including genotype, period, and genotype x period was significant for 2, 4, 6, and 8 weeks ($P < 0.01$). The R² of linear regressions of EEdiff against RH was slightly greater for 2 and 4 vs. 6 and 8 weeks (0.11, 0.10, 0.08, and 0.07, respectively); regression coefficients for 2 and 4 weeks were 1.265 and 1.163 kJ/kg BW^{0.75} per 1% RH, respectively. With RH of 50%, regression coefficient of 1.214 kJ/kg BW^{0.75} per 1% RH, and MEM of 390 kJ/kg BW^{0.75}, predicted MEM is 372 and 408 kJ/kg BW^{0.75} at 35 and 65% RH, respectively. In conclusion, without extremes eliciting cold or heat stresses, RH appears to have a slight effect on MEM of meat goats by acclimatization in both cool and warm periods of the year.

Keywords: Goats; Energy requirements; Acclimatization; Climate

Murilo D.M. Innocentini, Wellington S. Barizan, Maicon N.O. Alves, Reinaldo Pisani Jr, Pneumatic separation of hulls and meats from cracked soybeans, Food and Bioproducts Processing, In Press, Corrected Proof, Available online 23 December 2008, ISSN 0960-3085, DOI: 10.1016/j.fbp.2008.11.001.

(<http://www.sciencedirect.com/science/article/B8JGD-4V6RNWH-1/2/a1e95b7d0dbe5611f4995493ec88448d>)

Abstract:

The dehulling process of cracked soybeans was experimentally investigated in this work. The mean Sauter diameter ($d_{v,s}$) of as-received material was 2.70 mm, with an average proportion of 95% meats and 5% hulls for a moisture content of 11.8%. The true densities of hulls and meats were 1090 and 1267 kg/m³, with $d_{v,s}$ of 2.11 and 2.74 mm, respectively. Hulls were mostly elutriated around 2.7-4.5 m/s and meats around 9.1-13.7 m/s. The overlap of terminal velocity profiles required a combination of pneumatic and sieving operations for optimized separation. The influence of particle concentration on continuous dehulling was investigated for three solid-to-air ratios (W/Q). The procedure that maximized particle separation was a sequence of pneumatic dehulling with $v_s=7.4-9.1$ m/s and $W/Q = 1.05$ kg solids/m³ air, followed by screening of lifted material with sieve ASTM no. 6 and a final pneumatic separation of small hulls and meats at $v_s=3.9-4.1$ m/s. An industrial scale pneumatic dehuller was built and tested for $W = 6973$ kg/h, $v_s=7.6-8.2$ m/s and $W/Q = 0.97$ kg solids/m³ air. The efficiency of the pneumatic device to remove hulls from the cracked soybean was very high, with the recovery of meats with purity around 99%.

Keywords: Soybean; Hulls; Pneumatic dehulling; Terminal velocity; Elutriation

Zengling Yang, Lujia Han, Xian Liu, Qiongfeng Li, Detecting and quantifying meat meal or meat and bone meal contamination in fishmeal by visible and near infrared reflectance spectra, Animal Feed Science and Technology, Volume 147, Issue 4, 15 December 2008, Pages 357-367, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.02.005.

(<http://www.sciencedirect.com/science/article/B6T42-4S69S70-1/2/f30ee082b4143309acdec495a768967e>)

Abstract:

The use of animal protein feeds such as meat meal or meat and bone meal (MMBM) play an important role in the feed manufacturing industry, but their safe and healthy use in animal feeds is of public concern in order to prevent the spread of bovine spongiform encephalopathy (BSE). The objective of the present work was to develop a technique using near infrared reflectance spectroscopy (NIRS) that would be suitable for detecting and quantifying contaminating levels of MMBM in fishmeal. To this end, a partial least squares (PLS) discriminant analysis and a modified partial least squares (MPLS) quantitative analysis, using visible and NIRS, were developed using a calibration set of 186 samples including 90 samples of pure fishmeal and 96 samples adulterated with MMBM at levels ranging from 10 to 320 g/kg. An external validation set, comprised of 39 pure samples and 54 adulterated samples, was used to validate the calibration model. A PLS discriminant analysis model developed with mathematic pretreatment 1,4,4,1, successfully detected fishmeal adulterated with MMBM. External validation indicated that all samples were discriminated correctly. A MPLS quantitative model, developed with mathematic pretreatment 1,4,4,1, also successfully predicted the MMBM in fishmeal with standard error of cross-validation (SECV) of 27.89 g/kg and ratio of the standard deviation of the validation set to the standard error of prediction (RPD) of 3.37. The calibration and validation results confirm that NIRS could provide the feed industry and inspection bodies with a rapid, non-destructive and non-invasive technique for the detection and quantification of MMBM in fishmeal.

Keywords: Fishmeal; Near infrared reflectance spectroscopy; Meat meal or meat and bone meal; Qualitative; Discrimination; Quantitative

Sana Mujahid, Tibor Pechan, Chinling Wang, Protein expression by *Listeria monocytogenes* grown on a RTE-meat matrix, *International Journal of Food Microbiology*, Volume 128, Issue 2, 10 December 2008, Pages 203-211, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.08.007.

(<http://www.sciencedirect.com/science/article/B6T7K-4T8YH9Y-1/2/647c722b391ab105df8e9ec382fef1f5>)

Abstract:

Little is known about whether the growth of *L. monocytogenes* on a ready-to-eat (RTE) meat matrix has an impact on the bacterium's pathogenic capabilities. In this report, we examined protein expression by *L. monocytogenes* grown on RTE sliced turkey meat, using *L. monocytogenes* grown on brain-heart-infusion agar as a control. Total protein fractions of *L. monocytogenes* from both growth conditions were extracted and compared by two-dimensional gel electrophoresis. Seventy-seven proteins expressed by turkey meat-grown *L. monocytogenes* were identified by MALDI-TOF/TOF mass spectrometry analysis. The identified proteins include proteins known to be involved in virulence and stress adaptation such as ClpB, ClpC, ClpP, and surface antigen. This is the first report describing the proteome expressed by *L. monocytogenes* grown on a meat matrix. Our results suggest that certain proteins that are expressed by RTE meat-grown *L. monocytogenes* may contribute to the virulence of the bacterium.

Keywords: *Listeria monocytogenes*; Proteomics; Meat matrix; Two-dimensional gel electrophoresis

Paolo Calistri, Armando Giovannini, Quantitative risk assessment of human campylobacteriosis related to the consumption of chicken meat in two Italian regions, *International Journal of Food Microbiology*, Volume 128, Issue 2, 10 December 2008, Pages 274-287, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.08.021.

(<http://www.sciencedirect.com/science/article/B6T7K-4TDK6NW-1/2/265e75292d1961b0ffd37d342f025389>)

Abstract:

Campylobacteriosis is the most frequently reported zoonotic disease in humans within the European Union. The consumption of contaminated chicken meat is considered one of the main sources of human infection. Although there are no official data on the incidence of *Campylobacter* infection in Italy, the available studies suggest that this infection is a major problem also in Italy. The authors developed a simulation model to quantitatively estimate the expected annual number of human cases of campylobacteriosis in the Italian regions of Abruzzo and Molise, due to the cross-contamination during the handling of *Campylobacter jejuni* contaminated chicken meat in domestic kitchen. The authors considered two different models for the dose-response relationship, given their crucial effects on the model's outputs. The expected percentage of human population, experiencing *Campylobacter* gastroenteritis episodes every year in Abruzzo e Molise regions, varied between 0.8% and 1.8%, according to the dose-response model.

Keywords: *Campylobacter*; Quantitative risk assessment; Chicken meat; Italy

Imca Sampers, Ihab Habib, Dirk Berkvens, Ann Dumoulin, Lieven De Zutter, Mieke Uyttendaele, Processing practices contributing to *Campylobacter* contamination in Belgian chicken meat preparations, *International Journal of Food Microbiology*, Volume 128, Issue 2, 10 December 2008, Pages 297-303, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.08.024.

(<http://www.sciencedirect.com/science/article/B6T7K-4TG9HMG-1/2/1a10f5f4ac9e5e420b2e15756f480764>)

Abstract:

The aim of this study was to obtain insight into processing practices in the poultry sector contributing to the variability in *Campylobacter* contamination in Belgian chicken meat preparations. This was achieved by company profiling of eleven food business operators, in order to evaluate variation of processing management, in addition to statistical modelling of microbiological testing results for *Campylobacter* spp. contamination in 656 end product samples.

Almost half (48%) of chicken meat preparation samples were positive for *Campylobacter* spp. Results revealed a statistically significant variation in *Campylobacter* contamination between 11 chicken meat producers across Belgium at both quantitative and qualitative detection levels. All producers provided *Campylobacter*-positive samples, but prevalence ranged from 9% up to 85% at single producer level. The presence or addition of skin during production of chicken meat preparations resulted in almost 2.2-fold increase in the probability of a sample being positive for *Campylobacter*, while chicken meat preparations made from frozen meat, or partly containing pre-frozen meat, had a significant (Odds Ratio = 0.41; CI 95% 0.18:0.98) lower probability of being positive for *Campylobacter*. However, the quantitative results indicated that the positive freezing effect on *Campylobacter* count was compromised by the presence and/or adding of skin.

Keywords: Food; Processing practices; *Campylobacter*; Chicken meat preparations; Freezing; Skin

Jose M. Lorenzo, Maria C. Garcia Fontan, Inmaculada Franco, Javier Carballo, Biochemical characteristics of dry-cured lacon (a Spanish traditional meat product) throughout the manufacture, and sensorial properties of the final product. Effect of some additives, Food Control, Volume 19, Issue 12, December 2008, Pages 1148-1158, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.12.005.

(<http://www.sciencedirect.com/science/article/B6T6S-4RJ3WCM-1/2/5967ff9de39c782982c9e3aa26aca3c7>)

Abstract:

The gross composition, the main physicochemical parameters, the proteolytic changes and the characteristics of the fat throughout the manufacture process, and the sensorial characteristics of the final product, were studied in dry-cured lacon, a traditional dry-salted and ripened meat product made in the north-west of Spain from the fore leg of the pig following a similar technological process to that of dry-cured ham. The effect of the use of additives (glucose, sodium nitrite, sodium nitrate, sodium ascorbate and sodium citrate) was also studied.

In comparison with other dry-cured meat products made from whole meat pieces, dry-cured lacon is characterised by the low moisture contents, the high pH values, and the low transformation of the pigments. The proteolytic and lipolytic processes throughout the manufacture of this product were not intense. Except for the total carbohydrate and nitrate contents, and the percentage of transformation of the pigments, which were significantly ($P < 0.05$) higher in the batches processed with additives, the use of additives did not influence the biochemical modifications that occur throughout the manufacture process of the dry-cured lacon. Regarding the sensorial characteristics, the use of additives seems to improve the colour and the odour of the final product.

Keywords: Dry-cured lacon; Biochemical characteristics; Sensorial characteristics; Ripening; Cured meat products; Additives

Jerzy Stangierski, Hanna Maria Baranowska, Ryszard Rezler, Jacek Kijowski, Enzymatic modification of protein preparation obtained from water-washed mechanically recovered poultry meat, Food Hydrocolloids, Volume 22, Issue 8, December 2008, Pages 1629-1636, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2007.11.005.

(<http://www.sciencedirect.com/science/article/B6VP9-4R5W02V-2/2/c05cf2a707368717595736a7f471d6b1>)

Abstract:

Studies were conducted on a protein preparation obtained from washed mechanically recovered poultry meat (MRPM). The effect of addition of 3 g/kg microbial transglutaminase (MTG) to poultry meat protein was evaluated in terms of texture changes by dynamic mechanical analysis (DMA) and nuclear magnetic resonance (NMR) to determine water content in the preparation and its effect on protein. Samples with the addition of MTG were pre-incubated at 5-6 [degree sign]C for 1.5, 3, 4.5, 6, 7.5, 9 and 24 h. The largest changes for both texture parameters and rheological

properties were observed in the interval of approx. 4-7 h incubation. The protein preparation with the enzyme added had significantly higher values of the moduli of elasticity (G1) and losses (G2) in comparison to the control system. Samples with the addition of MTG also showed a higher water-binding capacity. From the NMR studies it was found that the greatest amount of water was bound by protein in the period of approx. 2.5-5 h incubation. After that time an increase was found in the amount of free water in the sample, which suggests that it was displaced from the system by stronger protein-protein bonds.

Keywords: Mechanically recovered poultry meat; Poultry surimi; Transglutaminase; Dynamic mechanical analysis; Nuclear magnetic resonance

Steven T. Yen, Biing-Hwan Lin, Christopher G. Davis, Consumer knowledge and meat consumption at home and away from home, *Food Policy*, Volume 33, Issue 6, Food Product Composition, Consumer Health, and Public Policy, December 2008, Pages 631-639, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2008.02.006.

(<http://www.sciencedirect.com/science/article/B6VCB-4S7S2V6-1/2/27bb7cb3dda608fa529d256cc1117f9c>)

Abstract:

We investigate the roles of consumer knowledge and sociodemographic factors in the consumption of meat products at home and away from home. Censored dependent variables and endogenous dietary knowledge are accommodated by developing and estimating a simultaneous-equations system. Results suggest endogeneity of knowledge and support the system approach to demand functions for meat products. Dietary knowledge decreases consumption of beef and pork at home and away from home but does not affect poultry or fish consumption in either location. Men eat more meat and fish than women, meat consumption declines with age, and regional and racial/ethnic differences are present.

Keywords: D12; C34; Censored dependent variables; Dietary knowledge; Maximum simulated likelihood; Meat demand; Simultaneous-equations system

M.S. Rao, R. Chander, A. Sharma, Synergistic effect of chitooligosaccharides and lysozyme for meat preservation, *LWT - Food Science and Technology*, Volume 41, Issue 10, December 2008, Pages 1995-2001, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.01.013.

(<http://www.sciencedirect.com/science/article/B6WMV-4RRNXTY-2/2/3863a58f9c63ac4a705e380d601d2258>)

Abstract:

The objective of this study was to enhance the antibacterial spectrum of lysozyme with the use of chitooligosaccharides (COS) produced by radiation treatment of chitosan. Exposure of chitosan solution to [gamma] radiation led to formation of oligosaccharides of different molecular weights. COS with molecular weight of 8.3 kDa were found to exhibit highest antioxidant potential in free radical scavenging assay but antibacterial activity decreased with decrease in molecular weight. Combination of COS and lysozyme was more effective against Gram-negative bacteria than when used alone. This clearly indicated the synergistic effect of the two antibacterial agents added together. When tested in meat model system, the combination treatment resulted in complete elimination of *Escherichia coli*, *Pseudomonas fluorescens* and *Bacillus cereus* and reduced the load of *Staphylococcus aureus* cells in packed inoculum and storage studies. The shelf life of minced meat containing COS-lysozyme mixture was extended up to 15 days at chilled temperatures.

Keywords: Chitooligosaccharides; Irradiation; Antioxidant; Lysozyme; Antimicrobial

A. Jastrzebska, A. Hol, E. Szlyk, Simultaneous and rapid determination of added phosphorus(V) compounds in meat samples by capillary isotachopheresis, *LWT - Food Science and Technology*,

Volume 41, Issue 10, December 2008, Pages 2097-2103, ISSN 0023-6438, DOI: 10.1016/j.lwt.2007.11.015.

(<http://www.sciencedirect.com/science/article/B6WMV-4RDR1KM-13/2/f4be41cfae379566b7d5d66a6ed2234a>)

Abstract:

One-dimensional capillary isotachophoretic method (CITP) for the simultaneous determination of added phosphorus(V) compounds (ortho-, pyro- and tripolyphosphates) in pork meat is described. The calibration curves were obtained for KH_2PO_4 , $\text{K}_4\text{P}_2\text{O}_7$, $\text{Na}_2\text{H}_2\text{P}_2\text{O}_7$, $\text{Na}_3\text{P}_3\text{O}_9$, $\text{Na}_5\text{P}_3\text{O}_{10}$ resulting in linearity ($R^2 = 0.9996, 0.9998, 0.9991, 0.9978$ and 0.9994 , respectively). Detection limits ranged from 0.4 mg P/L for potassium pyrophosphate (PP) to 1.1 mg P/L for trisodium trimetaphosphate (TTP) and quantification limits ranged from 1.2 mg P/L for PP to 3.7 mg P/L for TTP. The repeatabilities of within-day and between-days analysis were $\leq 2.27\%$ and $\leq 4.89\%$ for relative step height, respectively. The developed procedure was applied for added phosphates determination in meat samples. The minimal sample pretreatment and presented results make CITP an alternative to the existing methods of meat analysis.

Keywords: Meat samples; One-dimensional CITP; Phosphorus(V) compound

Daniel Demeyer, Karl Honikel, Stefaan De Smet, The World Cancer Research Fund report 2007: A challenge for the meat processing industry, Meat Science, Volume 80, Issue 4, December 2008, Pages 953-959, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4SSNDB0-2/2/5ce41b48f6b9e09d0821551d53dcb8c7>)

Abstract:

One of the 10 universal guidelines for healthy nutrition in a report of the World Cancer Research Fund released at the end of 2007 is to 'limit intake of red meat and avoid processed meat', as a result of the 'convincing evidence' for an association with an increased risk of colorectal cancer development. In the present paper, the scientific evidence for the association between processed meats intake and colorectal cancer development is explored and the most probable hypothesis on the mechanism underlying this relationship formulated.

It seems that the present state of knowledge is not well understood but relates to a combination of haem iron, oxidative stress, formation of N-nitroso compounds and related residues in the digestive tract as the causal factors. Although criticisms of the inaccurate definition of processed meats and the insufficient accounting for the large variability in composition of meat products have been expressed, it is clear that the report urges proper action by the meat and nutrition research community and the meat industry.

Research items that in our view should be addressed are discussed. They include: (1) evaluating the health risks associated with processed meats intake within the context of the supply of beneficial nutrients and other nutrition associated health risks; (2) definition of the role of nitrites and nitrates in meat processing; (3) investigating the role of red and processed meats on the endogenous formation of N-nitroso compounds in the digestive tract; and (4) developing improved processed meats using new ingredients.

Keywords: Processed meats; Colorectal cancer; Haem iron; N-Nitroso compounds

Jacques Lepetit, Collagen contribution to meat toughness: Theoretical aspects, Meat Science, Volume 80, Issue 4, December 2008, Pages 960-967, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4SVV8P1-1/2/e84bb74d075e453990d7bcf908d1995e>)

Abstract:

One of the major changes in connective tissues during heating is the transformation of the quasi-crystalline structure of collagen into a random-like structure. This molecular change induces a

shortening of these tissues and gives them a rubber-like behaviour. In this state, their mechanical properties are dependent on the total number of cross-linked chains present per volume, which can be estimated from the number and the functionality of each cross-link present in the sample. The number of cross-linked chains per volume of meat explains a large amount of the tenderness variation, produced by muscle type, animal age, type, and sex in different species. During heating collagen fibres and fibrils shortening produces a pressure which is also dependent on the total amount of cross-linked chains present per volume, but also on the morphology of endomysial and perimysial envelopes. In meat, during heating, collagen fibres and fibrils thermal shortening is restricted by muscle fibres and muscle fibre bundles. This restriction, which depends on several muscle fibre characteristics, has a strong effect on the final elastic modulus of connective tissues, by changing the respective amount of crystalline and rubber-like fractions in collagen fibres and fibrils after heating. The implications of this phenomenon in tenderness variations are discussed.

Keywords: Collagen; Cross-links; Rubber-like elasticity; Crystallinity; Tenderness; Pressure; Proteoglycans; Composites

A. Kwasiborski, T. Sayd, C. Chambon, V. Sante-Lhoutellier, D. Rocha, C. Terlouw, Pig Longissimus lumborum proteome: Part II: Relationships between protein content and meat quality, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 982-996, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4SFS0S9-4/2/b2cd431530715fe16bbfc33d52a2f08d>)

Abstract:

Gender, rearing environment and breed of sire influenced 50.5% of the matched protein spots of the soluble fraction and some meat quality traits [Kwasiborski, A., Sayd, T., Chambon, C., Sante-Lhoutellier, V., Rocha, D., & Terlouw, C. (2008). Muscle proteome in pigs: Part I: Effects of genetic background, rearing environment and gender. *Meat Science*]. Multiple regression analyses determined that 1 or 2 proteins explained between 24% and 85% of variability in Longissimus meat quality. Regression models differed between treatment groups, but relationships between proteins and meat quality traits seemed to be related to common underlying mechanisms. Thus, proteins retained in models for ultimate pH, lightness, drip, thawing and cooking loss were related to the glycolytic pathway, phosphate transfer, or fibre type composition. Another model for thawing loss retained proteins related to denaturation of myofibrils or lipid content. The models for redness involved proteins related to post-mortem oxidative activity. Thus, proteins correlated with meat quality traits were related to biochemical mechanisms known to be involved in meat quality. Relative contributions of these mechanisms may vary according to gender, sire breed or rearing environment.

Keywords: Pig; Proteome; Meat quality; Longissimus lumborum; 2D-electrophoresis; Biochemical pathways

M.S. Madruga, T.S. Torres, F.F. Carvalho, R.C. Queiroga, N. Narain, D. Garrutti, M.A. Souza Neto, Carla W. Mattos, R.G. Costa, Meat quality of Moxoto and Caninde goats as affected by two levels of feeding, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1019-1023, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4SD29WR-2/2/0e9559938f16b5c089ff288e3f4ff2d5>)

Abstract:

The objective of this study was to evaluate the effect of reduced feed intake on Moxoto and Caninde goat, which are native breeds of semi arid area of Brazil, by analyzing the resultant meat quality. Intact male goats of both genotypes (10 animals each), weighing about 15 kg, were allocated to two feeding levels (AL: feed ad libitum and FR: feed restricted to 63% of the total feed consumed by AL). Water-holding capacity and a* color parameter were significantly influenced (p

< 0.05) by genotype. Proximate composition, cholesterol, shear force, pH, cooking loss, and sensory scores did not differ significantly ($p > 0.05$) between genotypes. The redness of the meat of the Caninde breed was much improved in FR goats. Although, feed restriction by 37% did affect the final live weight and mean daily gain weight, it had no effect on chemical, physical, and sensory quality of Moxoto and Caninde meat.

Keywords: Breed; Diet; Goat; Meat quality

Juan Florencio Tejeda, Ramon E. Pena, Ana I. Andres, Effect of live weight and sex on physico-chemical and sensorial characteristics of Merino lamb meat, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1061-1067, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4SDX2XV-1/2/62e2737b3d4a5805536d55ed822f9318>)

Abstract:

Forty-eight lamb carcasses were divided into four groups ($n = 12$) according to slaughter weight (24 and 29 kg) and sex (male and female). Colour, pH, moisture, and intramuscular fat were not affected ($p > 0.05$) by slaughter weight or sex. With respect to fatty acid composition, slaughter weight had significant effects on C12:0 ($p < 0.01$), C14:0, C16:0, and C18:1 n-9 ($p < 0.05$) in Longissimus lumborum (LL) muscle. The percentage of C12:0 and C14:0 decreased as slaughter weight increased, while C16:0 increased. In Semimembranosus (SM) m., only C18:3 n-3 and C20:2 n-6 were affected ($p < 0.001$) by slaughter weight. Total PUFA in LL m. was greater ($p < 0.01$) in females than in males. Although in general, sensorial quality was not significantly affected by slaughter weight or sex, meat from lighter lambs (24 kg) had greater general acceptability than meat from heavier lambs (29 kg).

Keywords: Lamb; Slaughter weight; Sex; Meat quality

Nam Kuk Kim, Soohyun Cho, Seung Hwan Lee, Hye Ran Park, Chang Soo Lee, Yong Min Cho, Yun Ho Choy, Duhak Yoon, Seok Ki Im, Eung Woo Park, Proteins in longissimus muscle of Korean native cattle and their relationship to meat quality, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1068-1073, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4SDX2XV-2/2/ffdc7afa5362312bdc722ce883c25e1a>)

Abstract:

Proteomic profiling by two-dimensional gel electrophoresis and mass spectrometry of longissimus dorsi muscle tissue from Korean native cattle identified seven proteins that are differentially expressed in animals producing low and high quality grade beef. The expression level of alpha actin is increased in high quality grade beef and the expression levels of T-complex protein 1 (TCP-1), heat shock protein beta-1 (HSP27), and inositol 1,4,5-triphosphate receptor type1 (IP3R1), a new protein to be associated with meat quality, are increased in low quality grade beef. In particular, the quantitation of HSP27 and IP3R1 by both silver staining and immunoblotting correlated well with intramuscular fat content, meat tenderness, and free calcium levels. The data suggest that HSP27 and IP3R1 are potential meat quality biomarkers and their identification provides new insight into the molecular mechanisms and pathways associated with overall beef quality.

Keywords: Muscle proteome; Meat quality; Two-dimensional gel electrophoresis

Giampiero Sacchetti, Carla Di Mattia, Paola Pittia, Giuseppe Martino, Application of a radical scavenging activity test to measure the total antioxidant activity of poultry meat, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1081-1085, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4SFS0S9-3/2/507a743aea1eeaca2b926a3a08be66ad>)

Abstract:

The antioxidant activity of the hydrophilic and lipophilic fraction of poultry meat was determined in terms of 'radical scavenging activity' (RSA) using a modified ABTS radical cation decolorization method.

The method uses the extraction of hydrophilic and lipophilic fractions in water and methanol-chloroform, respectively. The determination of the RSA of the lipophilic fraction was conducted using a chloroform extract and maintaining a constant chloroform:ethanol ratio in the solution of analysis. The method was tested on nine samples of poultry breasts and thigh meats and permitted to quantify the RSA in terms of [μ]mol Trolox equivalent antioxidant capacity (TEAC) with a mean relative standard deviation of less than 5%.

The contribution of the hydrophilic fraction to the total RSA was much higher than that of the lipid soluble fraction. Breast showed a higher RSA than thigh meat due to its lower total lipids content. The total RSA value (TEAC = 2.4 [μ]mol g⁻¹) suggests that poultry meat could significantly contribute to the antioxidant activity of the diet.

Keywords: Chicken meat; Antioxidant activity; ABTS test; Hydrophilic fraction; Lipophilic fraction

R.J.B. Bessa, M. Lourenco, P.V. Portugal, J. Santos-Silva, Effects of previous diet and duration of soybean oil supplementation on light lambs carcass composition, meat quality and fatty acid composition, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1100-1105, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4SFS0S9-2/2/76a14e243968916f488c9446eca09f07>)

Abstract:

Forty Merino Branco ram lambs were used to study the effects of initial diet and duration of supplementation with a conjugated linoleic acid (CLA) promoting diet, on carcass composition, meat quality and fatty acid composition of intramuscular fat. The experimental period was 6 weeks. The experimental design involved 2 initial diets (commercial concentrate (C); dehydrated lucerne (L)), and 2 finishing periods (2 and 4 weeks) on dehydrated lucerne plus 10% soybean oil (O). Data were analysed as a 2 x 2 factorial arrangement with initial diet and time on finishing (CLA promoting) diet as the main factors. The lambs were randomly assigned to four groups: CCO; COO; LLO; LOO according to the lamb's diet fed in each period.

Lambs initially fed with concentrate showed higher hot carcass weights (11.2 vs 9.6 kg) than lambs fed initially with lucerne. The increase of the duration of finishing period reduced the carcass muscle percentage (57.4% vs 55.5%) and increased the subcutaneous fat percentage (5.67% vs 7.03%). Meat colour was affected by initial diet. Lambs initially fed with concentrate showed a lower proportion of CLA (18:2cis-9, trans-11 isomer) (0.98% vs 1.38% of total fatty acids) and most of n-3 polyunsaturated fatty acids than lambs initially fed with lucerne. Initial diet did not compromise the response to the CLA-promoting diet and the proportion of 18:2cis-9, trans-11 in intramuscular fat increased with the duration of time on the CLA-promoting diet (1.02% vs 1.34% of total fatty acids).

Keywords: Carcass composition; Conjugated linoleic acid; Fatty acids; Lamb; Meat quality; Dietary soybean oil

E. Krzecio, M. Kocwin-Podsiadla, J. Kuryl, A. Zybert, H. Sieczkowska, K. Antosik, The effect of interaction between genotype CAST/Rsal (calpastatin) and MYOG/Mspl (myogenin) on carcass and meat quality in pigs free of RYR1T allele, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1106-1115, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4SFS0S9-5/2/a9510abbfb50f167b2d8d0787e7ab3de>)

Abstract:

The purpose of the studies was to demonstrate to what degree genotypes of calpastatin (CAST/Rsal) and myogenin (MYOG) genes as well as the interaction between them may affect the carcass and meat quality of pigs. The investigations were conducted on 397 stress resistant pigs (free of RYR1T allele). It was demonstrated that the favourable effect of the variants of CAST and MYOG genes on carcass quality traits depends on the cut. The gene variant favourably affecting the weight of ham simultaneously had a negative effect on the weight of the loin. It was also shown that the interaction between CAST and MYOG genotypes has a significant effect on backfat thickness. The effect of a given combination of CAST and MYOG genotypes on carcass traits is related to the weight of a substantial cut (ham, loin).

Genotypes at loci CAST/Rsal and MYOG have a significant effect on the value of certain traits and parameters of meat quality and its technological value (genotype CAST on pH at 35 min and 2, 3, 24, 48, 96, 144 h post-mortem (pH35, pH2, pH3, pH24, pH48, pH96, pH144, respectively), R1 (IMP/ATP), electrical conductivity at 3 and 4 h post-mortem (EC3, EC4), technological yield of meat in curing and thermal processing (TY) and protein content in the muscle tissue, while genotype MYOG on pH48, EC35, EC3, EC24 and dry matter content).

Keywords: CAST; MYOG; Genes interaction; Meat quality; Pork carcasses

P.G. Peiretti, G. Meineri, Effects on growth performance, carcass characteristics, and the fat and meat fatty acid profile of rabbits fed diets with chia (*Salvia hispanica* L.) seed supplements, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1116-1121, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4SH0Y57-1/2/88bdbc1330607d7afbb5b4e1f2eeb52b>)

Abstract:

The effects of three levels (0%, 10%, or 15%) of chia (*Salvia hispanica* L.) seed (SHS) included in the diet on the growth performance, some carcass characteristics and fatty acid profile of rabbit meat and perirenal fat was studied. At the end of the experiment, there were no significant differences among the groups in live weight, live weight gain, feed consumption, feed efficiency, carcass yield or the percentages of edible organs. The percentage values of hind legs, fore legs, loin and abdominal wall, breast and ribs, skin and limbs, and head were not affected by the inclusion level of SHS. The polyunsaturated fatty acid (PUFA) concentration in the longissimus dorsi muscle and perirenal fat was significantly increased with increasing SHS inclusion, while the saturated fatty acid (SFA) decreased. The n - 6/n - 3 PUFA ratio of the rabbit meat decreased from 4.55 in the control group, to 1.03 in the 15% SHS group.

Keywords: Rabbit; Meat quality; *Salvia hispanica*; Fatty acid

M.P. Serrano, D.G. Valencia, A. Fuentetaja, R. Lazaro, G.G. Mateos, Effect of gender and castration of females and slaughter weight on performance and carcass and meat quality of Iberian pigs reared under intensive management systems, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1122-1128, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4SJG6CV-1/2/38a948d3b244d8499a18a0ed8872b4bc>)

Abstract:

A total of 360 Iberian dam x Duroc sire pigs was used to study the influence of gender and castration of females (CM, castrated males; CF, castrated females; IF, intact females) and slaughter weight (SW; 145 and 156 kg body weight, BW) on performance and carcass and meat quality. Each treatment was replicated four times (15 pigs). Intact females ate less, tended to have better feed conversion and had less carcass fat and more primal cuts yield than CM and CF. Pigs slaughtered at 156 kg BW ate more feed and had worse feed conversion than pigs slaughtered at 145 BW. An increase in SW improved carcass yield, but tended to decrease trimmed ham yield. Intact females are an alternative to castrated females for intensive production of Iberian pigs. Also,

the reduction in slaughter weight from 156 to 145 kg BW is recommended for this type of production.

Keywords: Iberian pigs; Gender; Castration; Slaughter weight; Performance traits; Carcass and meat quality

G. Barbieri, P. Rivaldi, The behaviour of the protein complex throughout the technological process in the production of cooked cold meats, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1132-1137, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4SKB3JB-2/2/67e68e6d69d09bee2382c5a5b3fc806a>)

Abstract:

Protein composition was examined in order to find markers that could be useful in technology optimization. The behaviour of sarcoplasmic and myofibrillar proteins during the processing of roast pork was studied at the various processing steps, utilising some electrophoretic (SDS-PAGE, 2DE and IEF) and thermometric (DSC) techniques and evaluating the content of amino acids produced. The relevance of desmin as a marker of structural modification was emphasised. The extraction of myofibrillar proteins by brine, the formation of a protein network at 62 [degree sign]C and the evaluation of the exudate produced during cooking are the crucial steps that should be monitored when a new industrial process is to be optimised.

Keywords: Meat proteins; Meat technological process; Cooking; Electrophoresis

N.R. Lambe, E.A. Navajas, C.P. Schofield, A.V. Fisher, G. Simm, R. Roehe, L. Bunger, The use of various live animal measurements to predict carcass and meat quality in two divergent lamb breeds, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1138-1149, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4SMNY08-1/2/405abdcdee045ab45ef8f966ab8add83>)

Abstract:

Live weight, subjective scores of condition and conformation, live animal video image analysis (LVIA), ultrasound and X-ray computed tomography (CT) scanning were used to investigate the best method or combination of methods for predicting carcass and meat quality traits in live Texel and Scottish Blackface lambs. Predictors derived from CT alone accounted for a high proportion of the variance in dissected fat and muscle weight in Texel lambs (adjusted R² = ~0.8), as well as intra-muscular fat content in the loin (~0.6), but lower proportions in Blackface lambs (~0.7 for fat, 0.4-0.5 for muscle and intra-muscular fat), after adjusting for sire and fixed effects. Adding traits measured by other in vivo methods increased prediction accuracies (adjusted R²) by up to 0.26, depending on trait and data set. Shear force and ultimate pH could not be accurately predicted using the traits considered here (adjusted R² < 0.4). Although the same methods tended to be best for predicting product quality traits between breeds, prediction accuracies differed.

Keywords: Lambs; Carcass composition; Meat quality; Computed tomography

Laurits Lydehoj Hansen, Sandra Stolzenbach, Jens Askov Jensen, Poul Henckel, Jens Hansen-Moller, Kostas Syriopoulos, Derek V. Byrne, Effect of feeding fermentable fibre-rich feedstuffs on meat quality with emphasis on chemical and sensory boar taint in entire male and female pigs, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1165-1173, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4SK631T-6/2/7984f479dc7e6f25c2bdb7706e5ed0ab>)

Abstract:

Skatole, androstenone and other compounds such as indole cause boar taint in entire male pork. However, female pigs also produce skatole and indole. The purpose of this experiment was to

minimise boar taint and increase overall impression of sensory quality by feeding entire male and female pigs with fibre-rich feedstuffs. The pigs have been fed three organic diets for either 1 or 2 weeks prior to slaughter of which two diets contained different fermentable fibre-rich feedstuffs - 10-13.3% dried chicory roots or 25% blue lupines. These two treatments were compared with pigs fed with an organic control diet for either 1 or 2 weeks prior to slaughter. Lupines significantly reduced skatole in blood and backfat for both genders after 1 week. Moreover, lupines showed negative impact on growth rate and feed conversion whilst chicory showed no significant differences in this respect. However, the indole concentration was significantly lower in chicory than lupine fed pigs. From a sensory perspective, chicory and lupine feeding reduced boar taint since odour and flavour of manure related to skatole and urine associated to androstenone were minimised. The level of boar taint in the entire male pigs was most effectively reduced after 14 days by both fibre-rich feeds while lupine had the largest influence on 'boar' taint reduction in female pigs.

Keywords: Chicory; Lupine; Fibre; NSP, Boar taint; Skatole; Androstenone; Sensory profiling; Meat quality

O. Skewes, R. Morales, F. Gonzalez, J. Lui, P. Hofbauer, P. Paulsen, Carcass and meat quality traits of wild boar (*Sus scrofa* s. L.) with $2n = 36$ karyotype compared to those of phenotypically similar crossbreeds ($2n = 37$ and $2n = 38$) raised under same farming conditions. 1. Carcass quantity and meat dressing, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1200-1204, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4SK631T-8/2/c3f987d95bc9de68c3ee5593cb33f78b>)

Abstract:

The aim of this study was to compare wild boar (chromosomal number $2n = 36$) to phenotypically similar animals of $2n = 37$ and $2n = 38$ chromosomes (crossbreeds) with respect to live weight, carcass yield, meat yield, fat and weight of inner organs. All animals were born and raised on the same farm and slaughtered at 39 weeks. The final live weight of wild boar $2n = 36$ was significantly lower (47.2 kg) as compared to crossbreeds (80.0 kg). Animals $2n = 36$ had more carcass yields (65.5%) than $2n = 37$ karyotype (64.9%) and $2n = 38$ (64.4%). Wild boar had the highest yields for the cuts with bones and boneless cuts compared to crossbreeds. Therefore, variations in karyotype are accompanied by differences in some carcass quantitative traits, i.e., $2n = 36$ grow and fatten slower than crossbreeds $2n = 37$ and $2n = 38$.

Keywords: Carcass; Meat cuts; By-products; Crossbreeds; Wild boar

P. Polidori, S. Vincenzetti, C. Cavallucci, D. Beghelli, Quality of donkey meat and carcass characteristics, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1222-1224, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4SMNY08-2/2/6ce06c45dbab217f8fe7d922e70844d7>)

Abstract:

A study based on 15 entire donkey males was carried out to evaluate carcass quality and nutritional characteristics of meat obtained by these animals slaughtered at 15 months of age and a mean final body weight of 181 kg. The meat had a low (2.02 g/100 g) fat content, an appreciable (22.8 g/100 g) protein content, and cholesterol content was 68.7 mg/100 g. Glycogen was also determined (0.45 g/100 g) within 12 h of sampling. Potassium was the mineral with the highest content (343 mg/100 g), followed by phosphorus (212 mg/100 g), sodium (52 mg/100 g) and magnesium (24 mg/100 g). Donkey meat obtained from young animals can be considered a good alternative to other red meats and not only for the production salami, or other fermented meat products.

Keywords: Donkey; Meat quality; Carcass quality

K. Lunde, B. Egelanddal, J. Choinski, M. Mielnik, A. Flatten, E. Kubberod, Marinating as a technology to shift sensory thresholds in ready-to-eat entire male pork meat, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1264-1272, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.035.

(<http://www.sciencedirect.com/science/article/B6T9G-4SNWW7R-2/2/98ef81bd0488d73ca4dd0ec858b9649c>)

Abstract:

This study investigated the effect of marinades in improving the eating quality in ready-to-eat boar meat. Neck chops with fat content below 18.9%, skatole [less-than-or-equals, slant]1.1 ppm (range 0.03-1.1) and androstenone [less-than-or-equals, slant]5.6 ppm (range 0.01-5.6) were used. In a screening experiment different marinades were tested for their ability to mask boar taint (defined as manure and urine odour and flavour). Liquid smoke and oregano extracts appeared to have the best potential for masking, and were studied in detail. Results from the study indicated that marinated chops with skatole content of approximately 0.4 ppm appeared similar to castrates in boar taint. Chops with skatole contents above 0.7 ppm remained unmasked despite the use of strongly flavoured marinades. Unmarinated chops served at 60 [degree sign]C were more tainted than those served at 15 [degree sign]C, but scored lower for boar taint when reheated, although the concentrations of androstenone and skatole remained the same. The fat content of the chops was not well correlated to the perception of boar taint. The attributes manure and urine were correlated with the level of skatole, but urine attribute was not a good indicator of the androstenone level.

Keywords: Androstenone; Skatole; Boar taint; Marinating; Sensory thresholds

Diana Martin, Teresa Antequera, Elena Muriel, Trinidad Perez-Palacios, Jorge Ruiz, Effect of dietary conjugated linoleic acid in combination with monounsaturated fatty acids on the meat composition and quality traits of dry-cured loin, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1309-1319, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4SSY912-2/2/ecd72e63173d9132e9e52b9aa9d8c200>)

Abstract:

Three levels (0%, 1% and 2%) of an enriched conjugated linoleic acid oil (CLA) were combined with two levels of monounsaturated fatty acids (MUFA) (low -19% average and high -39% average) for pig feeding. Composition, weight losses, lipid oxidation (thiobarbituric acid test, TBARs), change in the fatty acid content of the lipid fractions and sensory analysis of dry-cured loin as affected by dietary CLA, MUFA and CLA x MUFA interaction were studied. CLA and CLA x MUFA did not affect moisture and intramuscular fat content of dry-cured loin, weight losses during the processing, changes in the content of most fatty acids from lipid fractions and sensory traits. CLA and MUFA supplementation led to lower TBARs values (1.3 mg MDA/kg sample for 0% CLA and 0.9 mg MDA/kg sample for 2% CLA; 1.2 mg MDA/kg sample for low MUFA diets and 0.9 mg MDA/kg sample for high MUFA diets), the highest TBARs values being detected for 0% CLA-low MUFA diets [1.5 mg MDA/kg sample]. The combination of dietary CLA with different MUFA levels in pig diets did not affect most composition and quality traits of dry-cured loin. Dietary CLA and MUFA seemed to lead to lower lipid oxidation in this product.

Keywords: Conjugated linoleic acid; Monounsaturated fatty acids; Pork; Dry-cured meat products

J. Schneider, J. Wulf, B. Surowsky, H. Schmidt, F. Schwagele, O. Schluter, Fluorimetric detection of protoporphyrins as an indicator for quality monitoring of fresh intact pork meat, *Meat Science*, Volume 80, Issue 4, December 2008, Pages 1320-1325, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4SSY912-3/2/f2357f725334d51194385038ce717b17>)

Abstract:

In fresh meat production fast and non-destructive quality monitoring along the distribution chain is a key aspect to guaranteeing high quality and safe products for consumption. The applicability of fluorescence spectroscopy using protoporphyrins as indicators for meat ageing was investigated. Porcine musculus longissimus dorsi (MLD) was stored in slices over 20 days at 5 and 12 [degree sign]C and measured every day with an excitation of 420 nm and an emission range of 550-750 nm. Additionally, pH, drip loss and colour were examined to assess possible correlations.

The obtained spectra of the MLD showed an increase in three peaks at 592, 638 and 705 nm which could be reconstructed using the spectra of standard solutions of protoporphyrin IX (PP) and zinc protoporphyrin IX (ZnPP) or magnesium protoporphyrin (MgPP), respectively.

Using principal component analysis (PCA) on the fluorescence spectral data, the meat slices stored at 5 [degree sign]C showed differences in the fluorescence signal after the 10th day and 5th day when stored at 12 [degree sign]C. An interrelationship between the additional analyses and the fluorescence intensities on these relevant days could not be established.

In conclusion, the increase of ZnPP fluorescence due to temperature related changes of physiological meat properties is capable of serving as a quality indicator with regards to inadequate conditioning (e.g. during transportation and/or storage) of pork meat.

Keywords: Fluorescence spectroscopy; Pork; Zinc protoporphyrin IX; Protoporphyrin IX; Non-invasive; Quality monitoring

P. Gou, R. Morales, X. Serra, M.D. Guardia, J. Arnau, Effect of a 10-day ageing at 30 [degree sign]C on the texture of dry-cured hams processed at temperatures up to 18 [degree sign]C in relation to raw meat pH and salting time, Meat Science, Volume 80, Issue 4, December 2008, Pages 1333-1339, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4ST3YP2-2/2/ea569a4598e704bb63456e19193b4327>)

Abstract:

The aim of this study was to investigate the effect of a 10-day ageing at 30 +/- 2 [degree sign]C on the texture of dry-cured hams processed at temperatures up to 18 +/- 2 [degree sign]C for 12 months in relation with raw ham pH and salting time. Three pH groups (semimembranosus muscle at 24 h post-mortem: Low pH < 5.7, Medium pH = 5.7 [less-than-or-equals, slant] pH [less-than-or-equals, slant] 5.9, and High pH > 5.9), three salting times (6 d, 10 d and 14 d) and two ageing temperatures (18 [degree sign]C and 30 [degree sign]C) were investigated. Physicochemical characteristics, instrumental and sensory texture and product sliceability were evaluated on biceps femoris and semimembranosus muscles. Hams with pHSM24 < 5.7 should be avoided in order to reduce the incidence of texture problems in dry-cured ham elaboration. Texture problems are especially important in hams with a reduced salt content that are mechanically sliced (not frozen). A 10-day ageing at 30 [degree sign]C could be useful for reducing the soft texture problems in dry-cured hams processed at temperatures up to 18 [degree sign]C for 12 months without affecting the product flavour.

Keywords: Texture; Stress relaxation test; pH; Salting; Water content; Ageing temperature; Dry-cured ham

Katarzyna Waszkowiak, Krystyna Szymandera-Buszka, The application of wheat fibre and soy isolate impregnated with iodine salts to fortify processed meats, Meat Science, Volume 80, Issue 4, December 2008, Pages 1340-1344, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4STYV3T-3/2/b3447a3ca62b4e2c40704c852866b7da>)

Abstract:

The aim was to use wheat dietary fibre and soy protein isolate as carriers of KI and KIO₃ for fortification of processed meat with iodine. Products from minced pork were prepared with addition of iodised wheat fibre and soy isolate, and iodised table salt for comparison and the effects of thermal processing and storage on changes in iodine content were determined. It was shown that both alternative carriers limited the iodine changes in meat products compared with iodised table salt. However, wheat fibre was more effective in limiting iodine losses during thermal processing and soy protein during storage of the products. The greatest effect of the carriers was found in meat products fortified with the less stable KI.

Keywords: Iodine carriers; Wheat dietary fibre; Soy protein isolate; Iodine retention; Food fortification; Meat product

B. Huber-Eicher, P. Spring, Attitudes of Swiss consumers towards meat from entire or immunocastrated boars: A representative survey, *Research in Veterinary Science*, Volume 85, Issue 3, December 2008, Pages 625-627, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2008.03.002.

(<http://www.sciencedirect.com/science/article/B6WWR-4SBHF47-2/2/d94ef4f48bffc5d1718cb44411a69906>)

Abstract:

Male piglets are castrated in order to prevent boar taint in pork. The surgical intervention is currently done without anaesthesia. Growing public concern about the welfare issue of this procedure forces the meat industry to evaluate alternative methods. The acceptance of such methods was studied in Switzerland within a large representative survey on the image of Swiss meat. Five questions were aimed at our subject.

It was found that only a small part of the population has actually experienced boar taint. Nevertheless, the majority would not buy products made from tainted meat even if the absence of any perceivable boar taint and identical quality with current products could be guaranteed. The acceptance of meat from immunocastrated animals was low. Among the proposed four alternative methods, the production of entire males (with two options regarding processing of the tainted meat), immunocastration and castration with anaesthesia, only the last one seems to be acceptable to the interviewees.

Keywords: Boar taint; Castration; Immunocastration; Anaesthesia; Survey; Consumer attitudes

Y. Le Marc, J. Plowman, C.F. Aldus, M. Munoz-Cuevas, J. Baranyi, M.W. Peck, Modelling the growth of *Clostridium perfringens* during the cooling of bulk meat, *International Journal of Food Microbiology*, Volume 128, Issue 1, 5th International Conference on Predictive Modelling in Foods, 30 November 2008, Pages 41-50, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.07.015.

(<http://www.sciencedirect.com/science/article/B6T7K-4T193WT-2/2/13c835d7ca1933b02920740b41d62ef6>)

Abstract:

A dynamic predictive model was developed to describe the effects of temperature, pH and NaCl concentration on the growth of *Clostridium perfringens* type A. The model for the specific growth rate was based on 81 growth curves generated in our laboratory or obtained from the publicly available ComBase database. Growth curves obtained during cooling were fitted with the dynamic model of Baranyi and Roberts. This made it possible to determine the parameter value reflecting the physiological state of *C. perfringens* after heating profiles typically applied to bulk meat. The model with the obtained parameters provided a good description of growth of *C. perfringens* in 24 heating/cooling curves generated specifically for this work (various non-isothermal treatments with a range of combinations of pH and NaCl concentration), and also for existing literature data. The dynamic model was implemented in *Perfringens Predictor*, a web-based application that can be accessed free of charge via www.combase.cc. It is anticipated that the use of this model and *Perfringens Predictor* will contribute to a reduction in the food poisoning incidence associated with *C. perfringens*.

Keywords: Clostridium perfringens; Predictive model; ComBase; Perfringens Predictor

Steinar Waage, Synnove Vatn, Individual animal risk factors for clinical mastitis in meat sheep in Norway, Preventive Veterinary Medicine, Volume 87, Issues 3-4, 17 November 2008, Pages 229-243, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.04.002.

(<http://www.sciencedirect.com/science/article/B6TBK-4SN92CH-1/2/83dc909fd093ac140f55f98eaf34f421>)

Abstract:

An m:n matched case-control study was conducted to identify risk factors for ovine clinical mastitis (CM). Data were from a national sheep registry and only ewes that lambed in the spring of 2004 were included. Eligible cases (n = 2857) and controls (n = 76,716) from 1056 flocks of meat sheep were matched on flock and conditional logistic regression was used for analysis of the data. CM risk was associated with age of the ewe and whether or not assistance at lambing was needed owing to dystocia; however, the effects of both these factors were modified by the number of lambs born. In ewes with 1 lamb, increasing age was associated with increased odds of CM (OR = 1.2 for each 1-year increase), while only a slight numerical increase in the odds was observed in ewes with >1 lamb. Dystocia was associated with increased odds of CM in ewes with 1 lamb (OR = 1.7) or 2 lambs (OR = 1.4), while no association was observed in ewes with >2 lambs. The odds of CM increased markedly with increasing number of lambs born to the ewe. For example, odds for 2-year-old ewes without dystocia were 6.7 times greater for those with >3 lambs than for those with 1 lamb. Compared with ewes of old Norwegian breeds, ewes of other breeds were more likely to experience CM (OR = 1.7). Ewes treated for CM at least once during the preceding 3 years had 4.0 times greater odds of CM compared with ewes without a CM history. It is likely that the effect estimates from this study, which are adjusted for breed and unaffected by inter-flock variations, are valid also for other meat sheep populations.

Keywords: Ewe; Clinical mastitis; Risk factors; Case-control study

Julie Arsenault, Pascal Dubreuil, Robert Higgins, Denise Belanger, Risk factors and impacts of clinical and subclinical mastitis in commercial meat-producing sheep flocks in Quebec, Canada, Preventive Veterinary Medicine, Volume 87, Issues 3-4, 17 November 2008, Pages 373-393, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2008.05.006.

(<http://www.sciencedirect.com/science/article/B6TBK-4T29WCK-1/2/162089806af009e8040dd877bbba9f0b>)

Abstract:

We conducted a prospective observational study on clinical and subclinical mastitis in 30 commercial meat-producing sheep flocks from 2 regions of the province of Quebec, Canada. A total of 2792 ewes selected in late gestation were followed from lambing to weaning of lambs. The incidence of clinical mastitis for the total lactation period (average of 58 days) ranged among flocks from 0 to 6.6%, with a median of 1.2%. The most frequently isolated bacteria from the cases of clinical mastitis, in pure or mixed culture, were *Mannheimia haemolytica* (26%), *Staphylococcus aureus* (23%), and coagulase-negative staphylococci (17%). Incidence of clinical mastitis was higher in ewes that gave birth to 3 or more lambs and from the Estrie region, and was associated with an increase in ewe mortality, an increase in lamb mortality at the litter level, and a decrease in lamb's weaning weight for lambs born in multiple litter size or from ewes ≥ 4 years old.

Among 354 selected ewes with clinically normal udder at the end of lactation, 28.8% had potentially pathogenic bacteria isolated from milk. The most prevalent bacteria were *S. aureus* (9.3%) and coagulase-negative staphylococci (9.3%). The risk of having a positive culture in at least one half was different between the two regions. Prevalence of ewes (n = 261) with California Mastitis Test (CMT) positive result in at least one half was 24.1 and 14.9% using a cut-off of $\geq 1+$ and $\geq 2+$, respectively. Prevalence of culture-positive udder halves was 11.7% for CMT-negative compared with 53.6% for CMT 3+ halves. CMT status was positively associated with the isolation

of coagulase-negative staphylococci, *M. haemolytica*, *S. aureus*, and various *Streptococcus* species, but not with other isolated bacteria. Additionally, prevalence of CMT-positive halves was higher in ewes from the Estrie region, aged of ≥ 4 years versus 1 year, having clinical mastitis previously detected in the lactation and/or with low body condition score. Lamb weaning weight was associated with CMT status of ewes, while weaning weight was not associated with milk culture results. More research is needed to understand the dynamic of milk SCC and IMI in ewes from meat-producing flocks, its economical impact and best ways to control it.

Keywords: Sheep; Mastitis; Risk factors; Incidence; Mortality; Weaning weight

Qun-Lin Zhang, Jun Li, Tao-Tao Ma, Zhong-Tang Zhang, Chemiluminescence screening assay for diethylstilbestrol in meat, *Food Chemistry*, Volume 111, Issue 2, 15 November 2008, Pages 498-502, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.04.010.

(<http://www.sciencedirect.com/science/article/B6T6R-4S80XN9-3/2/cf0a1b68aa138856c854f05ff957f610>)

Abstract:

A simple, rapid, and sensitive flow injection method with chemiluminescence detection was developed for the screening of meat samples containing diethylstilbestrol, based on the enhancement by diethylstilbestrol of the cerium(IV)-rhodamine 6G chemiluminescence system in sulfuric acid medium. Under the optimal conditions, the chemiluminescence intensity was linear for the diethylstilbestrol concentration in four types of meat (chicken, beef, mutton, and pork) matrix, with the linear ranges of CL detection more than three orders of magnitude and the detection limits ($3[\sigma]$) in the range 0.75-1.12 pg/mL. The relative standard deviations for intra-day and inter-day precision were less than 3.0%. The proposed method was found to be highly reliable for screening purpose and successfully applied to the screening of diethylstilbestrol residue in four types of meat samples, with the good quantitative recoveries for the different concentration levels varied from 93.1% to 104.5%. The mechanism of this chemiluminescence reaction has also been proposed.

Keywords: Flow injection; Chemiluminescence; Screening; Diethylstilbestrol

V. Vasta, A. Nudda, A. Cannas, M. Lanza, A. Priolo, Alternative feed resources and their effects on the quality of meat and milk from small ruminants, *Animal Feed Science and Technology*, Volume 147, Issues 1-3, Shrubby vegetation and agro-industrial by-products as alternative feed resources for sheep and goats, 14 November 2008, Pages 223-246, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.09.020.

(<http://www.sciencedirect.com/science/article/B6T42-4PYJF20-1/2/69132b4ee2fb8eee3c020ae5b8874994>)

Abstract:

The present paper reviews the quality of meat and milk from sheep and goats offered alternative feeds as a replacement for concentrates. Legume seeds and pods, shrubs, local agro-industrial by-products or novel pasture species are cheap and widely available in Mediterranean countries and are suitable for sheep and goat nutrition. Many of these alternative feed resources (AFR) contain secondary compounds, such as tannins. Tannin-containing feeds result in meat of a lighter colour and tend to increase milk yield and protein content, probably because they protect dietary proteins from ruminal degradation. Conjugated linoleic acid (CLA) content in kid meat can be increased by feeding animals chopped cactus cladodes. Grazing saltbush (*Atriplex* spp.) preserves lamb meat colour stability, suggesting that the high level of vitamin E in these shrubs protects myoglobin from oxidation. When olive cake silage is included in lamb or ewe diets, linoleic and oleic acid contents may increase in meat and milk fat, respectively. The appearance of terpenes in sheep and goat milk is enhanced by grazing on some novel pasture species, such as *Galium verum*, *Cichorium intybus* and *Chrysanthemum coronarium*, which modify milk and cheese sensorial profile, compared to grazing on conventional forages.

Keywords: Feeding resources; Meat quality; Milk quality; Sheep; Goats

Rennio F. de Sena, Regina F.P.M. Moreira, Humberto J. Jose, Comparison of coagulants and coagulation aids for treatment of meat processing wastewater by column flotation, *Bioresource Technology*, Volume 99, Issue 17, November 2008, Pages 8221-8225, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.03.014.

(<http://www.sciencedirect.com/science/article/B6V24-4SCTSMS-3/2/8b0652bdb117784bd4ebad7d5c6ea7f6>)

Abstract:

The physicochemical treatment of the wastewater from a meat processing industry was studied using three ferric salts as coagulants in conjunction with four different polymers as coagulation aids by batch column flotation. The effluent was characterized in terms of pH (6.5-6.7), turbidity (1000-12000 NTU), total solids (TS) (2300-7000 mg l⁻¹), oils and greases (OG) (820-1050 mg l⁻¹), and biochemical and chemical oxygen demands (BOD₅ and COD) (1200-1760 and 2800-3230 mg l⁻¹), respectively. The treatments achieved typical organic load reductions of oils and greases, and total solids (up to 85%), as well as biochemical and chemical oxygen demands (between 62.0-78.8% and 74.6-79.5%, respectively). The research also found that the utilization of a column flotation achieved high efficiency of organic matter removal and its operation as a primary treatment showed no significant dependence of pollutant removal and air flow rate.

Keywords: Meat industry; Wastewater treatment; Coagulation; Air flow rate; Column flotation

I.T. Kadim, O. Mahgoub, R.W. Purchas, A review of the growth, and of the carcass and meat quality characteristics of the one-humped camel (*Camelus dromedaries*), *Meat Science*, Volume 80, Issue 3, November 2008, Pages 555-569, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4RW43CS-2/2/a38998aec78f1e4d0b399e0a2d1f1b81>)

Abstract:

The dromedary camel is a good source of meat especially in areas where the climate adversely affects the performance of other meat animals. This is because of its unique physiological characteristics, including a great tolerance to high temperatures, solar radiation, water scarcity, rough topography and poor vegetation. The average birth weight of camels is about 35 kg, but it varies widely between regions, breeds and within the same breed. The meat producing ability of camels is limited by modest growth rates (500 g/day). However, camels are mostly produced under traditional extensive systems on poor levels of nutrition and are mostly slaughtered at older ages after a career in work, racing or milk production. Camels reach live weights of about 650 kg at 7-8 years of age, and produce carcass weights ranging from 125 to 400 kg with dressing-out percentage values from 55% to 70%. Camel carcasses contain about 57% muscle, 26% bone and 17% fat with fore halves (cranial to rib 13) significantly heavier than the hind halves. Camel lean meat contains about 78% water, 19% protein, 3% fat, and 1.2% ash with a small amount of intramuscular fat, which renders it a healthy food for humans. Camel meat has been described as raspberry red to dark brown in colour and the fat of the camel meat is white. Camel meat is similar in taste and texture to beef. The amino acid and mineral contents of camel meat are often higher than beef, probably due to lower intramuscular fat levels. Recently, camel meat has been processed into burgers, patties, sausages and shawarma to add value. Future research efforts need to focus on exploiting the potential of the camel as a source of meat through multidisciplinary research into efficient production systems, and improved meat technology and marketing.

Keywords: Camel; Meat quality; Nutritive value; Meat composition; Meat processing

A. Saadoun, M.C. Cabrera, A review of the nutritional content and technological parameters of indigenous sources of meat in South America, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 570-581, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4S62RSK-1/2/2345086e1afb58446c6f92029287dab7>)

Abstract:

Meat yields, proximate compositions, fatty acids compositions and technological parameters are reviewed for species which might be further developed as indigenous sources of meat in South America. These include the alpaca (*Lama pacos*), capybara (*Hydrochoerus hydrochaeris*), guanaco (*Lama guanicoe*), llama (*Lama glama*), nutria (*Myocastor coypus*), collared peccary (*Tayassu tajacu*), greater rhea (*Rhea americana*), lesser rhea (*Rhea pennata*), yacare (*Caiman crocodilus yacare*), tegu lizard (*Tupinambis merianae*) and green iguana (*Iguana iguana*).

Keywords: Native species; South america; Meat sources; Indigenous meat

C. Saricoban, B. Ozalp, M.T. Yilmaz, G. Ozen, M. Karakaya, M. Akbulut, Characteristics of meat emulsion systems as influenced by different levels of lemon albedo, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 599-606, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4RV7YM2-2/2/12516bbf54831d4a66209e1b949e10dc>)

Abstract:

The effect of the addition of lemon albedo on the functional properties of emulsions was studied by using a model system. Oil/water (O/W) model emulsion systems were prepared by the addition of two types of lemon albedo (raw and dehydrated) at five concentrations (0.0%, 2.5%, 5.0%, 7.5% and 10%) to mechanically deboned chicken meat. The emulsion capacity, stability, viscosity and flow properties of the prepared model emulsions were analyzed. In addition, the colour parameters of cooked emulsion gel were determined. The addition of lemon albedo increased the emulsion capacity (EC) and the highest EC value was reached with 5% of albedo added. However, further increase in the albedo concentration caused an inverse trend in the EC values. A similar trend was observed in the emulsion stability (ES) values. Dehydrated albedo (DA) addition caused higher EC and ES values than did raw albedo (RA). DA increased the L*, a* and b* values of the cooked emulsion gels. Emulsion viscosity (EV) values were positively correlated with an increase in albedo concentration and the highest EV value was obtained from the emulsions with 10% albedo. Albedo addition did not change the flow properties of the emulsions and, in addition, increased the pseudoplasticity. As a consequence, the use of lemon albedo might be a potential dietary fiber source to enhance the functional and technological properties for frankfurter-type meat products.

Keywords: Model system; Lemon albedo; Fiber; Emulsion characteristics; Pseudoplasticity

Arun K. Das, A.S.R. Anjaneyulu, Y.P. Gadekar, R.P. Singh, H. Pragati, Effect of full-fat soy paste and textured soy granules on quality and shelf-life of goat meat nuggets in frozen storage, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 607-614, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4RW43CS-1/2/ec34bbf7b02b8a6fb516e5445bdafa6f9>)

Abstract:

Goat meat nuggets were prepared using commercially available textured soy granules and reduced beany flavour full-fat soy paste (FFSP) made by simple processing technology to compare the performance of these proteins in a comminuted meat system. Addition of soy proteins (soy paste and soy granules) did not significantly affect the product yield, pH, moisture and fat percentage whereas protein content and water holding capacity (% expressible water) were significantly ($p > 0.05$) lower in nuggets with 15% soy paste. Lower force was required to compress or shear the sample as hardness, springiness, gumminess and chewiness decreased in

soy paste incorporated nuggets. Soy proteins either paste or granules, did not affect sensory attributes except flavour and overall acceptability. Nuggets with soy paste and control ones did not differ significantly for flavour and overall acceptability whereas nuggets with soy granules were rated significantly ($p > 0.05$) lower. The nuggets remained stable with minor changes in physico-chemical, microbiological and sensory quality during frozen storage (-18 ± 1 [degree sign]C) for 90 days. It is concluded from this study that FFSP could be successfully incorporated in comminuted meat systems for producing quality products similar to commercially available soy granules.

Keywords: Full-fat soy paste; Soy granules; Goat meat nuggets; Texture profiles; Storage stability

W. Chiang, A. Booren, G. Strasburg, The effect of heat stress on thyroid hormone response and meat quality in turkeys of two genetic lines, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 615-622, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4RWBT2M-1/2/f8ca6ecb60dcb8dab5d2a57102b59f3a>)

Abstract:

The current study evaluated the effect of heat stress on thyroid hormone (T3 and T4) response and meat quality traits in two turkey lines: a growth-selected commercial line and a genetically unimproved control line. Birds were subjected to heat stress for different durations before harvest. Commercial line had higher pH15 min, and lightness values, but lower cook loss and marinade uptake than control line during the heat stress. There was no difference in drip loss between the two lines. The T3 concentration was positively correlated with cook loss and was negatively correlated with marinade uptake. The thyroid hormone response during heat stress was less stable in the commercial line than in the control line and the unstable thyroid hormone response in commercial turkeys caused by heat exposure might influence the consistency of meat quality. Results of this study may provide an application in selecting turkeys which yield consistent meat quality.

Keywords: Heat stress; Thyroid hormone; Meat quality; Turkey

G. Salvatori, F. Filetti, C. Di Cesare, G. Maiorano, F. Pilla, G. Oriani, Lipid composition of meat and backfat from Casertana purebred and crossbred pigs reared outdoors, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 623-631, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4RWBT2M-2/2/3ea1288c4e0cd4acfb0b91c025aa2745>)

Abstract:

The study aimed to evaluate, with regard to the human nutrition, the lipid profile of meat and backfat from gilts and barrows of the Italian autochthonous genotype Casertana and its crossbreed (Casertana x Large White) slaughtered at two different live weights. Meat from the Casertana cross was nutritionally comparable to that from the purebreed and both would be considered healthy, irrespective of sex and weight, due to the relatively low levels of intramuscular lipids and cholesterol. Muscle cholesterol was considerably lower in the heavy pigs than in the light ones and, as weight increased, cholesterol decreased but only in gilts. Females supply meat with higher polyunsaturated fatty acids (PUFA) and slightly lower saturated fatty acids (SFA) respect to barrows and, thus, higher PUFA/SFA ratio. Casertana crossbreds can represent a good alternative to pure Casertana, mainly in the production of Colonnata lard, due to the better fatty acid profile of the subcutaneous adipose tissue. From the nutritional point of view, the optimal slaughtering weight was about 150 kg for both genotypes. Heavy pigs, compared to the light ones, produced loin with lower atherogenic and thrombogenic indexes, lower SFA/unsaturated fatty acids ratio, and higher PUFA/SFA ratio.

Keywords: Casertana pig; Fatty acids; Cholesterol; Slaughter weight; Sex

Privat Kouakou, Hakim Ghalfi, Jacqueline Destain, Robin Duboisdauphin, Pol Evrard, Philippe Thonart, Enhancing the antilisterial effect of *Lactobacillus curvatus* CWBI-B28 in pork meat and cocultures by limiting bacteriocin degradation, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 640-648, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4RXJYWJ-1/2/5c6efea8b7487dd5f6b841f4a15e5d46>)

Abstract:

This work focused on *Listeria monocytogenes* growth inhibition and growth rebound in raw and cooked pork meat inoculated with *Lactobacillus curvatus* strains. During storage of raw meat homogenates in the presence of the bacteriocin-producing strain *Lactobacillus curvatus* CWBI-B28wt, the *Listeria monocytogenes* cfu count was initially reduced to an undetectable level, but a growth rebound occurred after two weeks, coinciding with loss of 70% of the bacteriocin activity present at the end of week 2. The *Listeria* growth rebound was suppressed when proteolysis of bacteriocin was countered by the absence of proteases (bacteriocin addition to cooked meat) or the presence of 1% soy flour (added to provide competing substrates). Further experiments confirmed that bacteriocin is sensitive to the action of proteolytic enzymes isolated from both *Lactobacillus curvatus* CWBI-B28wt and the meat matrix. Bacteriocin proteolysis thus emerges as a cause of *Listeria* growth rebound.

Keywords: Bacteriocin; *Lactobacillus curvatus*; *Listeria monocytogenes*; Commercial pork meat; Proteases

A.M. Herrero, L. de la Hoz, J.A. Ordonez, B. Herranz, M.D. Romero de Avila, M.I. Cambero, Tensile properties of cooked meat sausages and their correlation with texture profile analysis (TPA) parameters and physico-chemical characteristics, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 690-696, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4S2MJ1B-1/2/5bb0a46e379a140e579f1fc3c1324460>)

Abstract:

The possibilities of using breaking strength (BS) and energy to fracture (EF) for monitoring textural properties of some cooked meat sausages (chopped, mortadella and galantines) were studied. Texture profile analysis (TPA), folding test and physico-chemical measurements were also performed. Principal component analysis enabled these meat products to be grouped into three textural profiles which showed significant ($p < 0.05$) differences mainly for BS, hardness, adhesiveness and cohesiveness. Multivariate analysis indicated that BS, EF and TPA parameters were correlated ($p < 0.05$) for every individual meat product (chopped, mortadella and galantines) and all products together. On the basis of these results, TPA parameters could be used for constructing regression models to predict BS. The resulting regression model for all cooked meat products was $BS = -0.160 + 6.600 * \text{cohesiveness} - 1.255 * \text{adhesiveness} + 0.048 * \text{hardness} - 506.31 * \text{springiness}$ ($R^2 = 0.745$, $p < 0.00005$). Simple linear regression analysis showed significant coefficients of determination between BS ($R^2 = 0.586$, $p < 0.0001$) versus folding test grade (FG) and EF versus FG ($R^2 = 0.564$, $p < 0.0001$).

Keywords: Tensile test; Texture profile analysis; Breaking strength; Energy to fracture; Folding test; Cooked meat sausages

F. Rincon, B. Martinez, R. Perez-Olmos, A. Berzosa, The roles of pH extraction and colloidal protein solubility in the optimization of spectrophotometric nitrite determination in meat products via response surface methodology, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 744-752, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4S7JG3B-1/2/677a0f417c6e8d426c6bcabe47c4062b>)

Abstract:

The influence of four critical factors such as sample weight/borax reagent ratio (BR factor), ascorbic acid content (AR factor), neutralization with HCl 1 N (NR factor) and stirring extraction time (SET factor), was investigated in order to find the best conditions (optimization) to develop the official ISO 2.918 spectrophotometric method to determine the residual nitrite content in meat products, using the response surface methodology (RSM) as optimization tool.

The factors most strongly affecting nitrite determination in meat products are BR, NR and AR, due to their respective effects on pH extraction parameters and on the amount of colloidal protein present in the sample extract. At pH ≤ 6 , for example, the extract - though appearing clear and transparent to the analyst - contains a considerable amount of hydrolyzed protein, which will severely interfere with measurements, generating false-positive results. The colloidal protein present in the extract (≤ 20 mg/g, corresponding in these working conditions to an OD₃₄₀ value of ≤ 0.600) will lead to the recording of nitrite values greater than those actually present in the sample.

In order to avoid these drawbacks, this paper proposes that the amount of borax added (BR) varies as a function of sample weight (WS), using the ratio $WS/BR = 1.11$. In order to monitor the analytical method, it is further recommended that pH be adjusted to 6-7 (lower protein solubility) and that colloidal protein levels be ≥ 20 mg/g, as confirmed by an OD₃₄₀ value of ≥ 0.600 .

Keywords: Nitrite; Meat products; Response surface methodology; Official methods of analysis

M. del Campo, G. Brito, J.M. Soares de Lima, D. Vaz Martins, C. Sanudo, R. San Julian, P. Hernandez, F. Montossi, Effects of feeding strategies including different proportion of pasture and concentrate, on carcass and meat quality traits in Uruguayan steers, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 753-760, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.026. (<http://www.sciencedirect.com/science/article/B6T9G-4S5KXD9-1/2/73190a90eafb096ecd36b8017ae28971>)

Abstract:

Eighty four steers were randomly assigned to three pasture treatments with increasing levels of grain (T1: 0%; T2: 0.6%; T3: 1.2% of live weight) and to an ad libitum concentrate treatment, T4, to study the effects on carcass and meat quality. Animals were slaughtered with 500 kg of average live weight per treatment. Average daily gain increased with increasing levels of energy, determining different slaughter dates. Intermediate treatments showed higher carcass weight than T1. T4 and T3 had a higher weight of valuable cuts than T1 and T4. Pistolas from T4 had a higher fat proportion and lower bone percentage. Increasing levels of energy in diet decreased fat yellowness. After 20 days of aging, T4 had the lowest muscle a^* values and shear force was higher for T4 than for T1. With pastures finishing strategy, no adverse effects on meat quality were detected and tenderness was enhanced.

Keywords: Diet; Beef; Carcass traits; Meat quality

R. Hadorn, P. Eberhard, D. Guggisberg, P. Piccinali, H. Schlichtherle-Cerny, Effect of fat score on the quality of various meat products, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 765-770, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.020. (<http://www.sciencedirect.com/science/article/B6T9G-4S50K9C-2/2/8c115ec8690d26b9c625a2ccf75b96f1>)

Abstract:

In the larger Swiss abattoirs the fat score (FS) is determined by default as an indicator of fat quality. The FS refers to the iodine number and is related to the degree of unsaturation of the outer layer of backfat. In a feeding trial with Large White gilts, the FS was determined in 47 carcasses. Meat and fat tissues were prepared for the production of salami (SAL), raw-cured bacon (RCB), pork hamburger (PHB) and Vienna sausage (VIS). In the different meat products, the FS was

closely related to the percentage of saturated (SFA: $r = -0.49$ to -0.79) and polyunsaturated fatty acids (PUFA, $r = 0.36$ to 0.79) for RCB, SAL and PHB (p [less-than-or-equals, slant] 0.05), but not for VIS. For RCB, significant correlations with FS were seen for the meat:fat-ratio ($r = 0.39$), fat firmness ($r = -0.31$) and one fat oxidation marker (1-octen-3-ol: $r = 0.51$). The texture ($r = -0.60$), aw-value ($r = 0.63$) and one fat oxidation marker (1-octen-3-ol: $r = 0.46$) were significantly correlated with FS in SAL. On the whole, only a few variables correlated significantly with FS for SAL and RCB and the corresponding relationships were always linear. No significant correlation between FS and any of the technological and sensorial parameters were found for VIS or PHB.

Keywords: Fat score; Fat quality; Pig; Processing; Sensory; Texture; Oxidation; Volatiles; Meat products; Salami; Cured bacon; Vienna sausage; Pork hamburger

Stefano Bovolenta, Daria Boscolo, Simonetta Dovier, Micaela Morgante, Adolfo Pallotti, Edi Piasentier, Effect of pork lard content on the chemical, microbiological and sensory properties of a typical fermented meat product (Pitina) obtained from Alpagota sheep, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 771-779, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.021. (<http://www.sciencedirect.com/science/article/B6T9G-4S5760K-1/2/1e26674ecb6dc66a1250418bb02e335e>)

Abstract:

The aim was to investigate the physicochemical, microbiological and sensory properties of Pitina, a typical fermented meat product and evaluate the effect of two levels of pork lard content (Low Fat, LF, 10% vs. High Fat, HF, 30%) on its attributes. HF attained lower pH than LF Pitina, which reached lower water activity. LAB comprised the major flora with substantial counts of micrococci, enterococci and mould and yeast. Gram negative Enterobacteria were recovered as coliforms and faecal coliforms. *Listeria monocytogenes* was also isolated. The lard level influenced the count of micrococci and some sensory attributes. LF attained higher scores for both hardness and cohesiveness and differed from HF in having a more marked odour of ewe and smoke and sweeter taste. HF had a more pronounced odour and taste of garlic and mould than LF.

Keywords: Pitina; Fermented meat; Chemical composition; Microbiological attributes; Sensory quality

L. Fontanesi, R. Davoli, L. Nanni Costa, F. Beretti, E. Scotti, M. Tazzoli, F. Tassone, M. Colombo, L. Buttazzoni, V. Russo, Investigation of candidate genes for glycolytic potential of porcine skeletal muscle: Association with meat quality and production traits in Italian Large White pigs, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 780-787, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4S5KXD9-2/2/ed6497c033a856ff288abd130300285b>)

Abstract:

The objective of this study was to investigate the association of DNA markers in candidate genes for glycolytic potential on meat quality parameters (pH1, pHu, glycogen and lactate content and glycolytic potential of semimembranosus muscle) and estimated breeding values (EBVs) for average daily gain, lean cuts, back fat thickness, ham weight, and feed:gain ratio in 272 Italian Large White pigs. Three mutations in the PRKAG3 gene (T30N, G52S and I199V) were investigated as well as single nucleotide polymorphisms in two other skeletal muscle genes (PGAM2 and PKM2) involved in the glycolytic pathway. Association analysis with the PRKAG3 markers showed significant results ($P < 0.05$) only for pH1 (I199V, with significant additive effect) and lactate content (T30N), confirming, at least in part, the effects of this gene on meat quality traits. Significant association ($P < 0.05$) was also observed for PGAM2 and ham weight EBV with significant additive and dominance effects. PKM2 was associated with average daily gain, lean cuts ($P < 0.001$), back fat thickness and feed:gain ratio ($P < 0.05$), with significant additive and/or dominance effects on these traits. PKM2 encodes for a key enzyme of the muscle glycolytic

pathway and maps on porcine chromosome 7 where other studies have reported important QTL for the same traits. These data might suggest an important function of this gene in the mechanisms that produce the observed effects. The results will be important to evaluate the inclusion of some of these DNA polymorphisms in marker assisted selection programs.

Keywords: Candidate genes; PRKAG3; PGAM2; PKM2; Meat quality and production traits

R. Gomez, M. Alvarez-Orti, J.E. Pardo, Influence of the paprika type on redness loss in red line meat products, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 823-828, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4S6G93M-2/2/6df4abc6ca3723ab64d51e9c788c8b4e>)

Abstract:

Paprika, with its high colourant power (measured in ASTA units), imparts higher initial redness to fresh red sausage and fresh chorizo (red line meat products). This higher degree of redness (measured according to the red-green component, a^* , and spectrophotometric colour units) is maintained until the end of the products' shelf life. However, the pasteurization necessary to reduce the microbial load of paprika can cause alterations to its stability. The addition of natural antioxidants to pasteurized paprika (rosemary extract) was seen to maintain the colour levels of meat products throughout their shelf life. Differences in the colour of meat batches elaborated with paprika of different colourant power could be detected by consumers in a hedonistic test, who evaluated the colour positively.

Keywords: Chorizo; Colour loss; Fresh red sausage; Paprika; Red line meat products

M. Kouba, F. Benatmane, J.E. Blochet, J. Mourot, Effect of a linseed diet on lipid oxidation, fatty acid composition of muscle, perirenal fat, and raw and cooked rabbit meat, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 829-834, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4S62RSK-2/2/0ab47f3cc73ca2b3baf3de175574f1b7>)

Abstract:

Forty Californian x New Zealand rabbits (1 kg initial body weight) were fed a control or a linseed isoenergetic diet containing 30 g of extruded linseed/kg. Twenty rabbits for each dietary treatment were slaughtered at 11 weeks of age, at 35 days after the start of the experiment. Feeding the linseed diet increased ($P < 0.005$) the content of 18:2n-3 in muscles, perirenal fat, and raw and cooked meat. The long chain n-3 polyunsaturated fatty acid (PUFA) contents were also increased ($P < 0.01$) in the meat. The linseed diet produced a robust decrease in the n-6/n-3 ratio. Cooking did not alter n-3 PUFA more than saturated fatty acids (SFA) or monounsaturated fatty acids (MUFA). However, n-6 PUFA were altered by cooking. The oxidative stability of *Longissimus dorsi* was not affected by the linseed diet, even after 300 min of forced-oxidation. Inclusion of linseed in rabbit diets is a valid method of improving the nutritional value of rabbit meat.

Keywords: Rabbits; Linseed; Fatty acids; Meat quality

Sylvie Combes, Ignacio Gonzalez, Sebastien Dejean, Alain Baccini, Nathalie Jehl, Herve Juin, Laurent Cauquil, Beatrice Gabinaud, Francois Lebas, Catherine Larzul, Relationships between sensory and physicochemical measurements in meat of rabbit from three different breeding systems using canonical correlation analysis, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 835-841, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.033.

(<http://www.sciencedirect.com/science/article/B6T9G-4S80XNB-1/2/f2b39eec5e5a8ef3bd06035b4eb898b1>)

Abstract:

Meat from rabbits reared either according to a standard (STAND) or a high quality norm (LABEL) or a low growth breeding (RUSSE) system were submitted to a sensory evaluation and to a large set of physicochemical measurements (weight of retail cuts, colour parameters, ultimate pH, femur flexure test, Warner-Bratzler shear test, water holding capacities and cooking losses). STAND rabbit meat exhibited the most juicy meat in back and in leg ($p < 0.01$). Leg tenderness significantly decreased ($p < 0.001$) in the rank order STAND > LABEL > RUSSE. Canonical correlation analysis showed strong correlations between physicochemical and sensory variables ($R^2 = 0.73$ and 0.68 between the two first pairs of canonical variates). Especially, sensory tenderness and WB shear test variables assessed on raw longissimus muscle (LL) were correlated. Fibrous attribute in back was correlated with cooking loss in LL. When analysed separately only RUSSE rabbits exhibited the same relations between variables as those calculated in whole dataset.

Keywords: Rabbit meat quality; Canonical correlation analysis; Sensory attributes

D.E. Mushi, L.O. Eik, M.S. Thomassen, O. Sorheim, T. Adnoy, Suitability of Norwegian short-tail lambs, Norwegian dairy goats and Cashmere goats for meat production - Carcass, meat, chemical and sensory characteristics, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 842-850, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4S7907K-1/2/20514e75f97a32eb46457214beec6bed>)

Abstract:

Six female Norwegian lambs (29 kg body weight, 8 months old), six castrated Norwegian goats (27 kg body weight, 10 months old) and six castrated Cashmere goats (20 kg body weight, 8 months old) were used to study the relative potential of Norwegian lambs, Norwegian goats and Cashmere goats for meat production. Animals were fattened on silage and commercial concentrate before slaughter. Lamb meat had 4 % lower ($P < 0.05$) proteins and 13% higher ($P < 0.05$) fat content than goat meats. Moreover, m. longissimus dorsi samples from lambs were less red (a^*) ($P < 0.05$) and had lower colour intensity (C) and wider hue angle (H) than that from goats. Meat from lambs and Cashmere goats had higher proportions of saturated fatty acids (SFA) ($P < 0.001$), especially stearic acid and lower ones for total unsaturated fatty acids (TUFA) and monounsaturated fatty acids (MUFA) than the meat from Norwegian goats. Sensory panellists scored lamb meat fattier, juicier and more tender than goat meats. Meat from Cashmere goats scored highest ($P < 0.05$) in whiteness, and lowest ($P < 0.05$) in both colour tone and colour intensity. It is concluded that, since C18:0 was the main contributor of SFA in meat from Norwegian lamb and Cashmere goats, meats from them are nutritionally comparable to that from Norwegian goats. However, the higher proportion of SFA in Norwegian lambs and Cashmere goats may increase hardness of fat and being easily solidified upon cooling, may influence meat palatability.

Keywords: Lambs; Goats; Breed; Fatty acids; Meat quality

Christian L. Hansen, Frans van der Berg, Steffen Ringgaard, Hans Stodkilde-Jorgensen, Anders H. Karlsson, Diffusion of NaCl in meat studied by ^1H and ^{23}Na magnetic resonance imaging, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 851-856, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4S85DSC-1/2/3ab189e72a9b0a6fb065da12eac83c77>)

Abstract:

The effect of sodium chloride (NaCl) diffusion into meat was investigated. Proton and sodium magnetic resonance imaging were used to determine the diffusion behaviour of brine (NaCl) in porcine Longissimus dorsi and semitendinosus. NaCl diffusion was visualized through images and diffusion coefficients were determined to be in the range $3\text{-}7 \times 10^{-10} \text{ m}^2 \text{ s}^{-1}$, which is in agreement with values reported in the literature. The diffusion coefficient was found to increase

during curing, suggesting microstructural changes in the meat. A supplementary experiment proved that the diffusion behaviour of sodium chloride in regions of meat with connective tissue/fat is distinctive from regions with pure myofilament tissue, as anticipated. Apparent diffusion coefficient (ADC) maps showed that meat microstructures shrunk when cured with 20% (w/w) NaCl brine. ADC across ([perpendicular]) the main muscle fiber direction decreased more than ADC along (||) the main muscle fiber direction. The greater shrinkage in the direction across muscle fibers suggests that the curing induced shrinkage of the transverse structures rather than reduction in longitudinal structures.

Keywords: ²³Na MRI; Diffusion MRI; Meat curing; Muscle structure; Pork

T. Polak, A. Rajar, L. Gasperlin, B. Zlender, Cholesterol concentration and fatty acid profile of red deer (*Cervus elaphus*) meat, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 864-869, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4S8K9HC-1/2/04944b592c227b5b2277f0e9e04c99cc>)

Abstract:

The effects of gender and age on intramuscular fat (IMF) levels, cholesterol concentration, and fatty acid composition were investigated in the semitendinosus (ST) and triceps brachii (TB) muscles of feral red deer (*Cervus elaphus*). Six stags of >2 years of age, four hinds of 1 year, and six calves of 6 months were shot in Slovenia. Generally, all parameters measured were influenced by interaction of muscle and treatment group (hinds, stags and calves) at the 5% level or less. In ST muscle, the IMF levels were highest for hinds. In the TB muscle, cholesterol was lower for stags than for hinds and calves. The saturated fatty acids were the highest for stags and the mono-unsaturated fatty acids for hinds. The polyunsaturated fatty acids (PUFAs) were the highest for calves and lowest for hinds. The n-3 PUFAs were the lowest for hinds. In both muscles, the calves had higher n-6 PUFAs than stags and hinds. Only the ST muscle of the hinds contained >1% (1.44%) of the conjugated linoleic acid isomer 18:2cis-9,trans-11, while in the TB of hinds and calves this fatty acid was higher than with stags. We conclude that gender and age of feral red deer influence the IMF content, the cholesterol concentration, and the fatty acid composition of the meat.

Keywords: *Cervus elaphus*; Cholesterol; Fatty acids; Intramuscular fat; Semitendinosus; Triceps brachii

Nafiseh Soltanizadeh, Mahdi Kadivar, Javad Keramat, Mohammad Fazilati, Comparison of fresh beef and camel meat proteolysis during cold storage, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 892-895, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4S8K9HC-3/2/696f4546462a59d531bac609c8ed1566>)

Abstract:

The objective of this research was to determine the difference in myofibrillar fragmentation of camel meat and beef during postmortem aging. Semitendinosus muscle was excised at slaughter and muscle pH was measured at 6, 12, 24, 48, and 72 h postmortem. Myofibril fragmentation index was measured on 1, 3, 5, and 7 days postmortem. Also, myofibrils isolated from semitendinosus muscles of camel and cattle at 1, 3, 5 and 7 days postmortem storage were analyzed using sodium dodecyl sulfate (SDS)-polyacrylamide gel electrophoresis. Results showed that the camel semitendinosus muscle had significantly higher myofibril degradation values compared to that in beef which was supported by a difference in troponin-T degradation and appearance of a 30 kDa band. Postmortem pH decline of camel meat was significantly slower than that of beef. This study demonstrated that the semitendinosus protease activity of camel meat was superior to that of beef, which may have been due to the difference in pH decline.

Keywords: Camel meat; Beef; Semitendinosus; SDS-PAGE; Myofibrillar fragmentation index; Postmortem pH

Dennis S. Nielsen, Tomas Jacobsen, Lene Jespersen, Anette Granly Koch, Nils Arneborg, Occurrence and growth of yeasts in processed meat products - Implications for potential spoilage, Meat Science, Volume 80, Issue 3, November 2008, Pages 919-926, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4S9G98T-1/2/72b57fe65ace7a015a5dcb0cf7c24081>)

Abstract:

Spoilage of meat products is in general attributed to bacteria but new processing and storage techniques inhibiting growth of bacteria may provide opportunities for yeasts to dominate the microflora and cause spoilage of the product. With the aim of obtaining a deeper understanding of the potential role of yeast in spoilage of five different processed meat products (bacon, ham, salami and two different liver pates), yeasts were isolated, enumerated and identified during processing, in the final product and in the final product at the end of shelf life.

Yeasts were isolated along the bacon production line in numbers up to 4.2 log (CFU/g). Smoking of the bacon reduced the yeast counts to lower than 1.0 log (CFU/g) or non-detectable levels. In general, yeasts were only isolated in low numbers during the production of salami, cooked ham and liver pate. In the final products yeasts were detected in low numbers in a few samples (3 out of 30) samples, 1.0-1.3 log (CFU/g). By the end of storage, yeasts were only detected in 1 out of 25 investigated samples 1.8 log (CFU/g).

A combination of phenotypic and genotypic methods was used to identify the yeast microflora present during production of the processed meat products. The yeast microflora was complex with 4-12 different species isolated from the different production sites. In general, *Candida zeylanoides*, *Debaryomyces hansenii* and the newly described *Candida alimentaria* were found to be the dominant yeast species. In addition, three putatively previously undescribed yeast species were isolated. Fourteen isolates, representing seven different species isolated during the production of the processed meat products and one species isolated from spoiled, modified atmosphere packed, sliced ham, were screened for their ability to grow in a meat model substrate under a low oxygen/high carbon-dioxide atmosphere (0.5% O₂, 20% CO₂, 79.5% N₂) at two different temperatures (5 and 8 [degree sign]C). Eleven out of the tested 14 strains were able to grow in the meat model substrate with *C. zeylanoides*, *D. hansenii*, *Pichia guilliermondii* and *Candida sake* reaching levels of 10⁵-5 x 10⁶ log (CFU/g), where sensory changes appear.

Keywords: Yeast; Processed meat products; Spoilage

Marta Gil, Margaret I. Delday, Marina Gispert, Maria Font i Furnols, Charlotte M. Maltin, Graham S. Plastow, Ronald Klont, Andrzej A. Sosnicki, Domingo Carrion, Relationships between biochemical characteristics and meat quality of *Longissimus thoracis* and *Semimembranosus* muscles in five porcine lines, Meat Science, Volume 80, Issue 3, November 2008, Pages 927-933, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4SBSDKV-1/2/47254944a4598497bfedf139f95088e7>)

Abstract:

Five porcine genetic lines which represent a high proportion of European pig production were fully characterized for meat quality parameters and muscle biochemical characteristics (*Longissimus thoracis*, LT, and *Semimembranosus*, SM). The line characterisation was based on 100 animals each representing Large White, Landrace, Duroc, Pietrain (Halothane negative) and Meishan (a Meishan/Large White crossbred line) prevalent genetic backgrounds. Different meat quality parameters (pH 45 min, pH ultimate, electrical conductivity, and colour measurements), as well as muscle water holding capacity, muscle metabolic and contractile traits, fibre type, size and

frequencies were measured and their relationships studied. The main differences in the LT were found between the Meishan and Pietrain genetic lines, in relation to the muscle fibre size (larger in Pietrain). The Duroc line was characterized by the muscle oxidative traits and the Landrace by the high percentage of fast glycolytic fibres. In SM, Duroc and Pietrain were distinguished from Landrace and Meishan according to the metabolic and contractile characteristics of this muscle. Large White tended to lie between the other breeds for many of the traits. The measured muscle characteristics were related to differences in drip loss and marbling values and could thereby influence the eating quality of pork. Overall the results show differences between the genetic lines for a number of muscle traits which could have impact on consumer appeal and eating quality. The present findings should serve to emphasise the importance of including eating quality as a trait in breed selection.

Keywords: Pig genetics; Meat quality; Muscle fibre composition

B.M. Franke, R. Hadorn, J.O. Bosset, G. Gremaud, M. Kreuzer, Is authentication of the geographic origin of poultry meat and dried beef improved by combining multiple trace element and oxygen isotope analysis?, *Meat Science*, Volume 80, Issue 3, November 2008, Pages 944-947, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.03.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4S4TP1K-1/2/041a32ab91a523cabfece87841a6d295>)

Abstract:

Data available on contents of up to 72 different trace elements and the oxygen isotope ratio of 78 poultry breast and 74 dried beef samples were analysed to determine whether the accuracy of the prediction of the geographic origin is improved by combining promising methods. Validation was performed by determining the origin of a smaller sub-group using a statistical model established from the data of the second, larger, sub-group. As expected, the combined data proved useful for the determination of the geographic origin of meat samples. However, combining data did not clearly reduce the percentage of incorrectly classified individual samples compared to the two approaches applied separately. In poultry, cross-validation and validation resulted in 83% and 50% correct classifications, respectively. The corresponding values in dried beef were 73% and 43%. In conclusion, compared to element signature data alone, combining both methods did not improve predictions of origin.

Keywords: Poultry; Dried beef; Geographic origin; Authenticity

Lindsey A. Keskinen, Ewen C.D. Todd, Elliot T. Ryser, Impact of bacterial stress and biofilm-forming ability on transfer of surface-dried *Listeria monocytogenes* during slicing of delicatessen meats, *International Journal of Food Microbiology*, Volume 127, Issue 3, 31 October 2008, Pages 298-304, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.07.021.

(<http://www.sciencedirect.com/science/article/B6T7K-4T2DKRF-3/2/6541f6c0a30a18417dc7da0b93ca2fc6>)

Abstract:

Listeria monocytogenes contamination of delicatessen slicer blades can lead to cross-contamination of luncheon meats. A cocktail of 3 strong or 3 weak biofilm-forming strains of *L. monocytogenes* suspended in turkey slurry was used to inoculate stainless steel delicatessen slicer blades at a level of 6 log CFU/blade. The cocktails were used with or without injury (cold-shocked at 4[degree sign]C for 2 h, or chlorine-injured at 100 ppm for 1 min). Inoculated blades were held at 22[degree sign]C/78 +/- 2% relative humidity for 6 and 24 h, before being used to generate 30 slices from chubs of roast turkey breast or Genoa salami. Slices (25 g) were diluted 1:5 in University of Vermont Medium, homogenized by stomaching and then pour-plated using tryptose phosphate agar supplemented with esculin and ferric ammonium citrate. Greater cumulative transfer to the 30 slices was seen for the strong (3.62 log CFU) as opposed to weak biofilm-forming cocktails (3.12 log CFU) with transfer also significantly greater to turkey (3.61 log

CFU) than to salami (3.12 log CFU). Among the three treatments, cold-shock significantly increased subsequent *L. monocytogenes* transfer (3.69 log CFU) compared to the uninjured control (3.30 log CFU) and chlorine-injury (3.12 log CFU). Significantly greater transfer was also seen for blades used after 6 as opposed to 24 h of incubation. Differences in product composition and survival of *L. monocytogenes*, as seen via viability staining, are likely reasons for these observed differences in transfer.

Keywords: *Listeria monocytogenes*; Survival; Bacterial transfer; Knife blades; Biofilm

N.M. Schreurs, G.A. Lane, M.H. Tavendale, T.N. Barry, W.C. McNabb, Pastoral flavour in meat products from ruminants fed fresh forages and its amelioration by forage condensed tannins, *Animal Feed Science and Technology*, Volume 146, Issues 3-4, 15 October 2008, Pages 193-221, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.03.002.

(<http://www.sciencedirect.com/science/article/B6T42-4S92XN9-1/2/55c6a772e1ee7ead583644d9d9566f50>)

Abstract:

Pastoral flavour which occurs when animals graze pasture can have a negative impact on the consumer acceptance of sheep meat. Several options are available for amending pastoral flavour in sheep meat although the utilisation of condensed tannin (CT) forages holds the most potential. The formation of pastoral flavour compounds in the rumen depends on the forage consumed by the ruminant and is linked to differences in forage protein solubilisation and rumen degradability. White clover (*Trifolium repens*), with its rapidly solubilised and degraded protein, consistently results in a greater formation of the pastoral flavour compounds, indole and skatole, in the rumen. As such, white clover may be the primary contributor to pastoral flavour when animals graze New Zealand (NZ) pastures (which generally contain 5-30% white clover). Although CT-containing legumes contain a similar crude protein content to white clover, the formation of indole and skatole in the rumen is considerably less with these forages. The CT slowed the rumen degradation of forage protein, limited the availability of amino acids in the rumen for conversion to indole and skatole and other flavour compounds and consistently reduced the concentration of indole and skatole in the blood plasma. A higher CT concentration (70-90 g/kg DM) and the provision of CT within a forage diet (rather than exogenously) were most effective for reducing rumen indole and skatole formation. Grazing the CT forage *Lotus corniculatus* L. lowered indole and skatole concentration in body fat compared to grazing perennial ryegrass (*Lolium perenne*)/white clover pasture, and supplementing lambs with an exogenous CT in the form of a grape seed extract reduced pastoral meat flavour but did not reduce fat indole and skatole concentration. Further studies are needed to investigate the factors that influence the deposition of blood indole and skatole into body fat and to define the length of time that a high CT legume needs to be fed before slaughter to reduce fat indole and skatole to ameliorate pastoral meat flavour.

Keywords: Flavour; Meat; Forage; Condensed tannin; Rumen; Legume; Skatole; Ruminant; Pasture; White clover; Sheep; Indole

Nathan Fiala, Meeting the demand: An estimation of potential future greenhouse gas emissions from meat production, *Ecological Economics*, Volume 67, Issue 3, 15 October 2008, Pages 412-419, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.12.021.

(<http://www.sciencedirect.com/science/article/B6VDY-4RS3TJX-2/2/98e6f2f8683eb1f4092b706d38b39825>)

Abstract:

Current production processes for meat products have been shown to have a significant impact on the environment, accounting for between 15% and 24% of current greenhouse gas emissions. Meat consumption has been increasing at a fantastic rate and is likely to continue to do so into the future. If this demand is to be met, technology used in production in the form of Confined Animal Feeding Operations (CAFOs) will need to be expanded. This paper estimates future meat

consumption and discusses the potential aggregate environmental impact of this production if the use of CAFOs is expanded. I first separate meat into beef, chicken and pig products and estimate the elasticities associated with each product in order to forecast the world demand for meat. Using research on the environmental impact of food production in the US, which uses one of the most efficient CAFO processes in the world, I then calculate the total potential greenhouse emissions of this meat production and discuss the impact of these consumption patterns. I find that, under an expanded CAFO system, meat production in the future will still be a large producer of greenhouse gases, accounting for up to 6.3% of current greenhouse gas emissions in 2030.

Keywords: Meat consumption; Food demand; Environmental impact; Greenhouse gas emissions

T. Perez-Palacios, J. Ruiz, D. Martin, E. Muriel, T. Antequera, Comparison of different methods for total lipid quantification in meat and meat products, *Food Chemistry*, Volume 110, Issue 4, 15 October 2008, Pages 1025-1029, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.03.026.

(<http://www.sciencedirect.com/science/article/B6T6R-4S21TT4-2/2/298319f49c6db049d3ff459164b7d60b>)

Abstract:

This study was aimed to evaluate the efficiency of six extraction methods for the quantification of total lipid content in meat and meat products: standard Soxhlet method (with and without previous acid hydrolysis), continuous Soxhlet method (with and without previous acid hydrolysis), and those methods based in the use of a mixture of chloroform and methanol, and described by Folch, Less, and Sloane (1957) and Bligh and Dyer (1959). Lipid content was determined in nine different meat products with different fat contents and physico-chemical features: cooked turkey breast, fresh pork loin, cooked ham, dry-cured ham, mortadella, beef burger, fresh sausage, dry-cured sausage and salami. The most effective methods for determining fat content in the studied meat products were the method described by Folch et al. (1957) and the Soxhlet with previous acid hydrolysis method. The Soxhlet method without previous acid hydrolysis adequately extracted lipids only in those meat products with very high fat content. The use of the method described by Bligh and Dyer (1959) gave rise to the lowest lipid contents in all the studied meat products.

Keywords: Lipid extraction methods; Fat content; Meat products

Irina Gerchman, Inna Lysnyansky, Shimon Perk, Sharon Levisohn, In vitro susceptibilities to fluoroquinolones in current and archived *Mycoplasma gallisepticum* and *Mycoplasma synoviae* isolates from meat-type turkeys, *Veterinary Microbiology*, Volume 131, Issues 3-4, 15 October 2008, Pages 266-276, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2008.04.006.

(<http://www.sciencedirect.com/science/article/B6TD6-4S9G948-9/2/3e0e56d9030c4b0bb1d8225f978d157a>)

Abstract:

Monitoring of susceptibility to antibiotics in field isolates of pathogenic avian mycoplasmas is important for appropriate choice of treatment. Our study compared in vitro susceptibility to enrofloxacin and difloxacin in recent (2005-2006) isolates of *Mycoplasma gallisepticum* and *Mycoplasma synoviae* from meat-type turkey flocks with archived (1997-2003) isolates and reference strains. Comparison of minimal inhibitory concentration (MIC) values determined by microtest, agar dilution and commercial Etest showed good agreement, but underscored the need for standardized methods for testing. Notably, while the commercial Etest was convenient and accurate for determining MICs for enrofloxacin in the range 0.002-0.094 [μ g/ml], the endpoint of inhibition for *M. gallisepticum* and *M. synoviae* strains with MIC values ≥ 1.0 [μ g/ml] could not be determined. A decrease in susceptibility to both fluoroquinolones was detected in archived strains but to a greater degree in recent isolates, most of which had MICs above the NCCLS susceptibility breakpoint for these antibiotics (≤ 0.5 [μ g/ml]). In contrast, except for one flock, *M. synoviae* isolates were susceptible, although intrinsically less susceptible than *M. gallisepticum*. Overall for the 88 strains tested (45 *M. gallisepticum*, 43 *M. synoviae*), the MIC₅₀ for both enrofloxacin and

difloxacin was 0.5 [μ]g/ml. The isolation of fluoroquinolone-resistant *M. gallisepticum* isolates from breeder and broiler flocks as well as from meat-type turkeys suggests that these strains have become established in Israel, necessitating a reevaluation of antibiotic therapy. Periodic survey of MICs in field isolates of avian mycoplasmas to monitor for the possible appearance of resistant strains is recommended.

Keywords: *Mycoplasma gallisepticum*; *Mycoplasma synoviae*; Fluoroquinolones; MIC; Meat-type turkeys

Ilze Stumpe-Viksna, Vadims Bartkevics, Agnese Kukare, Andris Morozovs, Polycyclic aromatic hydrocarbons in meat smoked with different types of wood, *Food Chemistry*, Volume 110, Issue 3, 1 October 2008, Pages 794-797, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.03.004.

(<http://www.sciencedirect.com/science/article/B6T6R-4S0YXTG-5/2/42b126116dd22b5a3e11ab06189d80e2>)

Abstract:

The influence of the wood used for the smoking of meat on the formation of polycyclic aromatic hydrocarbons (PAH) has been studied. Ten types of wood and charcoal were used for preparation of smoked meat samples. The analytical sample preparation method implied extraction of PAH with cyclohexane, liquid-liquid extraction with N,N-dimethylformamide/water, back extraction with cyclohexane, followed by clean-up on silica solid phase extraction (SPE) column and quantification by gas chromatography-mass spectrometry. It was found that the type of wood has a significant influence on the amount of PAH in smoked meat. The samples smoked with apple-tree and alder contained the smallest PAH concentrations. The samples smoked with spruce had the highest concentrations of PAH. The difference in content of benzo[a]pyrene (from 6.04 till 35.07 [μ]g/kg) and total PAH (from 47.94 till 470.91 [μ]g/kg) indicates that choice of wood for smoking is one of the critical parameter to be controlled in order to diminish the contamination of food products.

Keywords: Polycyclic aromatic hydrocarbons; Gas chromatography-mass spectrometry (GC-MS); Smoked meat

Jean-Louis Damez, Sylvie Clerjon, Said Abouelkaram, Jacques Lepetit, Electrical impedance probing of the muscle food anisotropy for meat ageing control, *Food Control*, Volume 19, Issue 10, October 2008, Pages 931-939, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.09.005.

(<http://www.sciencedirect.com/science/article/B6T6S-4PSC23H-1/2/e2e92a271866224f764e34f31ff52c48>)

Abstract:

Muscle food undergoes structural modifications during postmortem ageing which affect its mechanical, electrical and dielectric properties, particularly the anisotropy of these properties. This study shows that rapid and non-invasive control methods based on measurement of electrical anisotropy of the meat could assess ageing state and be applied in a meat industry setting. We report the design and performances of two circular probes that proved good enough to carry out non-invasive on-line classification of bovine muscles according to ageing state. A strong correlation (R^2 [approximate] 0.70) was obtained between meat ageing state estimation by electrical impedance measurements and mechanical measurement achieved using the benchmark compression stress method. The aged muscles and the not aged muscles were sorted with a success rate close to 90%. Indeed, maturation measurement using these probes and method would make it possible to avoid unnecessary ageing of fast-maturing carcasses or muscles while at the same time, enabling better diversification between poorly aged products and fully aged products. This would open the way towards quality labels of meat tenderness.

Keywords: Dielectric properties; Electrical properties; Cell membrane; Meat ageing

K.P. Koutsoumanis, A.P. Stamatiou, E.H. Drosinos, G.-J.E. Nychas, Control of spoilage microorganisms in minced pork by a self-developed modified atmosphere induced by the

respiratory activity of meat microflora, Food Microbiology, Volume 25, Issue 7, October 2008, Pages 915-921, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.05.006.

(<http://www.sciencedirect.com/science/article/B6WFP-4SMDYYD-1/2/05c7660409edd848d7eff5b1ba6338b3>)

Abstract:

The changes in microbial flora of minced pork during aerobic storage at 0, 5, 10 and 15 [degree sign]C were studied. Minced pork samples (100 g) were packed using two types of packaging films: (a) a common food film with high permeability (HPF) and (b) a film with low permeability (LPF). The respiratory activity of meat microflora and the use of a LPF resulted in a modified atmosphere in the package headspace developed during storage. Oxygen concentration decreased from 18.7% (after packaging) to 7% (after 15 days of storage) in packages with LPF, stored at 0 [degree sign]C, while CO₂ increased from 3% to 10.5%, respectively. On the contrary, no significant atmosphere changes were observed during storage of HPF packages. The self-developed modified atmosphere in LPF packages resulted in a significant inhibition of pseudomonad growth which was more pronounced at low storage temperatures. For example, during storage at 0 [degree sign]C, the growth rate of pseudomonads in meat packed with LPF was reduced by 48.7% compared to HPF. At 10 [degree sign]C the latter reduction decreased to 13.7%. LPF packaging was also found to inhibit the growth of *Brochothrix thermosphacta* but this inhibition was weaker compared to pseudomonads. The effect of storage temperature on the growth rate of pseudomonads and *B. thermosphacta* in minced pork packed with the different films was modeled using an Arrhenius equation. For both bacteria, the activation energy was higher for LPF packaging. This can be attributed to the increased inhibitory effect of the modified atmosphere at lower storage temperature. The Arrhenius model was further used to evaluate the effect of temperature on the time required by the two bacteria to reach a spoilage level of 10⁷ CFU/g. The results showed that when LPF packaging is combined with effective temperature control the time-to-spoilage can be significantly extended compared to HPF packaging.

Keywords: Shelf-developed MAP; Minced meat; Spoilage; Microbial respiration

Michele Marcotte, Ali R. Taherian, Yousef Karimi, Thermophysical properties of processed meat and poultry products, Journal of Food Engineering, Volume 88, Issue 3, October 2008, Pages 315-322, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.02.016.

(<http://www.sciencedirect.com/science/article/B6T8J-4S1C84C-2/2/4b79fa2e9f050d1ebbdad5056ae9f8fb>)

Abstract:

Thermophysical properties of various meat and poultry emulsions were evaluated at four temperatures (20, 40, 60 and 80 [degree sign]C). Thermal conductivities (0.26-0.48 W m⁻¹ K⁻¹) increased linearly with temperature between 20 and 60 [degree sign]C. Between 60 and 80 [degree sign]C, it remained constant for most products except bologna. Curves for thermal conductivity as a function of temperature could be roughly grouped into two different categories: products containing meat particles and those containing meat emulsions. The application of various models was investigated for thermal conductivity prediction. It was found that a three phase structural based Kirscher model had the potential for predicting thermal conductivities with acceptable accuracy. Densities decreased slightly as a function of temperature from 20 to 40 [degree sign]C. A transition phase was observed from 40 to 60 [degree sign]C, which was followed by a decrease from 60 to 80 [degree sign]C. There was a decrease of about 50 kg m⁻³ between the density of a raw product at room temperature (at maximum 1070 kg m⁻³) and the product heated to 80 [degree sign]C (at minimum 970 kg m⁻³), due to the gelation or setting of the structure. After a transition period from 10 to 30 [degree sign]C, the heat capacity increased linearly from 30 to 80 [degree sign]C, and ranged from 2850 to 3380 J kg⁻¹ [degree sign]C⁻¹, respectively. Densities and heat capacities were strongly influenced by the carbohydrate content (i.e. as the carbohydrate content increased the density decreased). The salt content adversely

affected thermal conductivity and thermal diffusivity values. However, these parameters increased with moisture content.

Keywords: Meat and poultry emulsions; Meat and poultry products; Thermal conductivity; Thermophysical properties; Modeling; Correlation matrix

N.Z. Ballin, R. Lametsch, Analytical methods for authentication of fresh vs. thawed meat - A review, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 151-158, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.024.

(<http://www.sciencedirect.com/science/article/B6T9G-4RJ3WHM-2/2/d7907ecddd5e5cff2f80f7d6464e58f5>)

Abstract:

Proper labeling of meat products is important to ensure fair-trading and to enable consumers to make informed choices. Different investigations indicate that wrong labeling where thawed meat is labeled as fresh meat is present in 8-15% of analyzed samples. Enforcement of regulations requires adequate analytical methods where enzymatic-, DNA based-, spectroscopic-, bio imaging- and sensory techniques constitute the majority of published papers. The molecular changes that these techniques detect are described. The capability of both discrimination between fresh and thawed meat, and determination of frozen storage time are discussed for each of the analytical techniques. The products included in this review are primarily whole meat from *Bos taurus* (cow), *Sus scrofa* (pig) and *Gallus gallus* (chicken). The best analytical choice in the discrimination of fresh vs. thawed meat is concluded to be a combination of analytical methods.

Keywords: Meat; Authenticity; Frozen; Thawed; Fresh; Storage time; Fraud

I.T. Kadim, O. Mahgoub, W. Al-Marzooqi, D.S. Al-Ajmi, R.S. Al-Maqbali, S.M. Al-Lawati, The influence of seasonal temperatures on meat quality characteristics of hot-boned, m. psoas major and minor, from goats and sheep, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 210-215, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4R8H1Y0-4/2/e9fb3a3a83a3f1ae125e0d9a99f0b62b>)

Abstract:

Samples of psoas major and minor muscles were randomly collected weekly from 203 (99 hot and 104 cool seasons) Omani goats, 215 (106 hot and 109 cool seasons) Omani sheep, 212 (104 hot and 108 cool seasons) Somali goats, 242 (127 hot and 115 cool seasons) Somali sheep and 211 (110 hot and 101 cool seasons) Australian Merino sheep slaughtered at the Central Slaughterhouse in Oman to investigate the effect of season on meat quality. The collection period was during November 2004-October 2005 and divided into two seasons according to ambient temperatures and relative humidity. These were termed: cool season (average temperature of 21 [degree sign]C and 59% relative humidity and hot season (average temperature of 35 [degree sign]C and 47% relative humidity). Muscles collected during the hot season had significantly ($P < 0.05$) higher ultimate pH values (5.78) than those collected during the cool season (5.65). Myofibrillar fragmentation index was significantly ($P < 0.05$) higher for hot season samples (86.88%) than for cool season samples (85.59%). Expressed juice was significantly ($P < 0.05$) higher for cool season samples (36.84) than for hot season samples (35.74). Goat meat from the hot seasonal group was significantly ($P < 0.05$) darker than the cold season group based on L^* (37.6 vs. 39.6), a^* (20.0 vs. 23.3) and b^* (3.6 vs. 4.2) colour measurements. These results indicated that high ambient temperatures had caused an increase in muscle ultimate pH leading to significant effects on meat quality.

Keywords: Sheep; Goat; Psoas major and minor; Warner-Bratzler shear force; Meat quality; Sarcomere length; Myofibrillar fragmentation index

Fabio La Neve, Tiziana Civera, Nadia Mucci, Maria Teresa Bottero, Authentication of meat from game and domestic species by SNaPshot minisequencing analysis, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 216-224, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.027. (<http://www.sciencedirect.com/science/article/B6T9G-4R9GH02-1/2/aa794295f5691dce15f659d0bf2883c5>)

Abstract:

The aim of the present study is to develop an assay for the specific identification of meat from *Capreolus capreolus*, *Cervus elaphus*, *Capra ibex*, *Rupicapra rupicapra*, targeting sequences of the cytochrome b (cyt b) gene of mitochondrial DNA. The assay is also intended to enable differentiation between meat from these wild species as well as *Ovis aries*, *Capra hircus*, *Bubalus bubalis*, *Bos taurus* and *Sus scrofa* domestic species.

The primers used in the preliminary PCR were designed in well conserved regions upstream and downstream of the diagnosis sites. They successfully amplified a conserved 232 bp region from the cyt b gene of all the species taken into consideration. The sites of diagnosis have been interrogated using a minisequencing reaction and capillary electrophoresis. All the results of the multiplex PER (primer extension reaction) test were confirmed by fragment sequencing. The assay offers the possibility of discriminating nine species at the same time.

Keywords: Species identification; Meat; Cyt b; SNaPshot

A.B. Rodriguez, R. Landa, R. Bodas, N. Prieto, A.R. Mantecon, F.J. Giraldez, Carcass and meat quality of Assaf milk fed lambs: Effect of rearing system and sex, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 225-230, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.023. (<http://www.sciencedirect.com/science/article/B6T9G-4R8MDXC-1/2/6a332ce49e3c4c0e1c79f627b73ae1cb>)

Abstract:

The effect of sex and rearing system on growth and carcass and meat characteristics of milk fed Assaf lambs was studied. Thirty-six lambs, 18 males and 18 females were used. Twelve lambs remained with their mothers throughout the experiment (NR). Within 24-36 h of birth, the rest were housed individually and fed twice a day ad libitum (AAR) or at 70% of ad libitum consumption (RAR) with reconstituted cow's milk. Sex did not affect animal performance, yet females showed higher carcass and non-carcass fat deposits. NR lambs showed greater BWG than AAR fed lambs, and AAR, higher than the RAR. Differences between naturally and artificially reared lambs in CCW and killing out percentage were not significant. Empty digestive tract and mesenteric fat weights were greater for RAR than NR lambs, with the AAR lambs demonstrating intermediate values; conversely, omental fat was greater in NR lambs. Carcass ether extract content was greater for NR lambs, possibly due to the greater growth. Use of ad libitum cow's milk substitute in suckling lambs twice a day resulted in less body weight gain but similar killing out percentages compared to naturally raised lambs. A 70% restricted supply increased the days in suckling and reduced carcass fatness and compactness. Except for water loss, which was less in NR than artificially fed lambs, no differences were found in meat characteristics.

Keywords: Lamb; Naturally; Artificially milk feeding system; Growth; Carcass; Non-carcass; Meat quality

G. Ripoll, M. Joy, F. Munoz, P. Alberti, Meat and fat colour as a tool to trace grass-feeding systems in light lamb production, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 239-248, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.025. (<http://www.sciencedirect.com/science/article/B6T9G-4R8WK3K-1/2/054301c6d93e01b29ab1989275ab190f>)

Abstract:

Ninety-five lambs were fed as follows: lambs and dams grazing alfalfa (Gr); As Gr but lambs had access to concentrate (Gr+S); ewes grazed and lambs received milk and concentrate until

weaning and thereafter concentrate and straw (Rat-Gr); ewes and lambs were stall-fed (Ind). Lambs were slaughtered at 22-24 kg of live-weight and fat and M. rectus abdominis colour measured. Visual appraisal scores of Gr and Ind were significantly different. The absolute value of the integral of the translated spectrum (SUM) was greater in Gr and GR+S. A discriminate analysis was able to discriminate between grass-fed and indoor-fed lambs. A logistic regression including SUM and b* classify correctly 99.1% of carcasses. An equation is proposed to calculate the probability of one carcass to do not belongs to Gr or Gr+S group (PNA): .

Keywords: Alfalfa; Rectus abdominis colour; Subcutaneous caudal fat colour; Reflectance spectrophotometry

Lene Meinert, Kaja Tikk, Meelis Tikk, Per B. Brockhoff, Camilla Bejerholm, Margit D. Aaslyng, Flavour formation in pork semimembranosus: Combination of pan-temperature and raw meat quality, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 249-258, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4RC6RD6-1/2/157f82ac83521c584c72853d58c11492>)

Abstract:

Flavour development and overall eating quality of pork semimembranosus were investigated with regard to different raw meat qualities (feeding/fasting strategy; control/low glycogen level, gender; castrate/female, slaughter live-weight; 84 kg/110 kg) combined with frying temperature (150 [degree sign]C/240 [degree sign]C). It was further investigated whether the precursor levels of glycogen, IMP, inosine, and hypoxanthine in the raw meat were correlated to the raw meat quality and fried/grilled attributes. Pork schnitzels were fried on a pan (155 [degree sign]C) or grill-pan (240-250 [degree sign]C) to a core temperature of 70 [degree sign]C. Frying temperature was the one factor with greatest influence on the sensory attributes, and pan-grilled schnitzels had significantly higher scores in fried/grilled attributes regardless of meat quality compared to pan-fried schnitzels. Texture was not appreciably influenced by any treatment. There was no correlation between precursor levels and raw meat qualities or fried sensory attributes. Gender and slaughter live-weight had no pronounced influence on flavour and overall eating quality.

Keywords: Pork; Flavour; Frying temperature; Sensory analysis; Gender; Slaughter live-weight; Glycogen; IMP; Hypoxanthine; Inosine

K. Van den Maagdenberg, A. Stinckens, E. Claeys, N. Buys, S. De Smet, Effect of the insulin-like growth factor-II and RYR1 genotype in pigs on carcass and meat quality traits, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 293-303, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4RC6RD6-3/2/b342f2e95505b2713a2cee01d1f207be>)

Abstract:

Recently, a new QTN (quantitative trait nucleotide), which is located in the regulatory sequence of the imprinted IGF-II gene was discovered in the pig and is associated with a significant increase in IGF-II mRNA expression in skeletal muscle during postnatal growth. The aim of the current study was to investigate the effect of the IGF-II paternal allele (Apat and Gpat animals that inherited, respectively, the mutant and wild type paternal allele of interest) on carcass and meat quality traits in Nn and NN RYR1 genotypes. A total of 141 animals were measured, almost equally distributed over the IGF-II and RYR1 genotypes and gender. The Apat allele increased carcass lean meat percentage with approximately 4.5% ($P < 0.001$) as a result of decreased backfat thickness. Average live weight daily gain was not affected, hence average daily lean meat gain was significantly higher for Apat compared to Gpat animals. The IGF-II mutation had no noticeable effect on meat quality in contrast with the RYR1 mutation. No interaction effects of both mutations on meat quality were noticed.

Keywords: Calpain activity; Carcass quality; IGF-II mutation; Meat quality; RYR1 mutation

Lene Meinert, Sara C. Christiansen, Lars Kristensen, Charlotte Bjerregaard, Margit D. Aaslyng, Eating quality of pork from pure breeds and DLY studied by focus group research and meat quality analyses, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 304-314, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4RGTXDY-1/2/4e05abe4f1aaaa93585f4b1e4ed19552>)

Abstract:

The eating quality of pan-fried pork chops from the pure breeds of Duroc, Hampshire, Black spotted and Wild pigs, and of the cross-breed of Duroc, Landrace and Yorkshire (DLY) was investigated by focus group research in combination with analyses of raw meat quality. The three focus groups, all consisting of young consumers, generally agreed in their description of the eating quality of the five breeds. The focus group methodology was found to be an informative method for the sensory evaluation of pork chops. Chemical and physical analyses of raw meat quality were performed in parallel with the focus group research, and this combination proved useful. The chemical and physical analyses generally supported the focus group evaluation, and differences between the breeds could be explained. Duroc was the breed with the overall best eating quality, while Hampshire had the lowest overall eating quality. DLY, Black spotted, and Wild pigs were intermediate, though not similar.

Keywords: Pork; Eating quality; Focus group; Meat quality; Black spotted; Wild pigs; Duroc; Hampshire; DLY

G.M. Vacca, V. Carcangiu, M.L. Dettori, M. Pazzola, M.C. Mura, S. Luridiana, G. Tilloca, Productive performance and meat quality of Mouflon x Sarda and Sarda x Sarda suckling lambs, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 326-334, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4RR86W2-1/2/dfe7c733f21403ca7f51f2fb40afaa0a>)

Abstract:

The objective of this study was to compare slaughtering performance, carcass characteristics, and meat quality in lambs of two different genotypes. Sixteen crossbred Mouflon x Sarda (M x S) and sixteen pure Sarda breed (S x S) suckling lambs were analysed. Chemical and fatty acid composition were determined on semitendinosus and longissimus dorsi muscles and perirenal and pelvic fats. Dressing percentage was higher ($P < 0.01$) in M x S group and after histological dissection M x S carcasses had more muscle tissue ($P < 0.01$) and less separable fat ($P < 0.05$). Muscles of M x S had less cholesterol than the S x S lambs ($P < 0.01$). Polyunsaturated/saturated and n-6/n-3 fatty acids ratios of the intramuscular lipids were optimal in both groups. Indexes of atherogenicity and of thrombogenicity in muscles varied between 0.9 and 1.1. The results indicated several good qualities in both the genotypes, but M x S lambs have some traits which could provide a higher market price.

Keywords: Mouflon; Sarda sheep breed; Suckling lamb

Y.C. Ryu, Y.M. Choi, S.H. Lee, H.G. Shin, J.H. Choe, J.M. Kim, K.C. Hong, B.C. Kim, Comparing the histochemical characteristics and meat quality traits of different pig breeds, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 363-369, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4RFSD1T-2/2/110172d946505b14170acb164a340cb0>)

Abstract:

The purpose of this study was to compare the muscle histochemical characteristics and meat quality traits between Berkshire, Landrace, Yorkshire, and crossbred pigs. A total of 594 pigs were evaluated. A clear difference between histochemical properties was observed from the results for fiber type composition. In Berkshire pigs, the area percentage of type I fibers was higher ($P < 0.001$) and that of type IIb fibers was lower ($P < 0.05$) than those of other breeds. The muscle pH_{45min} and pH_{24h} were significantly higher in Berkshire pigs. Drip loss and color parameters were significantly different between the breeds ($P < 0.001$). The Berkshire pigs, which showed the highest muscle pH and lowest drip loss and L^* values, contained a significantly higher percentage of type I fibers than the other breeds. By comparing the fiber type compositions of the different breeds, the results imply that the longissimus dorsi muscle of Berkshire pigs is more oxidative than that of other breeds. A high pH value in Berkshire pigs is due to a high percentage of type I fibers and a low percentage of type IIb fibers. Based on these results, we conclude that muscle fiber composition can explain in parts the variation of meat quality across and within breeds.

Keywords: Muscle fiber type; Pig breed; Pork quality

H.J. Swatland, How pH causes paleness or darkness in chicken breast meat, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 396-400, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4RMNYM3-2/2/cca5509066a8d47e027ae2af12941860>)

Abstract:

Chicken breasts (Pectoralis) at a low-pH (5.91 \pm 0.12, $n = 10$) were compared with breasts at a high-pH (6.36 \pm 0.25, $n = 10$, $P < 0.001$). Low-pH breasts had the highest reflectance ($P < 0.001$ from 400 to 700 nm). High-pH breasts had the greatest transmittance into their depth and across individual muscle fibres ($P < 0.001$). The differences in refractive index between ordinary and extraordinary rays across individual muscle fibres were greater in low-pH than in high-pH breasts ($P < 0.001$). Light at low wavelengths had greater reflectance and lower transmittance than light at long wavelengths ($P < 0.001$). Myofibrillar refraction contributed to differences in light scattering between PSE (pale, soft, exudative) and DFD (dark, firm, dry) chicken meat, as it does in pork and beef.

Keywords: Chicken; PSE; DFD; Optical properties; Birefringence

M.C. Messia, T. Di Falco, G. Panfili, E. Marconi, Rapid determination of collagen in meat-based foods by microwave hydrolysis of proteins and HPAEC-PAD analysis of 4-hydroxyproline, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 401-409, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4RP0MTP-1/2/20299108ae5e266f16009c48672401f3>)

Abstract:

A rapid microwave procedure for protein hydrolysis coupled with High Performance Anion Exchange Chromatography and Pulsed Amperometric Detection (HPAEC-PAD) was developed to quantify the amino acid 4-hydroxyproline in meat and meat-based products. This innovative approach was successfully applied to determine collagen content (4-hydroxyproline \times 8) as the index quality of meat material employed in the preparation of typical meat sausages ('Mortadella di Bologna PGI' and 'Salamini italiani alla cacciatora PDO') and fresh filled pastas. Microwave hydrolysis showed a precision and accuracy similar to traditional hydrolysis (RSD% from 0.0 to 6.4; relative error 1.4-10.0%) with a reduction in the hydrolysis time from 24 h to 20 min. HPAEC-PAD allowed detection of 4-hydroxyproline without pre or post-column derivatization and the use of non-toxic eluents.

Keywords: 4-Hydroxyproline; Collagen; Microwave hydrolysis; HPAEC-PAD

A.K. Biswas, N. Kondaiah, K.N. Bheilegaonkar, A.S.R. Anjaneyulu, S.K. Mendiratta, C. Jana, H. Singh, R.R. Kumar, Microbial profiles of frozen trimmings and silver sides prepared at Indian buffalo meat packing plants, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 418-422, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4RR8YY0-1/2/4d68702955af637117abebf5db7eb44d>)

Abstract:

To assess microbiological quality of buffalo meat trimmings (TT = 114) and silver sides (SS = 41), samples were collected from four different Indian meat packing plants. The aim of this study was: (i) to evaluate standard plate count (SPC), psychrotrophic count (PTC), *Enterococcus faecalis* count (EFC), *Staphylococcus aureus* count (SAC) and *Escherichia coli* count (ECC) and the presence of *Salmonella* spp. and *Listeria monocytogenes*; and (ii) also to determine verotoxigenic *E. coli* (VTEC) by polymerase chain reaction (PCR). TT samples had significantly higher ($P < 0.001$) SPC, PTC, EFC, and SAC than SS, while across the meat types there was no difference ($P > 0.05$) in ECC. *E. coli* was recovered from 32.4% TT and 19.5% SS samples. The prevalence rate of *Salmonella* spp. and *L. monocytogenes* in TT was 1.75% and 0.87%, respectively. But no SS sample was found to be positive for any of these two pathogens. VTEC was found in 2.58% of all the tested samples. This finding suggests that TT contain higher microbes but only small numbers of pathogens of latent zoonotic importance. The present study confirmed the importance of maintaining good process hygiene at meat plants for microbiological status of buffalo meat.

Keywords: Buffalo meat; Trimmings; Silver sides; *Salmonella*; *Listeria*; *Escherichia coli*; *Staphylococcus*; *Enterococcus*; Microbiological quality

L.S. Ravn, N.K. Andersen, M.A. Rasmussen, M. Christensen, S.A. Edwards, J.H. Guy, P. Henckel, A.P. Harrison, De electricitatis catholici musculari - Concerning the electrical properties of muscles, with emphasis on meat quality, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 423-430, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4RP0MTP-5/2/0a03f373769cddfec8c8c2338dd2d4b3>)

Abstract:

This study aims to explore the potential of evoked non-invasive surface electromyography (SEMG) analysis, in predicting meat quality traits in livestock. Evoked SEMG is a system that records, transdermally, electrical signals generated in muscle fibres upon external stimulation. These signals are reported as compound muscle action potentials (CMAP). CMAP parameters of LD correlated negatively and significantly to ultimate pH (pH 24 h) at day 61, but not at day 153 after birth, and a similar albeit positive correlation was observed for muscle glycogen content. Muscle glycogen content and pH 24 h correlated negatively in LD and BF. Negative significant correlations between CMAP parameters and shear force were found in LD at day 153 after birth, which might, in the range of the recording electrodes, reflect the combined effect of large cross-sectional area fibres and reduced perimysium content per unit volume of muscle. The fact that correlations between CMAP characteristics and quality traits of both metabolic and non metabolic origin could be established, warrants a fuller investigation of this method in terms of its potential as a predictive tool for meat quality traits in live animals.

Keywords: Porcine; EMG; Biceps femoris; Longissimus dorsi; Meat quality

Carla Lazzaroni, Davide Biagini, Effect of pre- and post-pubertal castration on Piemontese male cattle. II: Carcass measures and meat yield, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 442-448, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4RP0MTP-6/2/5cb71ac973fc1cc043cbcbf19070f5d1>)

Abstract:

The effect of different castration ages on carcass morphological characteristics, meat yield, commercial cuts and bones weight and measures was evaluated on Piemontese steers and bulls. Carcasses (24) obtained from early castrated (EC, 5th month of age), late castrated (LC, 13th month) and intact males (IM, control group) of similar age (about 18 months) and fattening degree, were weighed, measured and dissected following the local commercial method. Very few differences were found in carcass conformation and fatness as in carcass weight and measures. After data adjusting, few meat cuts were heavier in IM compared to EC and LC, and only one cut measure was different, whereas, almost no differences were found in bone measures and weight. IM produced carcasses with more edible meat than LC and more forequarter and 2nd quality meat than LC and EC. Significant differences were found also between total, hindquarter and perinephric fat.

Keywords: Piemontese breed; Steers; Bulls; Early and late castration; Carcass; Commercial cuts and bone linear measures; Commercial dissection

Jasna Djinovic, Aleksandar Popovic, Wolfgang Jira, Polycyclic aromatic hydrocarbons (PAHs) in different types of smoked meat products from Serbia, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 449-456, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4RP0MTP-3/2/e0cb4184a375d10ae3ab1ea132b16c0e>)

Abstract:

The contents of the 16 EU priority PAHs in six different meat products from Serbia (beef ham, pork ham, bacon without skin, bacon with skin, cajna sausage and sremska sausage) were examined during the process of smoking. All these meat products from meat industry Zlatiborac, Mackat, Serbia presented in this study, have not previously been analysed concerning to their contents of PAH compounds. Determination and quantification of PAHs in meat products were performed by a Fast GC/HRMS method. The maximum level for benzo[a]pyrene (BaP) of 5 [μ g/kg in smoked meat products was not exceeded in any samples. BaP comprises in general 4.6% of the total sum of the 16 EU priority PAHs and 15.2% of the total sum of the 12 IARC PAH compounds. The suitability of BaP as a marker both for 16 EU priority PAHs and 12 IARC probably and possibly carcinogenic PAHs was checked by applying correlation analysis.

Keywords: Polycyclic aromatic hydrocarbons; Smoked meat products; BaP as a marker; Correlation statistic analysis

K.W. Farag, J.G. Lyng, D.J. Morgan, D.A. Cronin, A comparison of conventional and radio frequency tempering of beef meats: Effects on product temperature distribution, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 488-495, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.01.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4RT4XSM-1/2/c0139d11014b217625c5c4b951df4ab3>)

Abstract:

This study aimed to develop radio frequency (RF) pilot-scale protocols for tempering beef meat blends (4 kg blocks) to achieve average temperatures between -2 and -5 [$^{\circ}$ C]. Post-tempering temperature distribution in these blocks was compared to products tempered by conventional methods. The optimum RF power-time combination for tempering lean and 50:50 lean:fat mixtures to the target range was 500 W for 11 min which produced respective means of -3.6 [$^{\circ}$ C (s.d. 1.1)] and -3.4 [$^{\circ}$ C (s.d. 1.5)]. In contrast, 400 W for 11 min was optimum for fat (mean -4.9 [$^{\circ}$ C, s.d. 2.1]). This study shows the principal advantages of RF over conventional tempering as an approximate 30 fold tempering time reduction and a greater uniformity of end point temperature distribution under the conditions employed. Furthermore, power consumption was reduced approximately ninefold with RF compared to conventional

tempering. More uniform temperature distribution was achieved in samples that were comminuted to a greater extent.

Keywords: Radio frequency; Frozen beef; Tempering

N.J. Okeudo, B.W. Moss, Production performance and meat quality characteristics of sheep comprising four sex-types over a range of slaughter weights produced following commercial practice, *Meat Science*, Volume 80, Issue 2, October 2008, Pages 522-528, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.02.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4RT4XSM-4/2/5048a2b11e6ee02c7157ce87f04e3570>)

Abstract:

Eighty four lambs comprising four sex-types (entire rams, castrated rams, vasectomised rams and entire ewes) were distributed equally into seven target slaughter weights (32, 36, 40, 44, 48, 52 and 56 kg). All lambs were born in early spring. Dams and lambs were out on pasture until late September when they were housed and fed concentrate and hay. At birth, ram lambs were heavier than ewe lambs ($P < 0.01$) and gained weight faster ($P < 0.05$). The three male sex-types were similar in birth weight, growth rate and dressing out percentage ($P > 0.05$), and were significantly lower than ewes in dressing out percentage ($P < 0.001$). The m. longissimus dorsi (LD) from all sex-types were similar in initial pH, ultimate pH and sarcomere length ($P > 0.05$) but differed in cooking loss and shear force ($P < 0.05$). The LD from ewes were lower in cooking loss than those from the male sex-types ($P < 0.05$), and recorded smaller shear force values ($P < 0.05$). The average a^* values (redness) of the LD was highest in ewes and differed only from that of vasectomised rams ($P < 0.05$). Ewes were also highest in oxymyoglobin proportion ($P < 0.05$). Although correlations between most meat quality parameters and slaughter weight were highly significant ($P < 0.001$) the correlation coefficients (r) were generally small.

Keywords: Sheep; Sex; Slaughter weight; Meat quality; Correlation coefficient

Rafael A. Garcia, Kurt A. Rosentrater, Concentration of key elements in North American meat & bone meal, *Biomass and Bioenergy*, Volume 32, Issue 9, September 2008, Pages 887-891, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2007.12.011.

(<http://www.sciencedirect.com/science/article/B6V22-4RSRPX2-3/2/db38ddf664b38f1292abd6a350498c0c>)

Abstract:

Meat & bone meal (MBM) and related rendered protein commodities have potential for use in applications other than animal feed, including use as a fuel or a phosphorus fertilizer. In order to develop these applications, data on the elemental composition are required; the currently available elemental composition data have important limitations. To generate more appropriate and reliable data, MBM samples were collected from 17 North American rendering plants, carefully prepared and analyzed for 20 elements. Preliminary studies showed that the sample preparation process artificially increased levels of sulfur and nickel in a manner that was correctable. Concentrations of many elements were found to agree with previously published values, but concentrations of potassium, magnesium and copper were significantly different from the most authoritative reference. Concentrations of heavy metals tested for were low, and arsenic and cadmium were not detected in any sample. Among the elements tested, there were a number of pairs of elements whose concentration was correlated with high significance, which in some cases was due to the varying proportions of soft tissue and bone in the MBM. The data presented should allow the development of non-feed applications for MBM to proceed with increased confidence.

Keywords: Meat & bone meal; MBM; Mineral content; Analytical milling; Biofuel; Utilization; Fertilizer; Feedstock

Jose M. Lorenzo, Mari'a C. Garci'a Fontan, Inmaculada Franco, Javier Carballo, Proteolytic and lipolytic modifications during the manufacture of dry-cured lacon, a Spanish traditional meat product: Effect of some additives, *Food Chemistry*, Volume 110, Issue 1, 1 September 2008, Pages 137-149, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.02.002.

(<http://www.sciencedirect.com/science/article/B6T6R-4RSRDPH-4/2/b5940f1f32ee5c3333f209540925da05>)

Abstract:

The extractability of sarcoplasmic and myofibrillar proteins, the myofibrillar proteins and their degradation products, classical nitrogen fractions, free amino acids, acidity of the fat, and free fatty acids were determined throughout the manufacturing process of dry-cured lacon, a traditional dry-salted and ripened meat product made in the northwest of Spain from the foreleg of the pig, following a similar technological process to that of dry-cured ham. The effect of the use of additives (glucose, sodium nitrite, sodium nitrate, sodium ascorbate and sodium citrate) on the proteolytic and lipolytic changes was also studied.

Throughout the manufacture, approximately 87% of the sarcoplasmic proteins and 91% of the myofibrillar proteins became insoluble. There was a significant ($p < 0.05$) decrease of the myosin heavy chain, actin, and myosin light chains 1, 2 and 3, and also a significant ($p < 0.05$) increase in the components generated as a result of the degradation of these myofibrillar proteins. The content of the different nitrogen fractions and of the free amino acids indicated that protein degradation during the manufacture of dry-cured lacon is only moderate. Data on the acidity of fat and of free fatty acids also indicated that lipolysis in dry-cured lacon is lower than in hams. The use of additives did not significantly influence the protein and lipid degradation, which occur throughout the manufacturing process.

Keywords: Dry-cured lacon; Protein extractability; Proteolysis; Lipolysis; Additives; Cured meat-products

Fenghua Jin, Lei Qin, Lu Jiang, Bin Zhu, Yang Tao, Novel separation method of black walnut meat from shell using invariant features and a supervised self-organizing map, *Journal of Food Engineering*, Volume 88, Issue 1, September 2008, Pages 75-85, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.01.022.

(<http://www.sciencedirect.com/science/article/B6T8J-4RSYC3D-1/2/c1ac6f4077a6406b63142a40b3cf10cf>)

Abstract:

A method to automatically separate black walnut meat from shells would be highly beneficial to the walnut processing industry. We describe a machine vision system with backlight illumination. Backlit images of walnut meat and shells showed quite different texture patterns due to their different light transmittance properties. This texture pattern was described by the combination of two complimentary texture description operators: local binary pattern and local variance. The resultant feature vectors were fed into a classifier, the supervised self-organizing map (SOM), to determine if the images were meat or shell. Results showed that the proposed approach was very effective in walnut meat and shell separation, with an overall separation accuracy of 98.2%. The high separation accuracy, fast computation speed, and instrument low cost make the proposed imaging system a great potential in walnut processing industry.

Keywords: Black walnuts; Texture; Self-organizing map; Classification; Imaging; Machine vision; Invariant features

Diana Martin, Elena Muriel, Elena Gonzalez, Javier Viguera, Jorge Ruiz, Effect of dietary conjugated linoleic acid and monounsaturated fatty acids on productive, carcass and meat quality traits of pigs, *Livestock Science*, Volume 117, Issues 2-3, September 2008, Pages 155-164, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.12.005.

(<http://www.sciencedirect.com/science/article/B7XNX-4RPM38D-2/2/890c0668873554f35f58c3888b94baa7>)

Abstract:

Three levels (0, 1 and 2%) of conjugated linoleic acid (CLA) were combined with two levels (low and high) of monounsaturated fatty acids (MUFA) for pig feeding. Productive, carcass and meat quality traits were studied. Large White [male symbol] x Landrace x Large White [female symbol] gilts (n = 288) weighting 70 kg were randomly allotted to 6 different feeding treatments and fed to a final average weight of 107 kg. Loins were taken from 48 animals (8 animals randomly selected from each treatment). No differences due to dietary CLA, MUFA or CLA x MUFA interaction were found on average daily gain, average daily consumption, feed conversion ratio, carcass yield, backfat thickness, loin weight, loin pH and loin colour. A significant increase in intramuscular fat content ($p = 0.010$) and in saturated fatty acids (SFA) ($p < 0.001$), and a decrease in MUFA ($p = 0.001$) and desaturase indices were found as consequence of dietary CLA, regardless the MUFA level. Therefore, dietary CLA, MUFA and their interaction did not influence productive and carcass traits of pigs. However, the use of CLA for swine feeding increased the intramuscular fat content and modified the fatty acid profile, regardless the MUFA level of the diets.

Keywords: Conjugated linoleic acid; MUFA; Pig; Fatty acid profile; Meat quality

Q. Wang, Y.J. Chen, J.S. Yoo, H.J. Kim, J.H. Cho, I.H. Kim, Effects of supplemental humic substances on growth performance, blood characteristics and meat quality in finishing pigs, *Livestock Science*, Volume 117, Issues 2-3, September 2008, Pages 270-274, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.12.024.

(<http://www.sciencedirect.com/science/article/B7XNX-4RTCPY8-1/2/dd4d46ee3aa68d1a53e5fc2c529e3996>)

Abstract:

A total of forty-eight finishing pigs were used to determine the effects of humic substances (HS) on growth performance, blood characteristics, and meat quality. The finishing pigs were assigned randomly by weight to three treatments. The dietary treatments included: 1) Control (CON; basal diet), 2) HS1 (basal diet + 5% humic substances) and 3) HS2 (basal diet + 10% humic substances). Results of the whole experimental period showed that addition of 10% HS to the diet, significantly increased average daily gain (ADG) and gain/feed (G:F) ($P < 0.05$). At the end of the experiment, the relative lymphocyte counts (% of total white blood cells) of pigs fed HS2 diet were higher ($P < 0.05$) than that of pigs fed CON diet. The Minolta color parameter a^* of pigs fed HS2 was similar to that of pigs fed HS1, however, it was higher ($P < 0.05$) than that of pigs fed CON diet. The inclusion of either 5% or 10% HS significantly decreased backfat thickness ($P < 0.05$). The marbling score was increased significantly ($P < 0.05$) when diets were supplemented with HS at a level of 10%. The results of this study suggest that HS might be utilized as a feed additive in the diet. It could improve growth performance, relative lymphocyte counts and meat quality.

Keywords: Humic substances; Growth performance; Blood characteristics; Meat quality; Finishing pigs

Louw Hoffmann, E.C. Webb, International Congress of Meat Science and Technology - ICoMST 2008, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15 August 2008, Cape Town, South Africa, September 2008, Page 1, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.06.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4SSG51R-2/2/81a39e3fd8fbaeae7697be63888e81da>)

D.M. Ferguson, R.D. Warner, Have we underestimated the impact of pre-slaughter stress on meat quality in ruminants?, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat

Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 12-19, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4SHF4PW-1/2/33fcb39a3d45f8b4c73feb892a40940>)

Abstract:

Stress is the inevitable consequence of the process of transferring animals from farm to slaughter. The effects of chronic stress on muscle glycogen depletion and the consequent dark cutting condition have been well documented. However, there has been little examination of the consequences of acute stress immediately pre-slaughter on ruminant meat quality. New evidence is emerging to show that non pH-mediated effects on meat quality can occur through pre-slaughter stress in cattle and sheep. This paper reviews the general aspects of pre-slaughter stress in the pre-slaughter context. It then examines the impacts of pre-slaughter stressors on ruminant carcass and meat quality and considers remedial strategies for remediating and preventing pre-slaughter stress. Further quantification of the biological costs of pre-slaughter stress and the consequences to meat quality is required.

Keywords: Cattle; Meat quality; Pre-slaughter stress; Sheep; Tenderness

H.C. Schonfeldt, N. Gibson, Changes in the nutrient quality of meat in an obesity context, Meat Science, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 20-27, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4SMF049-2/2/33a06292cbb481fbccd36faee2783fb4>)

Abstract:

Today, being either overweight or obese is becoming the norm both in developing and developed countries. Developing countries often experience a double burden of nutrition-related diseases, as both over and undernutrition are experienced, with overweight presently exceeding underweight in most developing countries. Global diet trends such as moving from a traditional diet to more refined foods and increased sugar and saturated fat intake are identified as contributing to excess energy intake. The nutritional content of meat is non-homogenous and dynamic and meat has changed considerably in fat content, in many countries, during the last decade due to consumer demand. Choosing a particular meat cut of a specific fatness level, prior to cooking and consuming it without added high energy condiments, as well as trimming on the plate, can make a significant contribution to decrease energy intake, from a total diet perspective. Prudent portion size is also of importance. Meat is recognised as an important source of protein, vitamin B12, Vitamin D and essential Omega 3 fatty acids, as well as bio-available minerals such as iron, zinc and selenium.

Keywords: Nutrient quality; Red meat; Obesity; Age; Fatness level; Cut

E.C. Webb, H.A. O'Neill, The animal fat paradox and meat quality, Meat Science, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 28-36, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4SN8FJT-2/2/82faaeafefeb07cb94e33f8d7995d7c9c4>)

Abstract:

The purpose of this paper is to address some of the paradoxical issues and perceptions regarding animal fats and the related effects on meat quality and consumer perceptions. Meat scientists have been studying carcass characteristics for many years and although the factors that influence the accumulation, distribution and composition of carcass fat in livestock have been extensively researched, the role, value and perceptions of animal fats in meat quality differ significantly in importance between producers, abattoirs, butchers, retailers and consumers.

Fat and long-chain fatty acids, whether in adipose tissue or muscle, contribute to important aspects of meat quality and are central to the nutritional and sensory values of meat. In this review the nutritional value of fat, as well as the importance of fat in terms of carcass and meat quality will be highlighted. The 'quality' of meat depends greatly on the socio-demographic backgrounds of the consumer. The aim is to focus on the global importance of fat in the carcass to the producer, processor and consumer.

There is currently no clear cut definition for fat quality because the acceptability and perceived quality of fat varies significantly in terms of quantity, colour, consistency and chemical composition in different species of livestock around the world. The association between animal fats and human health is critical and recommendations by health professionals range from excluding fats altogether to a moderate consumption of fats due to their essential role in the body. Recently the emphasis has shifted away from fat quantity to fat quality. Despite these recommendations and years of bad publicity in terms of the adverse affects of animal fats in human health, the livestock industry seems reluctant to shift its focus to fat quality rather than quantity. This approach may adversely affect future meat consumption by consumers who are becoming increasingly critical about the food they eat.

Keywords: Lipid; Carcass fat; Fatty acid; Meat quality; Livestock; Feeding system

Kenneth W. McMillin, Where is MAP Going? A review and future potential of modified atmosphere packaging for meat, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 43-65, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4SMWFKG-1/2/1dd3d852db43bd95d8995b72ee00c105>)

Abstract:

Modified atmosphere packaging (MAP) is the removal and/or replacement of the atmosphere surrounding the product before sealing in vapor-barrier materials. While technically different, many forms of MAP are also case-ready packaging, where meat is cut and packaged at a centralized location for transport to and display at a retail store. Most of the shelf life properties of meat are extended by use of MAP, but anoxic forms of MAP without carbon monoxide (CO) do not provide bloomed red meat color and MAP with oxygen (O₂) may promote oxidation of lipids and pigments. Advances in plastic materials and equipment have propelled advances in MAP, but other technological and logistical considerations are needed for successful MAP systems for raw chilled fresh meat. Current MAP options of air-permeable overwrapped trays in master packs, low O₂ formats of shrunk film vacuum packaging (VP) or MAP with carbon dioxide (CO₂) and nitrogen (N₂) and their peelable barrier film derivatives, and high O₂ MAP each have advantages and disadvantages. Packaging technology innovations and ingenuity will continue to provide MAP that is consumer oriented, product enhancing, environmentally responsive, and cost effective, but continued research and development by the scientific and industry sectors will be needed.

Keywords: Packaging; Modified atmosphere; Case-ready; Meat properties

P.E. Strydom, Do indigenous Southern African cattle breeds have the right genetics for commercial production of quality meat?, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 86-93, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4SD29WR-1/2/c60e2d93d1e99692a75825fb2530eea3>)

Abstract:

The establishment of cattle breeds which are now indigenous to Africa is believed by historians to be very closely associated with man, his development, migration and specific behaviour from 6000 years BC. Today these breeds compete with exotic breeds in a commercial system driven by

global economical principles. Results from various trials are discussed to verify if these breeds can adhere to these principles and compete in the South African beef market to produce quality beef economically. Variation in frame size among indigenous breeds will determine their suitability as feedlot cattle depending on the price and feed margins driving profit in this industry sector. Meat quality analyses indicate small or no differences between indigenous and exotic European/British breeds but with potentially superior quality compared to *Bos indicus* breeds.

Keywords: Indigenous beef breeds; Tenderness; Yield; Growth performance; Pasture; Feedlot

L.C. Hoffman, The yield and nutritional value of meat from African ungulates, camelidae, rodents, ratites and reptiles, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 94-100, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4SKB3JB-3/2/4798d53256841084c63179fecea8b67b>)

Abstract:

The current knowledge of the yield and nutritional (proximate and fatty acid) composition of meat derived from African ungulates, camelidae, rodents, ratites and reptiles is reviewed. Although most of the species discussed give low cholesterol levels consistent with their low meat lipid contents, the tegu lizard gives a very low level (18.2 mg/100 g tissue). The fatty acid profiles of the various species all have low saturated fatty acids and high polyunsaturated fatty acids resulting in favourable saturated to polyunsaturated fatty acid ratios. Although the springbok, camel, ostrich and crocodile are marketed and exported to sophisticated markets, the rodents are the species that show most promise in becoming large commercial commodities. Not only is their meat desirable and nutritional, but they are also highly adaptable to extensive and intensive production systems.

Keywords: Fatty acids; Cholesterol; Ungulates; Camelids; Rodents; Ratites; Reptiles

L. Simela, R. Merkel, The contribution of chevon from Africa to global meat production, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 101-109, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.037.

(<http://www.sciencedirect.com/science/article/B6T9G-4SP3SVN-1/2/f12066715de318fdee6e653d04dfa101>)

Abstract:

Africa's goat population increased by 75% between 1980 and 2005 and constitutes 30% of the world goat population. Although Africa produces about 20% of the world's chevon, its share of world chevon market has been declining. Exports from Africa represent less than 5% of the total world trade. Most goats are raised by smallholder farmers for subsistence and trading in informal markets. The world renowned Boer, Kalahari Red and Savanna goats are meat breeds that were developed in South Africa. Information on most African goat breeds is scanty, but there seems to be large variations in the breed characteristics, which suggests a potential for selective breeding for more and meat breeds. Recommendations for enhancing goat production in Africa include, prioritizing research and technology transfer on meat goat production, development of more chevon breeds, devising methods to enhance the quality of African chevon through pre- and post-harvest interventions, and improved support from government institutions and policy.

Keywords: Goats; Chevon; Africa; Goat breeds; Chevon trade

Jean-Louis Damez, Sylvie Clerjon, Meat quality assessment using biophysical methods related to meat structure, *Meat Science*, Volume 80, Issue 1, 54th International Congress of Meat Science and Technology (54th ICoMST), 10-15August 2008, Cape Town, South Africa, September 2008, Pages 132-149, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.05.039.

(<http://www.sciencedirect.com/science/article/B6T9G-4SP3SVN-2/2/c45570e89306da216b207f2d55f754c4>)

Abstract:

This paper overviews the biophysical methods developed to gain access to meat structure information. The meat industry needs reliable meat quality information throughout the production process in order to guarantee high-quality meat products for consumers. Fast and non-invasive sensors will shortly be deployed, based on the development of biophysical methods for assessing meat structure. Reliable meat quality information (tenderness, flavour, juiciness, colour) can be provided by a number of different meat structure assessment either by means of mechanical (i.e., Warner-Bratzler shear force), optical (colour measurements, fluorescence) electrical probing or using ultrasonic measurements, electromagnetic waves, NMR, NIR, and so on. These measurements are often used to construct meat structure images that are fused and then processed via multi-image analysis, which needs appropriate processing methods. Quality traits related to mechanical properties are often better assessed by methods that take into account the natural anisotropy of meat due to its relatively linear myofibrillar structure. Biophysical methods of assessment can either measure meat component properties directly, or calculate them indirectly by using obvious correlations between one or several biophysical measurements and meat component properties. Taking these calculations and modelling the main relevant biophysical properties involved can help to improve our understanding of meat properties and thus of eating quality.

Keywords: Meat quality; Meat structure; sensor; Spectroscopy; Microscopy; Biophysical methods; Optical properties; NMR; MRI; Ultrasounds; X-rays; Mechanical properties; Impedance; Microwave; Fluorescence; Polarization; Anisotropy

L.G. Dias, D.M. Correia, J. Sa-Morais, F. Sousa, J.M. Pires, A.M. Peres, Raw bovine meat fatty acids profile as an origin discriminator, Food Chemistry, Volume 109, Issue 4, 15 August 2008, Pages 840-847, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.01.008.

(<http://www.sciencedirect.com/science/article/B6T6R-4RMNYM1-1/2/973fe720865bea3ec28a55f47189539d>)

Abstract:

Consumers are very concerned in 'Protected Designation of Origin' (PDO) products, namely meat, since they associate these products to quality and healthy foods. Thus, it is necessary to implement analytical methodologies that could assure consumers about the products they purchase. Since this kind of meat is usually sold with no information concerning cattle sex, age and slaughter season, these characteristics were intentionally not taken into account. In this study, two Portuguese PDO bovine breeds (Mirandesa and Barrosa) and two production sub-systems (traditional and organic farming) were studied during a two-year period. Statistical analysis showed that production system and breed had a significant effect on the overall raw meat fatty acids (FA) content. Besides, the FA profiles could be used as an effective tool to differentiate the four groups studied allowing a 100% correct classification. The meat FA content was also correlated with the relative importance of the animal feeding stuff area.

Keywords: Bovine breed; Fatty acids; Linear discriminant analysis; Meat differentiation; Production systems

M. Mataragas, P.N. Skandamis, E.H. Drosinos, Risk profiles of pork and poultry meat and risk ratings of various pathogen/product combinations, International Journal of Food Microbiology, Volume 126, Issues 1-2, 15 August 2008, Pages 1-12, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.05.014.

(<http://www.sciencedirect.com/science/article/B6T7K-4SJP77R-2/2/1fccd2497fc700ff49f003a128c251b2>)

Abstract:

Risk profiles of pork and poultry meat were carried out using an Excel-based software program, Risk Ranger. It is a semi-quantitative risk estimator answering various questions relating to the probability of exposure to a hazard, susceptibility of the population of interest, severity of the illness caused by the hazard if present and probability of food containing an infectious dose. Therefore, qualitative and quantitative inputs were used to estimate and rank the risk of various hazards/food combinations. Risk scores provided by the tool were characterized as low, medium and high. Also, health risk was estimated separately, where needed, for low and high risk populations. Low risk scores were obtained for *Salmonella* spp., *Listeria monocytogenes* and enterohaemorrhagic *Escherichia coli* (EHEC) for low risk population. High risk scores were obtained for hepatitis E virus (HEV) in raw pork products (both low and high risk populations). Moderate risk scores for *Salmonella* spp. and *L. monocytogenes* in processed pork or poultry-meat products (ready-to-eat or to be reheated) and partially cooked pork products were also obtained (low risk population). Scores for *Staphylococcus aureus*, *Clostridium perfringens* and *Bacillus cereus* and various product types were mostly in the 'medium' risk category, except for *S. aureus*/ready-to-eat pork products able to support growth of the organism, which fell into the high risk category. *Campylobacter* spp. gave moderate risk scores with one exception (raw poultry products), whereas *Y. enterocolitica* showed combinations of low risk and few of medium risk. High risk pathogen/product combinations identified were: 1) temperature abused, ready-to-eat pork and/or poultry-meat products with extended shelf life and cross-contaminated by *L. monocytogenes* (high risk population), EHEC (high risk population) or *S. aureus* (all population), 2) partially cooked or processed intended to be reheated pork products cross-contaminated by *L. monocytogenes*, served undercooked and receiving improper cooling or reheating (high risk population), and 3) all people consuming undercooked meals cross-contaminated with *Campylobacter* spp. (e.g. from raw poultry and raw poultry-meat products) and HEV (e.g. from raw pork and raw pork-meat products). *Salmonellae* gave high risk scores in all food categories (except preserved meat products) for high risk population. Preserved meats (mainly pork) such as dry fermented sausages gave low risk scores. Only *Salmonella* spp., *L. monocytogenes* and *E. coli* EHEC gave moderate risk ratings in case of ingredients likely to be contaminated at an early stage of processing (e.g. animal at slaughter) and inadequate fermentation process. These results may constitute a source of information for hazard assessment during application of a Food Safety Management System.

Keywords: Meat; Pathogens; Pork; Poultry; Risk assessment; Risk profile; Safety

Luke D. Peterson, Nancy G. Faith, Charles J. Czuprynski, Growth of *L. monocytogenes* strain F2365 on ready-to-eat turkey meat does not enhance gastrointestinal listeriosis in intragastrically inoculated A/J mice, *International Journal of Food Microbiology*, Volume 126, Issues 1-2, 15 August 2008, Pages 112-115, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.05.010.

(<http://www.sciencedirect.com/science/article/B6T7K-4SHMC9V-2/2/be5b69fb0850d2ce5a10205ce8037214>)

Abstract:

There have been significant outbreaks of listeriosis associated with consumption of contaminated ready-to-eat (RTE) turkey meat products. In this study, we investigated whether growth on RTE deli turkey meat sends environmental signals to listerial cells that makes them more virulent in the gastrointestinal tract of mice. *L. Listeria monocytogenes* strain F2365 grew from a starting inoculum of 10³ CFU/mL to final numbers of 10⁸-10⁹ CFU/mL (within 12 days at 10 [degree sign]C) when inoculated onto sliced processed, or whole muscle, turkey breast, or into emulsified whole turkey breast. We did not observe any difference in the numbers of CFU recovered from the spleens and livers of A/J mice inoculated intragastrically with *L. monocytogenes* grown on sliced turkey meat, in emulsified turkey meat, or in brain heart infusion broth. These results suggest that growth on RTE sliced deli turkey, or in RTE emulsified deli turkey, does not enhance the ability of

L. monocytogenes F2365 to cause gastrointestinal listeriosis in intragastrically challenged A/J mice.

Keywords: *Listeria monocytogenes*; Virulence; Meat; Mice

M. Lourenco, G. Van Ranst, B. Vlaeminck, S. De Smet, V. Fievez, Influence of different dietary forages on the fatty acid composition of rumen digesta as well as ruminant meat and milk, *Animal Feed Science and Technology*, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 418-437, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.043.

(<http://www.sciencedirect.com/science/article/B6T42-4PG2KV2-4/2/0ed016b0eb20fddb00bc1d7ba05878c2>)

Abstract:

We review literature on effects of dietary forages on milk and tissue fatty acid composition of cattle and sheep, with particular emphasis on changes induced by leguminous and biodiverse forages versus intensive ryegrass. Differences are discussed in relation to changes in rumen or duodenal digesta to explain the origin of the differences as, in most cases, increased omega-3 PUFA (i.e., linolenic acid and/or long chain omega-3 PUFA) in milk and intramuscular fat due to feeding of red or white clover and botanically diverse forages could not be attributed to increased dietary supply of linolenic acid (C18:3 n-3). Hence, increased forestomach outflow of C18:3 n-3 has been suggested to originate from reduced rumen lipolysis, with literature providing some evidence for the role of polyphenoloxidase, which is particularly active in red clover, to inhibit rumen lipolysis. Increased proportions of CLA c9t11 in milk and intramuscular fat of ruminants fed botanically diverse forages have been associated with increased forestomach outflow of vaccenic acid (C18:1 t11), which is the main precursor of endogenous CLA c9t11 production. Despite the lack of direct evidence, some plant secondary metabolites, present in herbs of botanically diverse forages, are suggested to be potential modifiers of rumen biohydrogenation based on their effects on rumen methanogenesis.

Keywords: Biohydrogenation; Botanically diverse forages; Fatty acids; Plant metabolites

Xiao-Dong Zhang, Yong-Fei Zhu, Li-Sheng Cai, Tian-Xing Wu, Effects of fasting on the meat quality and antioxidant defenses of market-size farmed large yellow croaker (*Pseudosciaena crocea*), *Aquaculture*, Volume 280, Issues 1-4, 1 August 2008, Pages 136-139, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2008.05.010.

(<http://www.sciencedirect.com/science/article/B6T4D-4SHVST2-1/2/7cb335c99ad592bae3ea143f289bf087>)

Abstract:

The study was conducted to investigate fasting effect on flesh composition and antioxidant defenses of market-size large yellow croaker (*Pseudosciaena crocea*). Two hundred fish (main initial weight 380 g) were divided into two groups (control and fasted) and reared in 6 cages. After two weeks of adaptation, group I fasted for 28 days; group II was fed normally as a control. In 3, 7, 14, 21 and 28 days, 6 fish per group were processed for proximate flesh composition, liver antioxidant enzyme activities and malondialdehyde flesh content analyses. In fasted fish, the reduction of lipid content in muscle occurred after day 3, and, compared to controls, the content of protein decreased from day 21, the activities of liver antioxidative enzymes superoxide dismutase (SOD) and glutathione peroxidase (GPX) increased from day 3, and flesh malondialdehyde (MDA) levels increased from day 21. Muscle lipid reduction shows that the fasting technique is effective in end product improvement of large yellow croaker. However, considering flesh protein loss and the subsequent oxidative stress, the fasting technique should be used with precautions.

Keywords: Large yellow croaker; *Pseudosciaena crocea*; Fasting; Meat quality; Antioxidant defenses

V. Sante-Lhoutellier, E. Engel, Ph. Gatellier, Assessment of the influence of diet on lamb meat oxidation, *Food Chemistry*, Volume 109, Issue 3, 1 August 2008, Pages 573-579, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.11.081.

(<http://www.sciencedirect.com/science/article/B6T6R-4RKTNGK-3/2/b6c27636cbb973135ae2c1736b71ab4b>)

Abstract:

The effect of pasture- or concentrate-diet on colour stability, lipid oxidation and protein oxidation was measured in lamb meat (*M. longissimus dorsi*) during refrigerated storage of 7 days under gas permeable film. Lipid and protein oxidation increased rapidly with storage time while evolution of colour parameters exhibited a biphasic curve. Diet had an important effect on lipid oxidation where animals fed concentrate showed higher thiobarbituric reactive substance (TBARS) levels than animals fed pasture-diet. However the nature of diet did not affect protein oxidation or colour parameters of meat. In parallel anti-oxidant status of meat was estimated by measurement of vitamin E content and anti-oxidant enzyme activities while pro-oxidant status was evaluated by haeminic iron, polyunsaturated fatty acid (PUFAs) and glycogen content of muscle. Statistical analysis was performed in order to relate oxidation parameters to pro- and anti-oxidant status of muscle.

Keywords: Lamb; Meat; Diet; Colour; Lipid oxidation; Protein oxidation

Elisabete Aparecida Martins, Pedro Manuel Leal Germano, Microbiological indicators for the assessment of performance in the hazard analysis and critical control points (HACCP) system in meat lasagna production, *Food Control*, Volume 19, Issue 8, August 2008, Pages 764-771, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.08.001.

(<http://www.sciencedirect.com/science/article/B6T6S-4PCXGDK-1/2/474f010c83245971b036444160e1ecd7>)

Abstract:

The HACCP system is being increasingly used to ensure food safety. This study investigated the validation of the control measures technique in order to establish performance indicators of this HACCP system in the manufacturing process of Lasagna Bolognese (meat lasagna). Samples were collected along the manufacturing process as a whole, before and after the CCPs. The following microorganism's indicator (MIs) was assessed: total mesophile and faecal coliform counts. The same MIs were analyzed in the final product, as well as, the microbiological standards required by the current legislation. A significant reduction in the total mesophile count was observed after cooking ($p < 0.001$). After storage, there was a numerical, however non-significant change in the MI count. Faecal coliform counts were also significantly reduced ($p < 0.001$) after cooking. We were able to demonstrate that the HACCP system allowed us to meet the standards set by both, the company and the Brazilian regulations, proved by the reduction in the established indicators.

Keywords: HACCP; Validation; Control measure; Verification; Microbiological indicators

A.M. Herrero, P. Carmona, S. Cofrades, F. Jimenez-Colmenero, Raman spectroscopic determination of structural changes in meat batters upon soy protein addition and heat treatment, *Food Research International*, Volume 41, Issue 7, August 2008, Pages 765-772, ISSN 0963-9969, DOI: 10.1016/j.foodres.2008.06.001.

(<http://www.sciencedirect.com/science/article/B6T6V-4SSG4SK-2/2/f1c115f32695d7595de951775a55992b>)

Abstract:

This article reports an assessment of the potential of Raman spectroscopy for determination of structural changes in meat batter with and without soy protein isolate (SPI) upon heating. It also reports proximate composition, water binding and texture analyses. Various meat batters were made up for this purpose: a control meat batter and meat batters with 3% and 6% SPI with and

without thermal treatment (70 [degree sign]C/30 min). Results showed an increase ($P < 0.05$) in penetration force, hardness and chewiness upon heating. In heated samples, increases ($P < 0.05$) in hardness and chewiness were observed as a result of SPI addition. Just in heated meat batter with added SPI, Raman spectroscopy analysis revealed decrease ($P < 0.05$) in [alpha]-helix accompanied by an increase ($P < 0.05$) in [beta]-sheet structures after heating. Significant correlations were found between these secondary structural changes in meat proteins and water binding and textural properties of the meat batters.

Keywords: Meat batter; Soy protein; Thermal treatment; Raman spectroscopy; Texture

Sanjay Sarang, Sudhir K. Sastry, Lynn Knipe, Electrical conductivity of fruits and meats during ohmic heating, *Journal of Food Engineering*, Volume 87, Issue 3, August 2008, Pages 351-356, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.12.012.

(<http://www.sciencedirect.com/science/article/B6T8J-4RPKYG5-1/2/f8078e311d9988f6a7a04c5e2a829479>)

Abstract:

The design of effective ohmic heaters depends on the electrical conductivity of foods. Electrical conductivities of six different fresh fruits (red apple, golden apple, peach, pear, pineapple and strawberry) and several different cuts of three types of meat (chicken, pork and beef) were determined from room temperature through to the sterilization temperature range (25-140 [degree sign]C). In all cases, conductivities increased linearly with temperature. In general, fruits were less conductive than meat samples. Within fruits, peach and strawberry were more conductive than apples, pear, and pineapple. Conductivity measurements of meat cuts showed that lean is much more conductive than fat. The fat content of all lean muscle cuts was measured, and no strong relationship was observed between the electrical conductivity and the fat content of lean muscle.

Keywords: Ohmic heating; Electrical conductivity; Solids; Fruit; Meat; Fat

E.S. Toohey, D.L. Hopkins, D.F. Stanley, S.G. Nielsen, The impact of new generation pre-dressing medium-voltage electrical stimulation on tenderness and colour stability in lamb meat, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 683-691, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.036.

(<http://www.sciencedirect.com/science/article/B6T9G-4R335JT-2/2/9e8acfae81a8b80cb85e07b2b8c67b41>)

Abstract:

Previous work identified that a large number of domestic lamb carcasses processed in Australia do not meet the recommended pH/temperature window during chilling. New medium voltage electrical stimulation technology has been developed to alleviate this problem. This study used an optimised setting (800 mA with a pulse width 0.5 ms) to evaluate the effects on meat quality with a focus on tenderness and meat colour. In total 40 (electrically stimulated) and 40 (non electrically stimulated) lambs from 11 lots killed over 2 days were evaluated. There was a significant difference ($P < 0.05$) between stimulation treatments for initial pH, rate of pH decline and the predicted temperature at pH 6.0. There was also a large difference in the number of carcasses that met the recommended window (pH of 6.0, between 18 and 25 [degree sign]C), with an average 67.5% of stimulated carcasses and 25% of unstimulated carcasses meeting or falling just above the recommended window. The stimulation treatment had no significant ($P > 0.05$) effect on sarcomere length or myofibrillar fragmentation index (MFI) of the m. longissimus (LL). After 1 day of ageing LL samples from stimulated carcasses had a significantly lower ($P < 0.05$) shear force than non stimulated samples, but there was no difference between stimulation treatments after 5 days ageing. However, ageing period did have a significant effect ($P < 0.001$) on both MFI and shear force, such that 5 days aged product had higher MFI and lower shear force values. There were minimal effects of stimulation on colour stability.

Keywords: Medium voltage; Electrical stimulation; Lamb; Meat quality

N. Prieto, S. Andres, F.J. Giraldez, A.R. Mantecon, P. Lavin, Ability of near infrared reflectance spectroscopy (NIRS) to estimate physical parameters of adult steers (oxen) and young cattle meat samples, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 692-699, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.035.

(<http://www.sciencedirect.com/science/article/B6T9G-4R335JT-3/2/f8feb188b2dc883e126f33b7dc6b8195>)

Abstract:

The potential of NIRS-based models to predict several physical parameters of oxen and young cattle beef protected by a quality mark was evaluated. Fifty-three and 67 samples of *Longissimus thoracis* muscle corresponding to oxen and young cattle reared in extensive conditions were analyzed for pH, colour (L^* , a^* , b^*), water holding capacity (WHC) and Warner-Braztler shear force (WBSF), according to the conventional methods. Several factors which might have jeopardized the prediction of pH, a^* , WHC and WBSF by NIRS are considered in the discussion section. However, the best NIR calibrations, tested by full cross-validation, were for L^* ($R^2 = 0.869$; $SECV = 1.56$) and b^* ($R^2 = 0.901$; $SECV = 1.08$) colour parameters in meat samples from young cattle. It can be concluded that NIRS could be a useful tool for estimating the colour of young cattle meat samples, primary consideration for consumers when making purchasing decisions.

Keywords: Beef; Meat; Physical parameters; NIRS

K.W. Farag, J.G. Lyng, D.J. Morgan, D.A. Cronin, Dielectric and thermophysical properties of different beef meat blends over a temperature range of -18 to +10 [degree sign]C, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 740-747, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4R68NM8-3/2/144f33f71882f1d3bd62949794eab1f>)

Abstract:

Dielectric and thermophysical properties of three different beef meat blends (lean, fat and 50:50 mixture) were evaluated over a range of temperatures from -18 to +10 [degree sign]C. In the region of thawing (-3 to -1 [degree sign]C), dielectric constant ($[\epsilon']$) and dielectric loss factor ($[\epsilon'']$) values for radio frequency (RF) and microwave (MW) were significantly higher ($P < 0.05$) than at other measured temperatures for the three blends. In the same region, thermal conductivity (k), specific heat (c) and thermal diffusivity ($[\alpha]$) also showed significant changes ($P < 0.05$). k and $[\alpha]$ values were significantly lower, while c values were significantly higher in this region than at other measured temperatures for the three blends. RF (27.12 MHz) vs. MW (896 and 2450 MHz) frequencies had an important effect ($P < 0.05$) on the measured dielectric properties of the beef meat blends, with a general tendency towards higher values at the RF frequency. Finally, composition significantly influenced ($P < 0.05$) the measured dielectric and thermophysical properties at all temperatures used. These data are of potential value to food technologists in the context of rapid defrosting of meat products.

Keywords: Dielectric properties; Thermal properties; Radio frequency; Microwave; Frozen beef

Sing K. Ng, Paul Ainsworth, Andrew Plunkett, Arthur D. Haigh, Andrew A.P. Gibson, Graham Parkinson, George Jacobs, Determination of added fat in meat paste using microwave and millimetre wave techniques, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 748-756, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4R68NM8-4/2/6b813a238001615a52b23455f56cf5e5>)

Abstract:

By evaluating the sensitivity of measurement parameters such as dielectric constant and microwave loss to fat content, several microwave and millimetre methods were compared to

identify optimal frequency measurement bands. The results showed that the optimum frequency range lay between 8 and 20 GHz where these parameters vary linearly, by up to a factor of 8, as fat is increased to 50% volume. A narrowband waveguide sensor cell was designed and constructed for this optimum range. The imaginary part ($[\epsilon]''$) of the complex permittivity demonstrated a better measurements resolution for determining fat content than the real part ($[\epsilon]'$). The waveguide method has excellent repeatability as indicated by low relative standard deviation (RSD < 4.88%). Temperature and sample density had minimal impact on the accuracy, repeatability and robustness of the final measurement system. A method of mixtures model for complex permittivity was shown to be a useful predictor of fat content.

Keywords: Coaxial probe; Dielectric characterization; Fat content; Meat; Permittivity measurement; Transmission line

S. Cofrades, I. Lopez-Lopez, M.T. Solas, L. Bravo, F. Jimenez-Colmenero, Influence of different types and proportions of added edible seaweeds on characteristics of low-salt gel/emulsion meat systems, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 767-776, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4R6B2TC-1/2/01fecad1142e7d46f506d272503622b2>)

Abstract:

The effects of three different types of edible seaweeds, Sea Spaghetti (*Himanthalia elongata*), Wakame (*Undaria pinnatifida*), and Nori (*Porphyra umbilicalis*) added at two concentrations (2.5% and 5% dry matter) on the physicochemical and morphological characteristics of gel/emulsion systems were evaluated. The addition of seaweeds improved ($P < 0.05$) water- and fat-binding properties except in the case of Nori added at 2.5%. Hardness and chewiness of the cooked products with added seaweed were higher ($P < 0.05$), and springiness and cohesiveness were lower ($P < 0.05$) than in control samples. Colour changes in meat systems were affected by the type of seaweed. The morphology of sample differed depending on the type of seaweed added, and this is the result of differences in physical and chemical characteristic of the seaweed powder used. In general, products formulated with the brown seaweeds (Sea Spaghetti and Wakame) exhibited similar behaviour, different from that of products made with the red seaweed Nori.

Keywords: Gel/emulsions meat systems; Seaweeds; Dietary fibre; Binding properties; Texture

Veronique Sante-Lhoutellier, Erwan Engel, Laurent Aubry, Philippe Gatellier, Effect of animal (lamb) diet and meat storage on myofibrillar protein oxidation and in vitro digestibility, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 777-783, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4R6B2TC-4/2/2c283b6946a8f4e00d209a879677044a>)

Abstract:

Effect of pasture- or concentrate-diet on myofibrillar protein oxidation and in vitro digestibility was measured in lamb meat (*M. longissimus dorsi*) during a refrigerated storage of 7 days under gas permeable film. Protein oxidation was measured by the carbonyl content determined chemically using 2,4-dinitrophenylhydrazine (DNPH) and specific targets of oxidation were identified by immunoblotting. Carbonyl content significantly increased during storage and diet affected protein oxidation where animals fed concentrate showed higher carbonyl group levels than animals fed pasture. To evaluate effect of diet and storage time on protein digestibility, myofibrillar proteins were exposed to proteases of the digestive tract (pepsin, and a mixture of trypsin and $[\alpha]$ -chymotrypsin) in conditions of pH and temperature which mimic digestive process. The myofibrillar protein digestibility was not influenced by the diet. Storage time had no significant effect on myofibrillar protein susceptibility to pepsin while an important increase in digestibility by trypsin and $[\alpha]$ -chymotrypsin was detected during storage.

Keywords: Lamb meat; Myofibrillar proteins; Storage; Diet; Protein oxidation; Immunoblotting; Digestibility

E.M.C. Terlouw, P. Rybarczyk, Explaining and predicting differences in meat quality through stress reactions at slaughter: The case of Large White and Duroc pigs, *Meat Science*, Volume 79, Issue 4, August 2008, Pages 795-805, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.11.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4R6B2TC-2/2/6a12b006c804977a50b804a647458df6>)

Abstract:

Large White and Duroc pigs (n = 42) were group-reared on straw. Durocs were more active in the home pens and had higher basal urinary cortisol levels. During tests, Durocs touched more often an unfamiliar human, but not an unfamiliar object, than Large Whites. Pigs were experimentally (low stress) or industrially (high stress) slaughtered. Meat (Longissimus lumborum (LL), Biceps femoris (BF), Adductor femoris (AF) and Semimembranosus (SM)) was darker, more yellow, had higher ultimate pH and better water holding capacity after high, compared to low-stress slaughter. Large White meat contained less pre-slaughter glycogen, was redder and lost more drip. Slaughter conditions influenced ultimate pH of Large White more than of Duroc meat. Large Whites, and to a lesser extent Durocs, touching the human less often during the test, had faster early post-mortem LL and BF muscle metabolism. Pigs exploring the unfamiliar object more often were more aggressive during pre-slaughter mixing and had higher AF and SM ultimate pH.

Keywords: Aggression; Handling; Meat quality; Pigs; Slaughter; Stress factors

Maria Teresa Osorio, Jose Maria Zumalacarre, Enrique Alfonso Cabeza, Ana Figueira, Javier Mateo, Effect of rearing system on some meat quality traits and volatile compounds of suckling lamb meat, *Small Ruminant Research*, Volume 78, Issues 1-3, August 2008, Pages 1-12, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.03.015.

(<http://www.sciencedirect.com/science/article/B6TC5-4SJ9G9S-1/2/28484183e16390a65127a5e24267270d>)

Abstract:

Twenty Churra-breed suckling lamb carcasses from two groups of animals were used in this study. One group had been reared on maternal milk (MM), and the other had been reared on milk replacer (MR) until slaughter at 25-35 days old. The effects of the type of milk on several meat quality traits were studied. These effects included pH, colour, WHC, texture, retinol and tocopherol concentrations, colour and lipid oxidation stability, and the volatile compounds that formed during boiling of the meat. Furthermore, a sensory analysis (triangle test) was carried out. The colour of *M. longissimus dorsi* of MM samples showed higher L*, lower a*, and higher b* values than those of MR samples (P < 0.05). Retinol, [alpha]-, [delta]- and [gamma]-tocopherol levels were all higher in the meat of lambs reared on MM (P < 0.001). Rancimat tests and TBARS analysis revealed more lipid-oxidative stability for the meat of the MR group, and the colour of meat from this group was also more stable. Likewise, volatile compounds derived from lipid oxidation were more abundant in the MM samples than in the MR group samples. The presence of volatiles attributed to non-oxidative lipid thermal degradation also differed between the two rearing systems, with concentrations of volatiles derived from dodecanoic acid being clearly higher for the MR meat samples. Residues of butylated hydroxytoluene (BHT) were detected in MR samples but not in the samples of the MM treatment. In the triangle test, an untrained panel could not detect a significant difference between MM and MR meat samples. The present study has demonstrated that variation in the composition of milk sources (MM vs. EM) used in rearing suckling lambs may be responsible for a significant effect in oxidative stability of fresh suckling lamb meat during storage and display and in the volatile composition of cooked suckling lamb meat. Thus, meat from MR-fed suckling lambs may become more stable to oxidation compared to meat from MM-fed suckling lambs. MR-

reared meat may, however, have a different flavour from what is expected from the more traditional MM-fed suckling lamb meat.

Keywords: Suckling lamb; Milk replacer; Meat quality; Volatile compounds; Lipid oxidation stability; Colour deterioration

K.M. Gadiyaram, G. Kannan, T.D. Pringle, B. Kouakou, K.W. McMillin, Y.W. Park, Effects of postmortem carcass electrical stimulation on goat meat quality characteristics, *Small Ruminant Research*, Volume 78, Issues 1-3, August 2008, Pages 106-114, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.05.013.

(<http://www.sciencedirect.com/science/article/B6TC5-4T0FHTB-1/2/71e44dbf8196e548ee3f0b532057a764>)

Abstract:

Electrical stimulation (ES) has been reported to improve meat quality, but the effects of postmortem ES have not been fully characterized in goats. This experiment was conducted to determine the effects of postmortem ES on meat quality in two breeds of goats. Uncastrated Spanish and crossbreds (Boer x Spanish females x Kiko male) yearlings ($n = 10/\text{breed}$, body weight 31.2 ± 2.43 kg) were transported to the slaughter facility, held overnight in pens without feed, and slaughtered on two different days. Immediately after slaughter each carcass was split into two halves along the vertebral column. The left half was subjected to a high voltage ES (580 V) at 5 s intervals during 120 s (treatment) and the right half was kept as a non-stimulated control. After 24 h of cooler storage ($2 \pm 1^\circ\text{C}$), the carcasses were fabricated into 2.5 cm-thick loin/rib chops. Longissimus dorsi (LD) muscle pH and temperatures were recorded at 0, 1, 2, 3, 4, 5, 6, 9, 12, 15, 18, and 24 h postmortem. The pH values of LD muscle were lower in stimulated sides than control sides ($P < 0.01$), and pH decreased quadratically ($P < 0.01$) with advancing time during the 24 h postmortem period. Treatment had no significant effect on the LD muscle temperature, and the temperature decline followed a cubic pattern ($P < 0.01$) during the 24 h postmortem period. Muscle glycogen concentrations immediately after electrical stimulation (0 h) were lower ($P < 0.05$) in the stimulated sides compared to control sides. Warner-Bratzler shear force (WBSF) values of loin chops were lower ($P < 0.01$) in stimulated sides (3.0 kg) compared to control sides (4.2 kg), and the chops from Spanish goats (3.9 kg) had higher ($P < 0.05$) WBSF values compared with crossbreds (3.3 kg). Color values (L^* , a^* , b^* , chroma, and hue angle) and sarcomere length were not affected by ES or breed. Heated calpastatin activities were not influenced by ES, but the activities were lower at day 4 compared with day 1 of aging ($P < 0.05$). There were no significant effects ($P > 0.05$) of ES or aging time on selected myofibrillar protein concentrations (myosin heavy chain, myomesin, desmin, actin, troponin-T, and myosin light chain, $P > 0.05$). However, desmin concentration tended to decrease at day 4 of aging ($P = 0.08$). The results indicate that ES significantly accelerated postmortem glycolysis and improved tenderness of loin chops, as indicated by WBSF values.

Keywords: Goat; Postmortem Electrical stimulation; Meat tenderness; Sarcomere length; Calpastatin activity

R. Marino, M. Albenzio, G. Annicchiarico, M. Caroprese, A. Muscio, A. Santillo, A. Sevi, Influence of genotype and slaughtering age on meat from Altamurana and Trimeticcio lambs, *Small Ruminant Research*, Volume 78, Issues 1-3, August 2008, Pages 144-151, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.06.002.

(<http://www.sciencedirect.com/science/article/B6TC5-4T1SFMY-2/2/d1df18aa4de602899ead02b6c9da665c>)

Abstract:

The effect of genotype and age at slaughter (42 days vs. 70 days) on growth, carcass measurements and meat quality were evaluated in 40 Altamurana and Trimeticcio lambs. Meat quality (as defined by chemical and nutritional composition) were measured on two different

muscles (longissimus dorsi, LD, semimembranosus, SM). Trimeticcio lambs were heavier at birth ($P < 0.01$) and had higher daily gains than Altamurana animals during the 0-42 days period, whereas no differences in growth rate were found during the 0-70 days period. Carcass measurements pointed out that Trimeticcio lambs had higher width of chest and width of pelvis and gave meat with more muscle and less bone than Altamurana lambs. Protein content was significantly higher in meat from Altamurana than from Trimeticcio lambs. The fat content of SM muscle was significantly higher in Trimeticcio than in Altamurana. The earlier slaughtering age produced an improvement in fatty acid composition with a lower percentage of total saturated fatty acids and higher amount of total polyunsaturated fatty acids. In addition, meat from younger lambs displayed lower thrombogenic index and $[\omega\text{-}6]/[\omega\text{-}3]$ ratio and higher PUFA/SFA ratio than meat from lambs slaughtered at 70 days.

Keywords: Lambs; Slaughtering age; Carcass composition; Meat quality; Fatty acid composition

El Akrem Hayouni, Imed Chraief, Manaf Abedrabba, Marielle Bouix, Jean-Yves Leveau, Hammami Mohammed, Moktar Hamdi, Tunisian *Salvia officinalis* L. and *Schinus molle* L. essential oils: Their chemical compositions and their preservative effects against *Salmonella* inoculated in minced beef meat, *International Journal of Food Microbiology*, Volume 125, Issue 3, 31 July 2008, Pages 242-251, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.04.005.

(<http://www.sciencedirect.com/science/article/B6T7K-4SB7TR7-1/2/9ea44699b23f21adf78b82bd9d0092d5>)

Abstract:

The essential oils (EOs) extracted from the aerial parts of cultivated *Salvia officinalis* L. and the berries of *Schinus molle* L. were analysed by gas chromatography-mass spectrometry (GC-MS) and 68 and 67 constituents were identified, respectively. The major constituents were 1,8-cineole (33.27%), $[\beta\text{-}]\text{thujone}$ (18.40%), $[\alpha\text{-}]\text{thujone}$ (13.45%), borneol (7.39%) in *S. officinalis* oil and $[\alpha\text{-}]\text{phellandrene}$ (35.86%), $[\beta\text{-}]\text{phellandrene}$ (29.3%), $[\beta\text{-}]\text{pinene}$ (15.68%), p-cymene (5.43%) and $[\alpha\text{-}]\text{pinene}$ (5.22%) in *S. molle* oil.

In its second part, the present study was conducted to evaluate the *in vitro* antimicrobial activity of both studied EOs. For this purpose, paper disc-diffusion method and broth microdilution test were used. The disc-diffusion method showed significant zone of lysis against all the pathogens studied (gram-negative and gram-positive bacteria, yeast). These activities remained stable after six months, and decreased approximately by 20% after one year of storage of the EOs at 4 to 7 $[\text{degree sign}]\text{C}$. On comparing the efficiency of both EOs, *S. officinalis* EO exhibited higher antibacterial activity against the majority of strains and especially against *Candida albicans* (two fold more active according to the inhibition zones values). The minimal inhibitory concentrations (MICs) were reported between 4.5 mg/ml and 72 mg/ml on nutrient broth. The particular chemotype of each EO may be involved in its specific antimicrobial behaviour.

Furthermore, the inhibitory effect of these EOs were evaluated against two foodborne pathogens belonging to *Salmonella* genus, experimentally inoculated (103 CFU/g) in minced beef meat, which was mixed with different concentrations of the EO and stored at 4 to 7 $[\text{degree sign}]\text{C}$ for 15 days. Although the antibacterial activities of both EOs in minced beef meat were clearly evident, their addition had notable effects on the flavour and taste of the meat at concentrations more than 2% for *S. molle* and 1.5% for *S. officinalis*. One solution to the above-mentioned problem may be the use of combinations of different food preservation systems. In this context, each of the EOs has been used along with low water activity (addition of NaCl) in addition to low refrigeration temperatures. Results on the *Salmonella* growth showed that some combinations could be recommended to eliminate germs from minced raw beef. By using this method, a stable and, from a microbiological point of view, safe meat can be produced without substantial loss in sensory quality.

Results obtained herein, may suggest that the EOs of *S. officinalis* and *S. molle* possess antimicrobial activity, and therefore, they can be used in biotechnological fields as natural preservative ingredients in food and/or pharmaceutical industry.

Keywords: Essential oils; *Salvia officinalis* L.; *Schinus molle* L.; Antimicrobial activity; GC-MS; Minced beef meat; Salmonella; Sodium chloride

S.R. Baxter, D.I. Skonberg, Gelation properties of previously cooked minced meat from Jonah crab (*Cancer borealis*) as affected by washing treatment and salt concentration, *Food Chemistry*, Volume 109, Issue 2, 15 July 2008, Pages 332-339, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.12.044.

(<http://www.sciencedirect.com/science/article/B6T6R-4RF45D6-B/2/730219c5528e27b2d6073135b6c40216>)

Abstract:

The influence of washing treatment (dewatered only, one wash, and three washes) and sodium chloride (NaCl) concentration (0%, 2%, and 4%) on the gelation properties of crab mince was investigated. This previously cooked muscle mince is a low-value by-product of the crab processing industry, considered to have little or no functional properties. Crab mince gels were produced and tested for water-holding capacity (WHC), gel strength, colour, and electrophoretic profile. Wash treatment and NaCl concentration significantly affected gelation. Washed samples exhibited significantly higher WHC than dewatered samples. The 4% NaCl treatment decreased WHC compared to lower NaCl levels. Multiple washing steps increased the force to gel deformation. Wash treatment and NaCl concentration also affected the colour of gels. Based on these results, cooked crab meat mince treated with three washes and 0% NaCl resulted in the strongest gels with the best water-holding capacity, which can be used in the development of value-added products.

Keywords: Jonah crab; Surimi; Thermal gelation; Denatured proteins

A.M. Herrero, M.I. Cambero, J.A. Ordonez, L. de la Hoz, P. Carmona, Raman spectroscopy study of the structural effect of microbial transglutaminase on meat systems and its relationship with textural characteristics, *Food Chemistry*, Volume 109, Issue 1, 1 July 2008, Pages 25-32, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.12.003.

(<http://www.sciencedirect.com/science/article/B6T6R-4R9Y786-1/2/5206b23d53ee018d77e58c70f64a6ba2>)

Abstract:

Raman spectroscopy and texture analysis (TPA) studies were carried out to determine the effect of adding different levels of microbial transglutaminase (MTGase) to meat systems. This addition produced a significant ($p < 0.05$) increase in hardness, springiness and cohesiveness in the meat systems. Raman spectroscopy analysis revealed the occurrence of secondary structural changes in meat proteins due to MTGase. Modifications in the amide I (1650-1680 cm^{-1}) and amide III (1200-1300 cm^{-1}) regions indicated a significant ($p < 0.05$) decrease in $[\alpha]$ -helix content, accompanied by a significant ($p < 0.05$) increase in $[\beta]$ -sheets and turns due to the addition of the enzyme to meat systems. Significant ($p < 0.05$) correlations were found between these secondary structural changes in meat proteins and the textural properties (hardness, adhesiveness, springiness and cohesiveness) of meat systems.

Keywords: Meat systems; Microbial transglutaminase; Texture profile analysis; Raman spectroscopy

M.K. Fasseas, K.C. Mountzouris, P.A. Tarantilis, M. Polissiou, G. Zervas, Erratum to 'Antioxidant activity in meat treated with oregano and sage essential oils' [*Food Chem.* 106 (3) (2008) 1188-1194], *Food Chemistry*, Volume 109, Issue 1, 1 July 2008, Page 173, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.11.068.

(<http://www.sciencedirect.com/science/article/B6T6R-4R8MDX9-8/2/93546c92905ad59166a05f6bde3ed5d3>)

Urszula Blaszczyk, Beata Janoszka, Analysis of azaarenes in pan fried meat and its gravy by liquid chromatography with fluorescence detection, *Food Chemistry*, Volume 109, Issue 1, 1 July 2008, Pages 235-242, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.12.038.

(<http://www.sciencedirect.com/science/article/B6T6R-4RPVJ8F-1/2/7261214da29d8a114829d2d686366c5b>)

Abstract:

A method for analysis of six azaarenes (benzo[h]quinoline, benzo[a]acridine, benzo[c]acridine, dibenzo[a,c]acridine, dibenzo[a,j]acridine and dibenzo[a,h]acridine) in thermally treated high-protein food has been described. The clean-up procedure used based on alkaline hydrolysis, tandem solid phase extraction on columns filled with Extrelut - diatomaceous earth and cation exchanger (propyl sulfonic acid), enabled a selective isolation of carcinogenic compounds belonging to benzoacridines and dibenzoacridines from samples of cooked meat and its gravy. The isolated fractions of aza-PAHs were analysed by high-performance liquid chromatography with fluorescence detection. The detection limits for the azaarenes were between 0.0001 ng and 0.005 ng loaded on column. The recoveries for the four-ring and five-ring azaarenes were from 55% to 67%. Two types of dishes prepared from pork by pan-frying were investigated. Total contents of the benzoacridines and dibenzoacridines determined in cooked meat were 1.57 and 2.50 ng/g in collar and chop samples, respectively; their gravies contained 0.34 and 0.59 ng of these azaarenes per g of cooked meat.

Keywords: Food analysis; Azaarenes; SPE; HPLC

V.A.C. Santos, J.A. Silva, A.M.D. Silvestre, S.R. Silva, J.M.T. Azevedo, The use of multivariate analysis to characterize carcass and meat quality of goat kids protected by the PGI 'Cabrito de Barroso', *Livestock Science*, Volume 116, Issues 1-3, July 2008, Pages 70-81, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.08.016.

(<http://www.sciencedirect.com/science/article/B7XNX-4PS5KFB-2/2/3f02322e0a4939b921cbe5f42f981940>)

Abstract:

Fifty five suckling kids from three genotypes and two sexes protected by the PGI 'Cabrito de Barroso' European quality label were used in this experiment. Carcass quality was assessed using indices from carcass measurements, dressing percentages, refrigerated losses, higher priced joints proportion and tissue composition of the carcass. Meat pH, colour, total pigment, fat, dry matter, collagen determinations (total and soluble), cooking losses and shear force estimated in longissimus thoracis et lumborum (LTL) and gluteobiceps (GB) muscles were used to characterize meat quality. Principal component (PC) analysis was performed in order to examine carcass quality traits (n = 16) and meat quality (n = 16) traits. The five first principal components (PCs) explained about 86% of the total variability for carcass quality and 75% of the total variability for meat quality. Compactness indices of carcass and leg, carcass weight and subcutaneous fat were the most effective variables for the PC1, whereas the higher priced joints proportion, muscle proportions of the higher priced joints and of the carcass and the muscle and bone ratio were useful to define the PC2. The first PC of the meat quality parameters was characterized by colour traits (L*, b*, a*, C*, H* and total pigment) whereas collagen determinations (total collagen and collagen solubility) defined the second PC. When the carcass quality data were projected on the plane defined by the first two PCs, two separate groups of points appeared, corresponding to the animals with slaughter live weight higher or lower than 10 kg. The distribution of the meat quality data on the plane defined by the first two PCs allowed the identification of two separate groups, corresponding to the muscles GB and LTL. The differences between genotypes tend to be small

and related to slaughter live weight, which implies certain constancy in carcass and meat quality of the PGI 'Cabrito de Barroso'.

Keywords: Goat kids; Principal component analysis; Carcass; Meat quality

A.B. Rodriguez, R. Bodas, N. Prieto, R. Landa, A.R. Mantecon, F.J. Giraldez, Effect of sex and feeding system on feed intake, growth, and meat and carcass characteristics of fattening Assaf lambs, *Livestock Science*, Volume 116, Issues 1-3, July 2008, Pages 118-125, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.09.016.

(<http://www.sciencedirect.com/science/article/B7XNX-4R05VFK-1/2/26b9362f38d313e159708ac4f849d5de>)

Abstract:

The effect of feeding system and sex on intake, growth and carcass and meat characteristics of Assaf fattening lambs was studied. Twenty four weaned Assaf lambs, half males and half females were used. After an adaptation period, lambs were randomly assigned to one of the two feeding systems studied. Control lambs received ad libitum commercial concentrate (70% barley, 22% soybean meal, 4.8% wheat, 0.5% bicarbonate, 2.7% mineral-vitamin premix) and barley straw. Free Choice lambs had ad libitum and separate access to whole barley grain and a protein supplement (73.3% soybean meal, 16% wheat, 1.7% bicarbonate, 9% mineral-vitamin premix). Lambs were slaughtered at 25 kg LBW. Feed intake was not significantly affected by sex ($P > 0.05$) but Free Choice lambs showed higher dry matter intake than the Control lambs. Nevertheless, only males from the Free Choice group showed an improvement in feed efficiency rate ($P < 0.05$) and average daily gain ($P < 0.01$) relating to the Control lambs. Neither feeding system nor feeding system x sex interaction significantly affected non-carcass weight, fat depots, cold carcass weight, dressing percentage, main proportions of commercial cuts and meat characteristics ($P < 0.05$). As it was expected, female lambs showed a lower average daily gain and a higher feed conversion efficiency than male lambs ($P < 0.001$) which was related to a greater fat deposition. Meat characteristics were unaffected by sex, with the exception of longissimus lumborum fat content, which was higher in female lambs.

The present results suggest that Free Choice feeding system might be suitable for intensively reared male lambs since improvements in daily weight gain and feed conversion rate were achieved, with no adverse effect on carcass and meat quality. Despite the selected diet of both, males and females, did not differ in the crude protein content, the use of Free Choice feeding system for female lambs did not improve performance compared to the Control group.

Keywords: Whole barley grain; Free Choice intensively reared lambs; Carcass; Meat

Howard J Swatland, Meat research in Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Page 407, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4PYJSHG-7/2/1dce7b3cc6eb1d47f805ff09eba3da34>)

J.O. Azcona, P.T. Garcia, M.E. Cossu, B.F. Iglesias, A. Picallo, C. Perez, C.I. Gallinger, M.J. Schang, Z.E. Canet, Meat quality of Argentinean 'Camperos' chicken enhanced in omega-3 and omega-9 fatty acids, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 437-443, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4RC2NV0-2/2/3e380f51060ad25662124c0fc50aa6e0>)

Abstract:

Five diets were assessed with the aim of increasing oleic fatty acid and omega-3 polyunsaturated fatty acid content in 'campero' poultry meat and evaluating their influence on sensory attributes. Animals from treatment 1 (T1) were confined and fed with corn/soybean diet; in T2, animals were

fed with a corn/soybean mix with free access to pasture; T3 diet had high oleic sunflower seeds (HOSS) and linseeds with access to pasture; T4 diet was similar to T2 with free access to chicory instead of pasture and T5 diet was similar to T3 with free access to chicory instead of pasture. Linseeds and HOSS supplementation significantly increased the fatty acids profile, regardless of forage supply. T3 MUFA content was significantly higher than in the other treatments. Due to the high presence of omega-3 PUFA in linseeds and HOSS treatments (T3 and T5), meat omega-6/omega-3 ratio decreased from 9 to 4. The presence of off-flavours was not influenced by diets but there was an interaction between portion and storage conditions. 'Poultry meat' aroma was only influenced by the storage conditions, being slight after 4 months of freezing, while presence of off-aromas was affected by diets. We conclude that it is possible to produce 'campero' poultry meat with enhanced omega-3 and omega-9 content and a low omega-6/omega-3 ratio using diets based on linseed and HOSS, without any important change in sensory properties.

Keywords: Camperos poultry meat; Argentina; Omega-3; Omega-9; Sensory quality

M.R. Lloveras, P.R. Goenaga, M. Irurueta, F. Carduza, G. Grigioni, P.T. Garcia, A. Amendola, Meat quality traits of commercial hybrid pigs in Argentina, Meat Science, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 458-462, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.033.

(<http://www.sciencedirect.com/science/article/B6T9G-4R2H7YM-2/2/63d4de533f314766960cf3373d7a34d2>)

Abstract:

This report describes the meat quality of two INTA hybrids (hybrid females) sired by Duroc (D) or Yorkshire (Y) boars and a third one from PIC (S), a cross of females C22 to 412 boars. Starting at 30 kg live weight, 18 barrows and 18 gilts of each genotype were kept in identical conditions until slaughtered at 110 kg. Longissimus dorsi muscles were analyzed. Means differed significantly ($P < 0.05$) for drip loss (higher in S); tenderness (more tender in D), water holding capacity (higher in Y); cooking loss (higher in Y); colour parameter L^* (lower in D) and b^* (higher in S) and intramuscular fat content (higher in D). As a result of sensory analysis, it was found that D was the most tender and juicy. There were few sex effects and no genotype-sex interactions. Distinct differences in meat quality between hybrids do exist, with D superior, S the worst, and Y intermediate.

Keywords: Pig; Pork; Meat quality; Genotypes; Argentina

P. Castellano, C. Belfiore, S. Fadda, G. Vignolo, A review of bacteriocinogenic lactic acid bacteria used as bioprotective cultures in fresh meat produced in Argentina, Meat Science, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 483-499, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4PYJSHG-6/2/0cba69ac302e14ea5a07056da4e69c34>)

Abstract:

Several lactic acid bacteria (LAB) associated with meat products are important natural bacteriocin producers. Bacteriocins are proteinaceous antagonistic substances that are important in the control of spoilage and pathogenic microorganisms. The use of LAB as bioprotective cultures to extend the shelf life of fresh meat can improve microbial stability and safety in commercial meat preservation. *Lactobacillus curvatus* CRL705 used as a protective culture in fresh beef is effective in inhibiting *Listeria innocua* and *Brochothrix thermosphacta* as well as the indigenous contaminant LAB, retaining its inhibitory effect at low temperatures and having a negligible effect on meat pH. In addition to the hurdle represented by low temperature and vacuum-packaging, the use of live cells of *Lb. curvatus* CRL705 seems more feasible from an economic point of view - and without legal restrictions - compared to the addition of purified bacteriocins. A description of meat-borne bacteriocins and their application in meat to extend shelf life is discussed.

Keywords: Lactic acid bacteria; Bacteriocins; Biopreservation; Raw meat

I. Galli, G. Teira, F. Perlo, P. Bonato, O. Tisocco, A. Monje, S. Vittone, Animal performance and meat quality in cull cows with early weaned calves in Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 521-528, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4PYJSHG-4/2/e827bcce77211d82b2ebdfcb47853748>)

Abstract:

Early weaning of calves (60 days old) is adopted in cow-calf operations for its high reproductive response. The objective of this research work was to find how age classes are related to beef quality in early weaning cull cows. Twenty four cows were grouped in four different age classes (teeth and number of calves produced) from two teeth and no calf produced, up to 12 years and 7 calves produced. All cows grazed a perennial pasture based on alfalfa and fescue. There were differences ($P < 0.05$) in final weight (younger cows being lighter) but no other differences could be found during field conditions or in abattoir data (carcass weight and yield, top value hindquarter cuts weight and carcass percent). No differences ($P > 0.05$) could be found in meat quality attributes except for moisture, protein and fat yellowness. Differences ($P < 0.05$) in sensory attributes could only be found in connective tissue.

Keywords: Cull cows; Age; Animal performance; Meat quality

Martin Irueta, Armando Cadoppi, Leandro Langman, Gabriela Grigioni, Fernando Carduza, Effect of aging on the characteristics of meat from water buffalo grown in the Delta del Parana region of Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 529-533, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4RDS475-2/2/a4201d6b05a31279d6c5e9b4daaca420>)

Abstract:

Fifteen crossbreed water buffalos were selected from a farm in Delta del Parana, Entre Rios Province, Argentina. Animals were castrated males 20-24 months old reaching final live weights of 400-420 kg. They were predominantly of Mediterranean and Murrah breeds and were feed in naturally grown pastures. Tenderness and chewiness increased with postmortem aging ($p < 0.05$). Aging did not affect flavour and odour scores, even though certain off-flavours and off-odours were reported. Changes in colour with aging were similar to those seen in beef.

Keywords: Pasture-fed buffalo; Delta del Parana; Quality traits

D.G. Pighin, A.M. Sancho, C.B. Gonzalez, Effect of salt addition on the thermal behavior of proteins of bovine meat from Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 549-556, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4RDS475-3/2/d2bca1090214baa017a0925874485980>)

Abstract:

Research was undertaken to investigate how the addition of sodium chloride (NaCl) and/or sodium tripolyphosphate (TPP) to sous vide cooked meat pieces produces an increase in water holding capacity (WHC). Semitendinosus muscles were injected to obtain tissue final concentrations of 0.70% NaCl, 0.25% TPP, 0.70% NaCl + 0.25% TPP, and 1.20% NaCl + 0.25% TPP. SDS-PAGE analysis showed increased protein solubilization in those treatments which included NaCl. Thermal analysis of whole muscles and isolated myofibrils showed the destabilizing effect of NaCl and a global stabilizing effect of TPP. Both salts together induced a destabilizing global effect, where TPP assisted NaCl in breaking the meat structure. It is suggested that the WHC increments are

related to conformational changes in myofibrillar proteins and to the weakening of myofibrillar structure by the removal of myofibrillar proteins.

Keywords: Beef; Myofibrillar proteins; Sodium chloride; Sodium tripolyphosphate; Differential scanning calorimetry

F. Perlo, P. Bonato, G. Teira, O. Tisocco, J. Vicentin, J. Pueyo, A. Mansilla, Meat quality of lambs produced in the Mesopotamia region of Argentina finished on different diets, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 576-581, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4PYJSHG-1/2/c6d9d752eccb1e77ceb76b1a87e43631>)

Abstract:

The meat quality of Corriedale lambs (40 kg live weight) produced in the Mesopotamia region (Argentina) was assessed. These lambs had different finishing diets: only native grass pasture, ground alfalfa and alfalfa-linseed pellet (70/30). Carcass yield, longissimus dorsi area, backfat thickness, marbling, pH, meat and subcutaneous fat color, cooking loss, Warner-Bratzler shear force, fat, protein and moisture content were determined. Lambs finished on alfalfa-linseed pellet had the highest carcasses yield and backfat thickness and their meat had a lighter color (higher L* value), higher marbling and tenderness than meat from lambs reared on native grass pasture. Grass-based finishing can lead to the production of leaner meat, with a more reddish color (higher a* value). The ground alfalfa finishing diet seems to be intermediate between native grass pasture and alfalfa-linseed pellet with respect to carcass yield, backfat and meat color. In addition, the animals fed on ground alfalfa showed the highest muscle area.

Keywords: Lamb; Finishing diet; Grass pasture; Alfalfa; Meat quality

A.M. Descalzo, L. Rossetti, A.M. Sancho, P.T. Garcia, A. Biolatto, F. Carduza, G.M. Grigioni, Antioxidant consumption and development of oxidation during ageing of buffalo meat produced in Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 582-588, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4R0CKMC-2/2/78add79de1b6bdc1a778934d45ca383f>)

Abstract:

Buffalo meat production is increasing in Argentina. Information on meat quality and nutritional value will be useful in marketing. This work describes the oxidative stability of the Longissimus dorsi (LD) in relation to consumption of antioxidant vitamins, fatty acid composition and color deterioration during ageing. Vitamins levels found in fresh beef were 4.22 +/- 0.93; 0.24 +/- 0.05 and 0.25 +/- 0.06 [mu]g/g for [alpha]- and [gamma]-tocopherol, and [beta]-carotene, respectively. Vitamin loss was almost 90% throughout an ageing period of 25 days at 2 [degree sign]C. Concomitantly, TBARS levels increased from 0.076 +/- 0.018 to 0.146 +/- 0.032 mg MDA/kg beef. Hexanal and pentanal levels were low and no correlations with oxidation were detected (P > 0.05). The predominant color changes in aged beef were reduced redness and yellowness with an increase in lightness (P < 0.05). Vitamin levels and TBARS were used to develop a prediction equation for post-mortem aging.

Keywords: Buffalo beef; Antioxidant vitamins; Tocopherol; Carotene; Oxidation; Fatty acids; Color

M.V. Santos, N. Zaritzky, A. Califano, Modeling heat transfer and inactivation of *Escherichia coli* O157:H7 in precooked meat products in Argentina using the finite element method, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 595-602, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4RDS475-6/2/ef4b82c21efcba90e38e16ede8d7fff9>)

Abstract:

The presence of *Escherichia coli* is linked with sanitary deficiencies and undercooking of meat products. Recent studies have detected *E. coli* O157:H7 in black blood sausages. Minimum time-temperature specifications to kill the bacteria were obtained by numerical simulations of the microscopic heat conduction equation using the finite element method, and calculating the temperature profile of the sausage and the population of *E. coli* at the coldest point during heating. The model was validated by heating sausages in a water-bath. The effects of heat transfer coefficients and water temperatures on the required time to achieve an inactivation value (IV) of 12log are reported. Macroscopic heat balances were simultaneously solved to consider the temperature drop in the water batch as a function of the ratio between the mass of thermally treated sausage and the heat capacity of the system.

Keywords: Numerical simulation; Blood sausage; Thermal inactivation; Food safety; Finite element method

S. Fadda, C. Chambon, M.C. Champomier-Verges, R. Talon, G. Vignolo, *Lactobacillus* role during conditioning of refrigerated and vacuum-packaged Argentinean meat, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 603-610, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-7/2/08412bb8472fc3b10c4ec6566fa91728>)

Abstract:

The role of *Lactobacillus* strains with bioprotective and technological potential on raw beef during 15 days of storage under vacuum at 7 [degree sign]C was investigated. The assayed strains were able to grow on the meat, *Lactobacillus curvatus* CRL705 and *Lactobacillus sakei* 23K showing the highest competitiveness. A net increase of amino acids was determined in inoculated samples when compared to the control, this being maximal for *Lactobacillus plantarum* CRL681. Although an important endogenous activity of meat sarcoplasmic proteins was observed, the disappearance of protein bands and the generation of a new one were detected as a consequence of *Lactobacillus* growth. A synergistic effect of *Lactobacillus* in combination with the muscle proteolytic enzyme complex can be suggested. From the studied strains, the bacteriocin producer *L. curvatus* CRL705 may be considered as a good candidate to contribute to meat ageing by means of small peptides and free amino acids generation while improving shelf life.

Keywords: LAB; Proteolytic activity; Meat proteins; Meat quality

P. Goenaga, M.R. Lloveras, C. Amendola, Prediction of lean meat content in pork carcasses using the Hennessy Grading Probe and the Fat-O-Meater in Argentina, *Meat Science*, Volume 79, Issue 3, Beef Up Your Tango - Meat Research in Argentina, July 2008, Pages 611-613, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.12.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4RC2NV0-3/2/3bba5ce7bd01bfe7a63a4fe4b7593cec>)

Abstract:

Rapid evolution of pork production in Argentina requires new calibrations for predicting carcass lean meat percentage with the Fat-O-Meater (FOM) and Hennessy Grading Probe (HGP), first adopted in 1995. The second objective was to unify the lean percentage units with those applied by the European Union. Carcasses of 59 gilts and 56 barrows from different environments and breeds were tested. Carcass weights were from 65 to 117 kg, and lean content was from 38% to 62%. Predicting lean content by multiple regression equations, the coefficients of determination R^2 were 0.801 and 0.794 for the FOM and HGP equations, and the residual standard deviations (RSD) were 2.40% and 2.45%, respectively. Both instruments had the same precision and were accurate enough to be adopted in national carcass grading classification. Hot carcass weight was

not selected as a significant variable. The same prediction equations could be used for gilts and barrows. Quadratic terms did not improve predictions.

Keywords: Pork; Lean content; Fat-O-Meater; Hennessy grading probe; Argentina

Maria Perez-Juan, Monica Flores, Fidel Toldra, Effect of pork meat proteins on the binding of volatile compounds, Food Chemistry, Volume 108, Issue 4, Cost Action 921 - Food Matrices: Structural Organisation from Nano to Macro Scale and Impact on Flavour Release and Perception, 15 June 2008, Pages 1226-1233, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.04.037.

(<http://www.sciencedirect.com/science/article/B6T6R-4NMC8DN-2/2/4b0b1d4bb524143b0c974342d7e805d2>)

Abstract:

The binding ability of pork meat proteins (sarcolemmal, myofibrillar and isolated actin and actomyosin) was determined by measuring the relative headspace concentration of the volatile compounds in the presence of each protein (expressed as percentages of the free volatiles relative to a standard solution without protein) using solid-phase microextraction (SPME) and gas chromatography analysis. The sarcolemmal homogenates bound higher quantities of the volatile compounds assayed (3-methylbutanal, 2-methylbutanal, 2-pentanone, hexanal, methional and octanal) than myofibrillar homogenates. The addition of salts also affected the binding ability of sarcolemmal and myofibrillar proteins. Actomyosin was able to bind all the assayed volatile compounds although the binding depended on protein concentration and conformation, and it was highly affected by frozen storage. On the other hand, G-actin was unable to bind any of the assayed volatile compounds although the polymerized form (F-actin) bound higher quantities of the volatile compounds.

Keywords: Meat proteins; Flavour; Aroma; Sarcolemmal proteins; Myofibrillar proteins; Actin; Actomyosin; Salts; Binding; Interaction

Thi Thu Hao Van, James Chin, Toni Chapman, Linh Thuoc Tran, Peter J. Coloe, Safety of raw meat and shellfish in Vietnam: An analysis of *Escherichia coli* isolations for antibiotic resistance and virulence genes, International Journal of Food Microbiology, Volume 124, Issue 3, 10 June 2008, Pages 217-223, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.03.029.

(<http://www.sciencedirect.com/science/article/B6T7K-4S5VCG0-5/2/cf6579463fedaa332ad4a68dec852787>)

Abstract:

This study was conducted to examine a current baseline profile of antimicrobial resistance and virulence of *Escherichia coli* isolated from foods commonly sold in the market place in Vietnam. *E. coli* were isolated from 180 samples of raw meat, poultry and shellfish and also isolated from 43 chicken faeces samples. Ninety-nine *E. coli* isolates recovered from all sources were selected for the investigation of their susceptibility to 15 antimicrobial agents by the disk diffusion method. Eighty-four percent of the isolates were resistant to one or more antibiotics, and multi-resistance, defined as resistance to at least 3 different classes of antibiotics, was detected in all sources. The rates of multi-resistance were up to 89.5% in chicken, 95% in chicken faeces and 75% in pork isolates. Resistance was most frequently observed to tetracycline (77.8%), sulfafurazole (60.6%), ampicillin (50.5%), amoxicillin (50.5%), trimethoprim (51.5%), chloramphenicol (43.4%), streptomycin (39.4%), nalidixic acid (34.3%) and gentamicin (24.2%). In addition, the isolates also displayed resistance to fluoroquinolones (ciprofloxacin 16.2%, norfloxacin 17.2%, and enrofloxacin 21.2%), with chicken isolates showing the highest rates of resistance to these antibiotics (52.6-63.2%). Thirty-eight multi-resistant isolates were selected for further the examination of antibiotic resistance genes and were also evaluated for virulence gene profiles by multiplex and uniplex polymerase chain reaction. The beta-lactam TEM gene and tetracycline resistance tetA, tetB genes were frequently detected in the tested isolates (84.2% and 89.5% respectively). Genes which are responsible for resistance to streptomycin (aadA) (68.4%), chloramphenicol (cmIA)

(42.1%), sulfonamides (sull) (39.5%), trimethoprim (dhfrV) (26.3%) and kanamycin (aphA-1) (23.7%) were also widely distributed. Plasmid-mediated ampC genes were detected in *E. coli* isolates from chicken and pork. The isolates were tested for the presence of 58 virulence genes for adhesins, toxins, capsule synthesis, siderophores, invasins and others from different *E. coli* pathotypes. All of the tested isolates contained at least one virulence gene and there were 16 genes detected. Virulence genes detected were fimH (92.1%), bmaE (84.2%), TSPE4.C2 (42.1%), aidA AIDA-I (orfB) (31.6%), east1 (26.3%), traT (23.7%), and others including fyuA, iutA, chuA, yjaA, iss, iroNE. coli, ibeA, aah (orfA), iha and papG allele III (10.5-2.6%). Typical toxin genes produced by enterohemorrhagic and enterotoxigenic *E. coli* pathotypes (a heat-stable toxin (ST), heat-labile toxin (LT) and Shiga toxin stx1, stx2) were not detected in any of these 38 isolates. The study has revealed that *E. coli* in raw foods is a significant reservoir of resistance and virulence genes.

Keywords: *Escherichia coli*; Food; Antibiotic resistance; Resistance gene; Virulence gene

Crisantema Hernandez, Miguel A. Olvera-Novoa, Karla Aguilar-Vejar, Blanca Gonzalez-Rodriguez, Isabel Abdo de la Parra, Partial replacement of fish meal by porcine meat meal in practical diets for Pacific white shrimp (*Litopenaeus vannamei*), *Aquaculture*, Volume 277, Issues 3-4, 3 June 2008, Pages 244-250, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2008.02.016.

(<http://www.sciencedirect.com/science/article/B6T4D-4RVG3G8-9/2/9dca57ab20b32e4fb23355f18324789c>)

Abstract:

In this study, it evaluated the growth performance of the Pacific white shrimp *Litopenaeus vannamei* in response to the replacement of fish meal with rendered porcine meat meal (PMM) in its diet. Six isolipidic and isonitrogenous diets were formulated with 0, 25, 35, 45, 55 or 65% replacement of fish meal with PMM on a protein basis. Shrimp grew from 0.55 g to > 3.6 g during the 41-day experimental period. Specific growth rate (SGR) was significantly lower when PMM inclusion was 26.18% or greater, replacing more than 45% fish meal protein. A significant negative relationship was observed between growth response and the level of fish meal protein replacement with PMM protein. Methionine content decreased as PMM inclusion levels increased, consequently compromising growth performance. Dry feed intake (DFI) and the feed conversion ratio (FCR) were unaffected by fish meal replacement levels. The protein efficiency ratio (PER) was highest at the lowest PMM inclusion level. Apparent protein digestibility coefficient (APDC) for PPM was 66.2%. Experimental diets D-0 and D-25 had apparent dry matter digestibility (ADMDs) ranging from 77-81% and ADPs from 82-85%, while the diets with higher PMM inclusion (D-35 to D-65) had a significantly lower ADMD range (70-72%) and APD range (73-78%). It is concluded that porcine meat meal is an acceptable alternative animal protein source that can replace up to 35% of fish meal protein in shrimp diets without significant adverse effects on growth, survival, FCR, PER and body composition.

Keywords: Rendered protein; Digestibility; Amino-acids; Growth

T.T.N. Dinh, J.R. Blanton Jr., J.C. Brooks, M.F. Miller, L.D. Thompson, A simplified method for cholesterol determination in meat and meat products, *Journal of Food Composition and Analysis*, Volume 21, Issue 4, June 2008, Pages 306-314, ISSN 0889-1575, DOI: 10.1016/j.jfca.2008.02.001.

(<http://www.sciencedirect.com/science/article/B6WJH-4RV7YC1-1/2/f68914886643787bf743810d15f2011e>)

Abstract:

The objectives of this study were to develop an accurate and precise method for cholesterol quantification in meat samples based on modifications made to an existing procedure (AOAC Official Method 994.10), and to apply this modified method to evaluate cholesterol levels in longissimus muscles (LM) from Angus (AN, n=5), Brahman (BR, n=4), and Romosinuano (RM,

n=9) breeds. Validation of this method was performed using a meat homogenate (Standard Reference Material 1546) from National Institute of Standards and Technology (NIST), and LM samples from the three breeds with fat contents ranging from 2.4% to 9.3%. The results indicated that the modified method was accurate with cholesterol recovery exceeding 95%. The method was also found to be precise with an average coefficient of variation of 3.12%. The modification reduced 90% of chemicals used and eliminated time-consuming steps that hindered high throughput application of the traditional method. The application of this method to quantify cholesterol contents of LM samples revealed differences among the three breeds evaluated. The Angus LM with a higher fat content (50% higher) was associated with a significantly higher cholesterol concentration (70.25 mg/100 g) as compared to LM from Brahman and Romosinuano purebreds (64.77 and 65.76 mg/100 g; $P=0.005$ and 0.006 , respectively). Cholesterol concentration was found to be correlated with the i.m. fat content of LM muscle from the three breeds ($r=0.90$, $P<0.001$). Cholesterol concentrations of LM determined in this study were comparable to those reported in the USDA National Nutrient Database for Standard Reference for separable lean from Choice rib-eye steaks. This modified method was reliable and should be evaluated for adoption as an appropriate method for cholesterol quantification in meat samples.

Keywords: Cholesterol determination; Gas chromatography; Method validation; Longissimus muscle; Beef cattle; Cattle breeds; Angus; Brahman; Romosinuano

Louwrens C. Hoffman, Karen Smit, Nina Muller, Chemical characteristics of blesbok (*Damaliscus dorcas phillipsi*) meat, *Journal of Food Composition and Analysis*, Volume 21, Issue 4, June 2008, Pages 315-319, ISSN 0889-1575, DOI: 10.1016/j.jfca.2007.12.003.

(<http://www.sciencedirect.com/science/article/B6WJH-4RTW3PT-2/2/2d4871043b583eee1cca85397b1b8a5c>)

Abstract:

The aim of this study was to describe the chemical composition of blesbok meat as influenced by region and sex. *M. longissimus dorsi* from both sexes of adult blesbok from different regions (Maria Moroka, Gariep, Qua-Qua and Rustfontein in the Free State Province, South Africa) were measured for chemical composition, cholesterol, fatty acid, amino acid and mineral contents. Sex had no influence on any of the chemical components evaluated. Region had an effect ($P<0.05$) on lipid (1.01%) and individual amino acid contents. The saturated fatty acids palmitic acid (16.36%) and stearic acid (26.08%) were found to be the main fatty acids in blesbok meat. Blesbok meat has a ratio of polyunsaturated to saturated fatty acids of 0.92. Cholesterol content (52.76 mg 100 g⁻¹ edible portion) is similar to that of other red meat species. Values for amino acids were in general higher, and for minerals lower, than the values reported for meat from two other African ungulates that are harvested for meat, the common duiker and the impala. Meat from the blesbok can be described as a red meat with a favourable fatty acid profile, and relatively low lipid and cholesterol contents.

Keywords: Blesbok; Game farming; South Africa; Red meat; Chemical composition; Cholesterol; Fatty acids; Amino acids; Minerals

V.K. Modi, Maya Prakash, Quick and reliable screening of compatible ingredients for the formulation of extended meat cubes using Plackett-Burman design, *LWT - Food Science and Technology*, Volume 41, Issue 5, June 2008, Pages 878-882, ISSN 0023-6438, DOI: 10.1016/j.lwt.2007.06.002.

(<http://www.sciencedirect.com/science/article/B6WMMV-4P008B9-2/2/400c69c7f069e2b0a76972412dc22daa>)

Abstract:

'Extended meat products' is an important concept which involves judicious utilization of other agricultural/animal produce as well as providing meat-like products. Selection of compatible ingredients from among numerous alternates is a daunting task. Of the several methods available,

Plackett-Burman design was used to screen 11 potential ingredients to formulate extended meat cubes. Twelve formulations were evolved and their evaluation as rehydrated and stewed meat cubes were carried out by a sensory panel. The attributes of firmness, juiciness, meaty aroma and overall quality were rated by an intensity ranking test followed by appropriate statistical analysis provided regression coefficients for individual ingredients for each attribute. Based on the direction of change (increase or decrease over control) for each attribute and its relation to the overall acceptability of the ingredients for their compatibility in formulating the product was provided. The overall rank sums for each ingredient and the attributes provided a reliable means to select the most compatible ingredients for further optimization work.

Keywords: Meat cubes; Extenders; Binders; Cereals; Millets; Vegetables

N. Panella-Riera, A. Dalmau, E. Fabrega, M. Font i Furnols, M. Gispert, J. Tibau, J. Soler, A. Velarde, M.A. Oliver, M. Gil, Effect of supplementation with MgCO₃ and L-Tryptophan on the welfare and on the carcass and meat quality of two halothane pig genotypes (NN and nn), *Livestock Science*, Volume 115, Issues 2-3, June 2008, Pages 107-117, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.06.014.

(<http://www.sciencedirect.com/science/article/B7XNX-4PCR1Y7-2/2/ad41da58222e2765dfa011a4281c0892>)

Abstract:

Sixty-one animals with different Halothane genes (homozygous halothane positive, n = 34; and homozygous halothane negative, n = 27) were fed with three diets (control group, with no supplement; magnesium (Mg) group with 1.28 g MgCO₃/kg and tryptophan (Trp) group with 5 g L-Trp/kg) during the last 5 days before slaughter. Animals were submitted to minimal stress antemortem conditions. Pig behaviour was recorded at the experimental farm, raceway to the CO₂ stunning system and during the stunning period. Corneal reflexes were recorded after stunning as well. There were no differences in feed intake among diets (P > 0.05) during the 5 days of treatment. The halothane positive (nn) group had lower intake than the halothane negative (NN) group (P < 0.01). The behaviour of the pigs in the raceway did not differ (P > 0.05) among treatments or halothane genotype. A significant (P < 0.001) interaction diet * halothane was found in the time to appear the first retreat attempt during the exposure to the CO₂ system. In the nn group, the time of performing the first retreat attempt was later in the Mg (P < 0.05) than the control group. Moreover, in the Mg group, the nn had a later (P < 0.05) first retreat attempt than the NN. Thus, Mg supplementation could have a positive effect on welfare of nn pigs. The nn had a lower proportion of animals that showed corneal reflexes after stunning than NN, indicating a higher effectiveness of the stunning method in nn pigs. Neither Mg nor Trp affected carcass quality and meat quality parameters, although significant differences were found between genotypes.

Keywords: Animal welfare; Carbon dioxide; Halothane gene; Magnesium; Pig; Tryptophan

M. Blanco, G. Ripoll, P. Alberti, A. Sanz, R. Revilla, D. Villalba, I. Casaus, Effect of early weaning on performance, carcass and meat quality of spring-born bull calves raised in dry mountain areas, *Livestock Science*, Volume 115, Issues 2-3, June 2008, Pages 226-234, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.07.012.

(<http://www.sciencedirect.com/science/article/B7XNX-4PG2M36-2/2/00e8276e19f0d3972ae7a7b031acfce4>)

Abstract:

Sixteen bull calves were born in the Spanish Central Pyrenees in spring. They were either early weaned (EW, 90 days of age) or normal weaned (NW, 180 days of age). At day 90, EW calves were placed on an intensive diet while NW calves were turned out with their dams to high mountain pastures. After summer, at day 180, NW calves were weaned and placed with EW calves on a common finishing diet until slaughter at the fixed age of 1 year. From birth to early weaning date, no performance differences appeared. However, EW calves gained faster (1.549 kg/day) than their

unweaned counterparts (0.783 kg/day) from early to normal weaning date ($P < 0.001$). During the finishing period, NW calves showed compensatory growth, with a 44% higher ADG than EW calves ($P < 0.001$), with a similar feed intake and a better feed conversion ratio. Early weaned calves had a longer fattening phase than NW calves (264 vs. 158 days, respectively; $P < 0.001$) and thus total feed intake and feed costs were greater. When slaughtered at 1 year of age, EW and NW calves attained similar weight (489 vs. 510 kg, respectively; $P > 0.05$), but dressing percentage was higher for EW calves (56.9%) than for NW calves (55.2%) ($P < 0.01$), which led EW calves to have heavier carcasses, without differences in fat score or conformation. The different growth paths, the result of weaning management, did not affect meat tenderness, chemical composition and fatty acid profile, but affected meat lightness, with higher values for compensating calves (NW) than calves in continuous growth (EW). In conclusion, advancing weaning age modified calf performance without affecting substantially carcass characteristics, except for an improvement in dressing percentage, or meat quality.

Keywords: Beef cattle; Early weaning; Performance; Carcass quality; Meat quality

M.A. Latorre, C. Pomar, L. Faucitano, C. Garipey, S. Methot, The relationship within and between production performance and meat quality characteristics in pigs from three different genetic lines, *Livestock Science*, Volume 115, Issues 2-3, June 2008, Pages 258-267, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.08.013.

(<http://www.sciencedirect.com/science/article/B7XNX-4PS6433-1/2/69ad0499c85bd1ee1ad11bc748287730>)

Abstract:

Ninety-six pigs from Large White (LW), Synthetic Genex 3000 (SG) and Meishan-derived dam line (M) genetic lines, each with a mean live body weight (BW) of 20.7 +/- 4.2 kg, were used to investigate the relationship that exist between production performance and meat quality parameters for these three genotypes. The animals were assigned to pens in groups of eight and slaughtered at 109.6 +/- 3.78 kg BW. At the end of the trial, the LW pigs had the highest ($P < 0.001$) average daily feed intake and average daily gain and protein deposition rates, the M pigs showed ($P < 0.001$) the worst feed conversion, the highest daily backfat gain and the lowest residual energy intake, and the SG pigs had the lowest ($P < 0.001$) daily fat deposition rate. The longissimus muscle of the M pigs had higher a^* ($P < 0.01$) and b^* ($P < 0.05$) values than the LW pigs, with the SG pigs in between. The M loins also had the highest ($P < 0.01$) shear force value, which may be explained by the lower ($P < 0.01$) soluble collagen content. In spite of their lowest fat deposition rate, the highest ($P < 0.001$) intramuscular fat content was measured in the SG loins, and the highest ($P < 0.01$) protein content was found in the M loins. Eight canonical correlations were obtained between performance and meat quality data, with the first three correlation coefficients of 0.87, 0.66 and 0.64 being significant. Performance and meat quality data were related to a certain extent. Pigs with a higher average daily feed intake also had a higher average daily gain, an average protein deposition rate, residual energy intake and gain-to-feed ratio, and lower meat dry matter, intramuscular fat, a^* values and pigment content. Body water content seems to be higher in fast-growing pigs. Furthermore, fast-growing pigs also have lower intramuscular fat, a^* values and pigment content. However, there is some indication that the magnitude of these correlations can be breed-dependent. The differences among the studied genotypes are much higher in terms of growth performance than in terms of meat quality traits.

Keywords: Correlation; Genotype; Meat quality; Production performance; Pigs

P.E. Simitzis, S.G. Deligeorgis, J.A. Bizelis, A. Dardamani, I. Theodosiou, K. Fegeros, Effect of dietary oregano oil supplementation on lamb meat characteristics, *Meat Science*, Volume 79, Issue 2, June 2008, Pages 217-223, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.09.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4PPF6FJ-1/2/64eb877a7749585e04947055e8f9d1d0>)

Abstract:

The effect of dietary oregano essential oil supplementation on lamb meat characteristics was investigated. Eight male and eight female Chios lambs were divided into two equal groups. The first group was fed with the control diet consisting of concentrated feed and alfalfa hay, whereas the second group consumed the same diet, the only difference being that the concentrated feed was uniformly sprayed with oregano essential oil (1 ml/kg). Duration of the experimental period was two months.

No differences were observed after oregano essential oil supplementation in final body weight (kg), body weight gain (g) and carcass yield (%). Tenderness of longissimus thoracis muscle, expressed as sarcomere length and shear force value, was not influenced by the treatment, whereas pH and colour parameters (yellowness-redness) appeared to increase ($P < 0.05$). Moreover, results showed that dietary incorporation of oregano essential oil exerted strong antioxidant effects retarding lipid oxidation (MDA formation) in meat during refrigerated and long-term frozen storage ($P < 0.001$).

Keywords: Oregano; Lamb; Meat quality; Oxidation

Violeta Fajardo, Isabel Gonzalez, Irene Martin, Maria Rojas, Pablo E. Hernandez, Teresa Garcia, Rosario Martin, Real-time PCR for detection and quantification of red deer (*Cervus elaphus*), fallow deer (*Dama dama*), and roe deer (*Capreolus capreolus*) in meat mixtures, *Meat Science*, Volume 79, Issue 2, June 2008, Pages 289-298, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.09.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4PTW51C-1/2/c2b8adc3709e74ffbdb98506c6b6888e>)

Abstract:

A rapid real-time polymerase chain reaction (PCR) technique using SYBR Green detection system, has been developed for the quantification of red deer, fallow deer, and roe deer DNAs in meat mixtures. The method combines the use of cervid-specific primers that amplify a 134, 169, and 120 bp of the 12S rRNA gene fragment of red deer, fallow deer and roe deer, respectively, and universal primers that amplify a 140 bp fragment on the nuclear 18S rRNA gene from eukaryotic DNA. The Ct (threshold cycle) values obtained with the 18S rRNA primers are used to normalize those obtained from each of the cervid-specific systems, serving as endogenous control for the total content of PCR-amplifiable DNA in the sample. Analysis of experimental raw and heat treated binary mixtures of red deer, fallow deer or roe deer meat in a swine meat matrix demonstrated the suitability of the assay for the detection and quantification of the target cervid DNAs in the range 0.1-0.8%, depending on the species and treatment of the meat samples analyzed.

Keywords: Species identification; 12S rRNA gene; Red deer; Fallow deer; Roe deer; Real-time PCR; SYBRGreen

C. Corino, M. Musella, G. Pastorelli, R. Rossi, K. Paolone, L. Costanza, A. Manchisi, G. Maiorano, Influences of dietary conjugated linoleic acid (CLA) and total lysine content on growth, carcass characteristics and meat quality of heavy pigs, *Meat Science*, Volume 79, Issue 2, June 2008, Pages 307-316, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4PWKSX3-1/2/56be3cd71c1de3a6f718965d96c09f9c>)

Abstract:

To assess the effects of dietary CLA, lysine and sex on performance, blood metabolites, carcass characteristics, meat quality and skeletal development, seventy-two pigs (initially 105.3 +/- 6.6 kg live weight) barrows and gilts, were assigned to one of four diets in a 2 x 2 x 2 factorial arrangement. The diets contained 0% or 0.75% CLA, and 0% or 0.16% of l-lysine-HCl. All pigs were slaughtered at an average weight of 153.4 +/- 11.0 kg. Neither CLA nor lysine

supplementation influenced growth, blood metabolites or carcass characteristics. CLA reduced ($P < 0.05$) pH₂₄ and increased ($P < 0.01$) yellowness (b^*) of the Longissimus muscle. Lysine increased ($P < 0.01$) pH₂₄ and reduced ($P < 0.01$) muscle ash content. CLA reduced ($P < 0.05$) collagen synthesis, and lysine increased ($P < 0.05$) collagen synthesis in Longissimus muscle, but no influence on intramuscular collagen maturity or muscle hydroxylysylpyridinoline crosslink concentration were observed. In addition, metacarpal bone diameter was reduced ($P < 0.05$) by CLA. Barrows had higher ADG, final weight ($P < 0.01$), carcass weight, lean percentage ($P < 0.05$), serum cholesterol ($P < 0.05$) and triacylglycerol ($P < 0.001$) than gilts. Metatarsal diameter was larger in gilts than barrows ($P < 0.05$).

Keywords: Heavy pig; Conjugated linoleic acid; Lysine; Sex; Carcass traits; Meat quality; Intramuscular collagen; Bone

A.P. Moloney, M.G. Keane, P.G. Dunne, M.T. Mooney, D.J. Troy, Effect of concentrate feeding pattern in a grass silage/concentrate beef finishing system on performance, selected carcass and meat quality characteristics, *Meat Science*, Volume 79, Issue 2, June 2008, Pages 355-364, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4PYYV0V-3/2/e852bd7e7a56b788d97ecede46de1c31>)

Abstract:

Steers were offered grass silage ad libitum and 6.4 kg concentrates daily for 126 days or silage ad libitum for 35 days, followed by concentrates ad libitum (Experiment 1). Steers were offered grass silage ad libitum and 6 kg concentrates daily for 154 days, concentrates ad libitum or grass silage ad libitum for 112 days followed by concentrates ad libitum (Experiment 2). All treatments received the same total concentrate allowance. In Experiment 1, there was no difference in any measurement of meat quality. In Experiment 2, ad libitum concentrate feeding per se, decreased redness and increased shear force of muscle at 2 days post-mortem. Delaying concentrate feeding decreased fat yellowness, decreased shear force at 7 and 14 days post-mortem and increased muscle redness at 14 days post-mortem. Modifications of the beef production system examined had minor effects on beef quality which are unlikely to be of commercial significance.

Keywords: Concentrates; Beef quality; Fat colour; Muscle colour

L.C. Hoffman, M. Muller, S.W.P. Cloete, M. Brand, Physical and sensory meat quality of South African Black ostriches (*Struthio camelus* var. *domesticus*), Zimbabwean Blue ostriches (*Struthio camelus australis*) and their hybrid, *Meat Science*, Volume 79, Issue 2, June 2008, Pages 365-374, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4R0KTFY-1/2/6d3b086c9774aa83c73f2ff7e62bbc12>)

Abstract:

Meat derived from three genotypes of ostrich, resulting from breeding South African Black (Black) ostriches and Zimbabwean Blue (Blue) ostriches as well as their hybrid, was analysed for physical and sensory quality. Ostriches of a commercially standard slaughter age of 14 months, raised under the same environment were used. The pH₂₄ was the highest in the pure Blue genotype and therefore meat from this genotype was the darkest and the percentage drip loss and cooking loss the lowest. When comparing the pure Blue genotype to the pure Black genotype, 70% of the muscles had a higher pH₂₄, 50% of the muscles were redder and significantly less saturated in colour, 67% of the muscles had a lower percentage drip loss and 50% of the muscles had a lower percentage cooking loss. No significant genotypic differences were found regarding the instrumental toughness, nor the sensory attributes of the meat.

Keywords: Ostrich muscles; pH; Instrumental colour and tenderness; Water-holding capacity; Sensory attributes

Elena Miguelez, Jose Maria Zumalacarregui, Maria Teresa Osorio, Ana Cristina Figueira, Beatriz Fonseca, Javier Mateo, Quality traits of suckling-lamb meat covered by the protected geographical indication 'Lechazo de Castilla y Leon' European quality label, *Small Ruminant Research*, Volume 77, Issue 1, June 2008, Pages 65-70, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2008.02.002. (<http://www.sciencedirect.com/science/article/B6TC5-4S4S5P5-1/2/c492dec8e47ff1e91ec76cd57e7fbd99>)

Abstract:

The quality of suckling-lamb meat (derived from Churra, Castellana and Ojalada breeds), covered by the protected geographical indication (PGI) 'Lechazo de Castilla y Leon', and the effects of carcass weight (CW), breed and sex on quality were studied. The edible portion (EP) of 81 carcasses was analysed for proximate composition, fatty acid, cholesterol, amino acid and mineral contents. The longissimus thoracis and lumborum muscle (30 samples) were analysed for proximate composition, pH, myoglobin content, water holding capacity, Warner-Bratzler shear force, and total and soluble collagen content. This study contributes to characterization of suckling-lamb meat quality recognised in the European Union with a PGI label and provides new data on the composition of the EP of the carcasses. CW and breed had a significant effect on several quality traits, most related to fatness.

Keywords: Meat quality; Milk-fed lambs; Lechazo de Castilla y Leon

Oliver Bucher, J.-Y. D'Aoust, Richard A. Holley, Thermal resistance of Salmonella serovars isolated from raw, frozen chicken nuggets/strips, nugget meat and pelleted broiler feed, *International Journal of Food Microbiology*, Volume 124, Issue 2, 31 May 2008, Pages 195-198, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.03.002.

(<http://www.sciencedirect.com/science/article/B6T7K-4S0PK39-4/2/39e17d1c8b2198e27604a51ca00babd3>)

Abstract:

Raw, frozen chicken nuggets/strips available at retail and prepared at home before consumption have been identified as a significant risk factor in contracting food-borne salmonellosis. Cases of salmonellosis from consumption of these products may be due, in part, to Salmonella strains originating in broiler feed. In this study the thermal resistances of Salmonella strains isolated from chicken nuggets and strips, chicken nugget/strip meat and broiler feed were determined to assess whether they exhibited enhanced thermal resistance. Thermal resistances (D- and z- values) of 7 cocktails (25 isolates, 4 serovars) were determined in commercially prepared irradiation-treated chicken nugget/strip meat blend, and heated in a constant temperature waterbath. The thermal resistances found were lower than those reported for similar strains in the literature. D-values ranged from 6.93 to 0.12 min at 55 and 62 [degree sign]C respectively, with z-values from 4.10 to 5.17 [degree sign]C. Two strains of *S. Enteritidis* separately isolated from pelleted feed and chicken nugget meat blend, with indistinguishable geno- and phenotypes, had lower (and probably identical) thermal resistances than the other isolates. Results indicated that the strains of Salmonella isolated from raw, frozen chicken nuggets/strips and pelleted broiler feed did not exhibit unusually high thermal resistance, and that normal heating (71 [degree sign]C) prior to consumption should eliminate these organisms from chicken nuggets/strips.

Keywords: Salmonella; Thermal resistance; Chicken nuggets and strips; Pelleted feed

S.A. Knott, L.J. Cummins, F.R. Dunshea, B.J. Leury, The use of different models for the estimation of residual feed intake (RFI) as a measure of feed efficiency in meat sheep, *Animal Feed Science and Technology*, Volume 143, Issues 1-4, Mathematical Models that Predict the Effects of Feed Characteristics on Animal Performance, 22 May 2008, Pages 242-255, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.013.

(<http://www.sciencedirect.com/science/article/B6T42-4P47V2M-1/2/35534079eea342888e85e8831f37f9db>)

Abstract:

The concept of residual feed intake (RFI), in determining differences among animals in converting feed into body tissue, was first raised in 1963. Feed efficiency is typically calculated as a function of liveweight gain (LWG) and feed intake (FI). Historically two versions of the same model were proposed, one where FI was adjusted for liveweight (LW) and LWG, and the other where LWG was adjusted for FI and LW. Variation in LWG or FI could then be partitioned into two parts; that which is expected and can be attributed to differences in FI or LWG; and that which is the residual portion, which is the deviation from the expected value based on regression, and therefore not accounted for by differences in FI or LWG. Based on this definition, it is the residual portion which is the measure of efficiency. Both within a livestock industry and between different livestock industries there is no set model for calculating RFI. This paper evaluated four models used to calculate RFI and one model used to calculate residual LWG (RLWG) at a standard level of nutrition. They were the main model currently in use in the Australian beef cattle industry (RFIB), the original models proposed in 1963 (RFI1963; RLWG1963); a French model which included ultrasound measures of muscle and fat depth (RFIF) and the use of the Australian feeding standards to calculate predicted intake and thus RFI (RFISCA). Using feed intake, liveweight and body composition data generated from the same group of sheep (n = 52) at two ages (6 mo, 13 mo), the relative merits of each model were evaluated and compared to the other models, to determine the most appropriate model to calculate RFI for sheep. For all the models except that used to calculate RLWG, over half of the variation in FI could be explained by the model. The amount of variation in FI accounted for depended on the parameters included and the dataset, with less variation in FI explained by the specific models in the older animals. The RFIF model, which included measures of body composition, accounted for the greatest proportion of the variation in FI and as such suggests that the inclusion of body composition parameters is likely to more accurately reflect true biological efficiency.

Keywords: Residual feed intake; Sheep; Model; Feed efficiency

Louise Marie Sorensen, Tomas Jacobsen, Per Vaeggemose Nielsen, Jens Christian Frisvad, Anette Granly Koch, Mycobiota in the processing areas of two different meat products, *International Journal of Food Microbiology*, Volume 124, Issue 1, 10 May 2008, Pages 58-64, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.02.019.

(<http://www.sciencedirect.com/science/article/B6T7K-4S1C852-1/2/fe21ce69f4cec121f361dd3c3ab8cc23>)

Abstract:

Mould growth is not accepted on most types of North European meat products and is considered as both an economic and aesthetic problem for the producers. In order to determine the mycobiota in processing areas of fermented sausage and liver pate, filamentous fungi were isolated from air, equipment and raw materials in the processing areas of two fermented sausage processing plants and two liver pate processing plants. A total of 336 samples were examined. The diversity of filamentous fungi in the processing areas was high; at least 17 different genera were identified. The main isolated genera were identified as *Aspergillus*, *Botrytis*, *Cladosporium*, *Epicoccum*, *Eurotium*, *Penicillium*, *Phaeoacremonium* and *Phoma*. Of these, *Penicillium* and *Eurotium* were the most important for contamination of fermented sausage, whereas *Penicillium* and *Cladosporium* were most important for liver pate. *Cladosporium* was isolated more frequently in the processing plants examined in the autumn than in the spring. The seasonal variation indicates that outdoor air is an important source for this contamination. *Eurotium* was isolated frequently at one of the fermented sausage plants. *Penicillium* was isolated frequently at all four processing plants and was in addition found on moulded meat products. Sixteen *Penicillium* species were identified. The most frequently isolated were *P. brevicompactum* and the closely related *P. bialowiezense*, *P. solitum*, *P. palitans*, *P. fagi* and a new, not described species named *P. 'milanense'* (ined.; Frisvad, 2007 personal com.). Isolation of a new species illustrates that the

mycobiota in the processing areas of North European meat products has not yet been intensively investigated. Several mycotoxin producing species were isolated; the most prevalent were *P. brevicompactum*/*P. bialowiezense* and *P. palitans*. A screening for secondary metabolites showed that isolates of these species consistently produced mycophenolic acid and cyclopiazonic acid, respectively. Presence of these toxinogenic species in the processing areas implies a risk of mycotoxin contamination of the products if they are or has been subjected to mould growth. The ochratoxin A producing species *P. nordicum* and *P. verrucosum* were not isolated during the study. It was concluded that *Penicillium* species are the most important contaminants of the meat products because of their high prevalence in the production environment, their presence on meat products and their toxinogenic properties.

Keywords: Fermented sausage; Filamentous fungi; Liver pate; Meat products; Mycobiota; Processing areas

Amit Pal, Theodore P. Labuza, Francisco Diez-Gonzalez, Comparison of primary predictive models to study the growth of *Listeria monocytogenes* at low temperatures in liquid cultures and selection of fastest growing ribotypes in meat and turkey product slurries, *Food Microbiology*, Volume 25, Issue 3, May 2008, Pages 460-470, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.01.009. (<http://www.sciencedirect.com/science/article/B6WFP-4RRFN95-2/2/b777556bc1e007ac312e834e3e7195e9>)

Abstract:

This study compared the performance of four primary mathematical models to study the growth kinetics of *Listeria monocytogenes* ribotypes grown at low temperature so as to identify the best predictive model. The parameters of the best-fitting model were used to select the fastest growing strains with the shortest lag time and greatest growth rate. Nineteen food, human and animal *L. monocytogenes* isolates with distinct ribotype were grown at 4, 8, and 12 [degree sign]C in tryptic soy broth and slurries prepared from cooked uncured sliced turkey breasts (with or without potassium lactate and sodium diacetate, PL/SD) and cooked cured frankfurters (with or without PL/SD). Separate regressions were performed on semi-logarithm growth curves to fit linear (based on Monod) and non-linear (Gompertz, Baranyi-Roberts, and Logistic) equations and performance of each model was evaluated using an F-test. No significant differences were found in the performance of linear and non-linear models, but the Baranyi model had the best fit for most growth curves. The maximum growth rate (MGR) of *Listeria* strains increased with the temperature. Similarly MGR was found significantly greater when no antimicrobials were present in the formulation of turkey or frankfurter products. The variability in lag times and MGRs in all media as determined by the Baranyi model was not consistent among strains. No single strain consistently had the fastest growth (shortest lag time, fastest MGR, or shortest time to increase 100-fold), but nine strains were identified as fastest growing strains under most growth conditions. The lack of association between serotype and fastest strain was also observed in the slurry media study. The fastest growing strains resulting from this study can be recommended for future use in *L. monocytogenes* challenge studies in delicatessen meat and poultry food matrices, so as to develop conservative pathogen growth predictions.

Keywords: *Listeria monocytogenes*; Sliced turkey breasts; Frankfurters; Primary growth models; Growth kinetics; Predictive modeling

V.T. Nguyen, M.J. Gidley, G.A. Dykes, Potential of a nisin-containing bacterial cellulose film to inhibit *Listeria monocytogenes* on processed meats, *Food Microbiology*, Volume 25, Issue 3, May 2008, Pages 471-478, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.01.004. (<http://www.sciencedirect.com/science/article/B6WFP-4RPM7S4-4/2/465d10503de88c064d51a1812ed054be>)

Abstract:

A bacterially produced cellulose film containing nisin was developed and used in a proof-of-concept study to control *Listeria monocytogenes* and total aerobic bacteria on the surface of vacuum-packaged frankfurters. Bacterial cellulose pellicles were produced by *Gluconacetobacter xylinus* K3 in Corn Steep Liquor-Mannitol Medium and were subsequently purified before nisin was incorporated into them. Investigations into the effect of nisin concentrations and contact times on incorporation of nisin into cellulose films showed that the lowest nisin concentration and shortest time needed for production of an effective antimicrobial cellulose film were 625 IU ml⁻¹ and 6 h, respectively. The active cellulose films produced under these conditions did not, however, significantly reduce *L. monocytogenes* populations on frankfurters ($P > 0.05$) during refrigerated storage for 14 days as compared to the controls. Films produced using a higher concentration of nisin (2500 IU ml⁻¹) with the same exposure time (6 h) resulted in a significant ($P < 0.05$) decrease in *L. monocytogenes* counts on frankfurters of ~ 2 log CFU g⁻¹ after 14 days of storage as compared to the control. Both the above-mentioned films showed a similar effectiveness in reducing total aerobic bacterial populations as measured by total aerobic plate counts on frankfurters. For both films, total aerobic bacterial levels were significantly ($P > 0.05$) reduced by ~ 3.3 log CFU g⁻¹ after 14 days of storage as compared to control samples. Bacterial cellulose films were demonstrated in this study to have potential applicability as antimicrobial packaging films or inserts for processed meat products.

Keywords: Antimicrobial packaging; Bacterial cellulose; Nisin; *Listeria monocytogenes*

C.L. Little, J.F. Richardson, R.J. Owen, E. de Pinna, E.J. Threlfall, *Campylobacter* and *Salmonella* in raw red meats in the United Kingdom: Prevalence, characterization and antimicrobial resistance pattern, 2003-2005, *Food Microbiology*, Volume 25, Issue 3, May 2008, Pages 538-543, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.01.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4RJYV5J-3/2/3f5d9cfbcad4da346670d014f3184749>)

Abstract:

The prevalence of *Campylobacter* and *Salmonella* was assessed in 3959 raw red meats in the UK during 2003-2005. Meats were more frequently contaminated with *Campylobacter* (7.2%) than with *Salmonella* (2.4%). Lamb and other meats (e.g. mutton, rabbit) exhibited the highest contamination from *Campylobacter* (12.6% and 19.8%, respectively), compared with pork (6.3%) and beef (4.9%). Pork however had the highest contamination from *Salmonella* (3.9%), followed by lamb (2.0%), other meats (2.0%) and beef (1.3%). Offal samples (36.6%) were more frequently contaminated with *Campylobacter* or *Salmonella* than muscle tissue (7.0%). *C. jejuni* predominated in all meat types. *C. coli* isolates were more likely to exhibit antimicrobial drug resistance, including quinolones, than *C. jejuni*. *Salmonella typhimurium* was the most frequent *Salmonella* serotype isolated from meats; *S. typhimurium* DT104/104b isolates exhibited higher rates of multiple drug resistance than other serotypes. The findings reinforce the importance of adequate cooking of meat and good hygiene to avoid cross-contamination.

Keywords: *Salmonella*; *Campylobacter*; Red meat; Prevalence; Food safety

M. Pla, A comparison of the carcass traits and meat quality of conventionally and organically produced rabbits, *Livestock Science*, Volume 115, Issue 1, May 2008, Pages 1-12, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.06.001.

(<http://www.sciencedirect.com/science/article/B7XNX-4P53RVM-2/2/1e0ab4468d3be2c52357736e4b36fb16>)

Abstract:

In order to compare the meat of conventionally and organically produced rabbits for possible future sale, two groups of 50 rabbits from the same genetic type were reared under conventional or Spanish organic conditions and were slaughtered at 63 or 90 days respectively. Differences were found in most of the characteristics studied. In some of the traits the differences were related to

age, as in the case of the liveweight (2209 vs. 2488 g), the weight of the different parts of the carcass, texture variables of meat, meat redness (a^* 5.51 vs. 7.49), carcass redness (a^* 2.92 vs. 3.70), or pH (5.82 vs. 5.76) in conventionally and organically reared rabbits, respectively. However, in other cases the variations were not age related. Organic rabbits had a higher carcass length to circumference ratio (2.22 vs. 1.97). Their carcasses were leaner (13.9 vs. 27.3 g fat/kg carcass) and had a lower meat to bone ratio (5.18 vs. 5.84) than in conventional rabbits. The organic meat had less protein (210 vs. 213 g/kg meat) and fewer lipids (19 vs. 39 g/kg meat). It had less saturated FA (41.3 vs. 42.6 g/100 g total FA) and less monounsaturated FA (29.4 vs. 35.6) but more polyunsaturated FA (28.9 vs. 21.9), n-6 FA (25.3 vs. 19.4) and n-3 FA (2.7 vs. 2.4). The ratio of polyunsaturated:saturated FA was higher (0.7 vs. 0.5) in the organic meat and, as such, was better from the nutritional perspective, but the n-6: n-3 ratio was higher (9.3 vs. 8.1) and poorer. The proteins in the organic meat were richer in methionine (12.78 vs. 4.33 mg/100 g meat) and cystine (4.47 vs. 1.71) although these results require further study. The organic rabbit meat had a reduced aniseed (0.23 vs. 0.79) and grass flavour (0.44 vs. 0.56), but higher liver flavour (1.49 vs. 1.02) than conventional rabbit meat.

Keywords: Rabbit; Organic system; Carcass traits; Meat quality

V. Muchenje, K. Dzama, M. Chimonyo, J.G. Raats, P.E. Strydom, Meat quality of Nguni, Bonsmara and Aberdeen Angus steers raised on natural pasture in the Eastern Cape, South Africa, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 20-28, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4P96265-3/2/73b26bb08623ae0209e439a3b78765d9>)

Abstract:

The current study compared meat quality of Nguni, Bonsmara and Angus steers raised on natural pasture. Fifteen seven-month-old weaners of each breed were kept at the University of Fort Hare Farm for 12 months till slaughter. Monthly weights of the steers were recorded. Carcasses were electrically stimulated. The *m. longissimus thoracis et lumborum* was sampled for the measurement of meat colour, pH, drip loss, sarcomere length, myofibrillar fragmentation length and Warner Bratzler (WB) shear force. The Nguni had the highest ($P < 0.05$) average daily gain. Bonsmara and Angus steers had higher ($P < 0.05$) carcass weight and dressing percentage than the Nguni steers. Meat quality characteristics were similar among all the breeds except that Nguni meat was darker (L^*) ($P < 0.05$) than meat from the other two breeds. The respective L^* values for Nguni, Bonsmara and Angus steers were 36.5, 38.6 and 39.9. There were significant ($P < 0.05$) correlations among some meat quality traits. There were significant ($P < 0.05$) correlations between WB values of meat aged for 2 and 21 days in Nguni and Bonsmara, but not in Angus. Meat quality from Nguni compares favourably with that from established breeds, when raised on natural pasture.

Keywords: Meat quality; Natural pasture; Natural meat; Nguni cattle

S. Barbut, A.A. Sosnicki, S.M. Lonergan, T. Knapp, D.C. Ciobanu, L.J. Gatcliffe, E. Huff-Lonergan, E.W. Wilson, Progress in reducing the pale, soft and exudative (PSE) problem in pork and poultry meat, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 46-63, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4PC8RNT-2/2/670c53bb01d6650f506d4c37b68a2de7>)

Abstract:

Research in the area of the pale, soft and exudative (PSE) pork and poultry meat is reviewed in this article with an emphasis on genetic, biochemical and metabolic factors contributing to the problem. Over the past five decades, there has been much more work in the pork meat area where a few genetic markers have been identified, and are currently used to remove susceptible

animals from the herd. Some of the markers are linked to aberrant calcium regulation in the early postmortem muscle. The poultry industry is still not at the point of using genetic marker(s); however, some recent work has revealed several potential markers. The review also discusses environmental factors such as antemortem stress and early postmortem processing practices (e.g. chilling rate) that can influence the development and severity of the PSE phenomenon. Some of these factors are known to cause protein denaturation at the early stage of postmortem and directly contribute to poor water-holding capacity and inferior texture in fresh meat and later in processed products. A newer hypothesis suggesting that variation in protein oxidation, in response to antemortem stress and early postmortem tissue environment, can contribute to development of PSE pork is also discussed. Finally, a few recommendations for future work are proposed.

Keywords: Chicken; Genetic; Halothane; Meat; Pig; Pork; Poultry; PSE; PSS; Review; Ryanodine

C.J. Lopez-Bote, F. Toldra, A. Daza, J.M. Ferrer, D. Menoyo, L. Sillio, M.C. Rodriguez, Effect of exercise on skeletal muscle proteolytic enzyme activity and meat quality characteristics in Iberian pigs, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 71-76, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4PFW6H7-1/2/ecadc209c2fbb054ae3e6488fe1da1bb>)

Abstract:

The effects of physical activity on performance, carcass traits, Psoas major lysosomal and exoprotease activities and meat quality were studied in 24 castrated male Iberian pigs during the last fattening period (from 111.1 +/- SD: 5.2 kg). Pigs were randomly distributed in three groups. Two groups receiving the same diet were reared in confinement, one housed in individual pens of 8 m² (sedentary group) and the other was housed outdoor with daily (up to 2 km) forced walking (exercise group). And one group was reared under the traditional production system walking daily several km and fed mostly with acorn from *Quercus ilex* and *Quercus rotundifolia* and grass (free-range group). No differences were found in performance and carcass traits. In exercised pigs a lower activity of cathepsin B + L and total cathepsins ($P < 0.05$) was observed. Exercise induced the inhibition of dipeptidyl peptidases II and III and arginyl aminopeptidase and the activation of dipeptidyl peptidases IV and leucyl aminopeptidase ($P < 0.05$). Although no effects on total free amino acids in Psoas major muscle were observed the concentration of branched chain amino acids decreased in the free-range pig group probably related to an increase in physical activity. Exercise had no effects in Psoas major postmortem tenderness and water holding capacity.

Keywords: Iberian pig; Proteolytic activity; Meat quality; Exercise

A.P. Moloney, M.G. Keane, M.T. Mooney, K. Rezek, F.J.M. Smulders, D.J. Troy, Energy supply patterns for finishing steers: Feed conversion efficiency, components of bodyweight gain and meat quality, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 86-97, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4PHSCBF-5/2/5447522196d2e93cfa87af35f10690b5>)

Abstract:

The objective was to determine the effect of pre-slaughter growth rate on feed efficiency, components of body growth and on the tenderness of longissimus muscle from steers reared to a common age and carcass weight. Sixty Friesian steers were group-housed and offered grass silage ad libitum and 3.5 kg concentrates per animal daily for 5 months and then 5 kg concentrates and 1 kg grass hay for 1 month before the experiment began. The animals were then weighed and in a randomised block were assigned to one of 5 groups, for slaughter at the beginning of the experiment or to be offered concentrates and hay (900 and 100 g/kg total diet, respectively) to achieve target growths of: 0.72 kg/day continuously for 17 weeks, 0.36 kg/day for the first 8 weeks and 1.08 kg/day for the final 8 weeks (low-high), 1.08 kg/day for the first 8 weeks and 0.36 for the

final 8 weeks (high-low) or 0.36 kg/day for the first 2 weeks, 0.72 kg/day during weeks 4 and 14 and 1.08 kg/day for the final 2 weeks (pulse). One week was allowed for transition to the different dietary allowances within each energy supply pattern. The mean age at the beginning and end of the study was 18 and 22.5 months, respectively. After slaughter, the weight of the carcass and kidney + channel fat depot were recorded, the pistola hind quarter was dissected into fat, lean and bone and the tenderness of the m. longissimus thoracis et lumborum (LTM) muscle was measured instrumentally and using a trained taste panel after 2, 7 or 14 days ageing. The pattern of energy supply did not affect carcass weight, fat score or kidney + channel fat weight. The pistola hind quarter from animals offered the low-high energy pattern had a similar composition to the continuously-fed animals but contained more muscle than that from animals offered high-low or pulse energy patterns. After 14 days ageing, LTM from the continuously-fed animals was more tender than that from animals offered the other energy supply patterns but shear force did not differ between supply patterns. The data do not support the hypothesis that pre-slaughter growth rate increases tenderness but suggest that energy supply pattern can influence body composition of finishing cattle.

Keywords: Beef; Energy; Muscle growth; Tenderness; Calpains; Sensory analysis

X. Serra, L. Guerrero, M.D. Guardia, M. Gil, C. Sanudo, B. Panea, M.M. Campo, J.L. Olleta, M.D. Garcia-Cachan, J. Piedrafita, M.A. Oliver, Eating quality of young bulls from three Spanish beef breed-production systems and its relationships with chemical and instrumental meat quality, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 98-104, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4PHSCBF-3/2/8359a7f4434f8a6903cc44b24e4a69e2>)

Abstract:

Sensory characteristics of longissimus thoracis muscle from three local Spanish beef breed-production systems and their relationships with chemical and instrumental meat quality traits were studied. Young bulls of Bruna dels Pirineus (BP; n = 69), Avilena-Negra Iberica (A-NI; n = 70) and Morucha (MO; n = 70) breeds were reared in their own production systems. MO breed showed the highest water holding capacity and also the highest thawing loss and haem pigment content ($P < 0.001$). No differences in moisture and protein contents were found among breeds. A-NI showed the highest intramuscular fat (IMF, $P < 0.05$) and total collagen ($P < 0.001$) contents, whereas BP showed the lowest IMF content ($P < 0.05$) and the highest collagen solubility ($P < 0.001$). Beef flavour, tenderness and juiciness accounted for the eating quality differences among the three breed-production systems. Meat from A-NI was rated significantly higher ($P < 0.01$) for beef flavour and tenderness than that from BP and MO animals. Furthermore, MO showed the lowest juiciness ($P < 0.001$) which could be due to its higher thawing loss. Within the three breeds, thawing loss was negatively correlated with juiciness and, likewise cooking loss with juiciness and tenderness ($P < 0.05$). The canonical discriminant analysis showed that the three breeds were significantly different ($P < 0.05$) from each other according to sensory attributes, which justifies their involvement in different protected geographical indications (PGI).

Keywords: Beef; Sensory quality; Meat quality; Spanish breeds

Karijn Bonne, Wim Verbeke, Muslim consumer trust in halal meat status and control in Belgium, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 113-123, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4PHSCBF-4/2/6cd86582cccd537705a75e3e5654571d>)

Abstract:

This paper focuses on public trust of Belgian Muslims in information sources of halal meat and their confidence in key actors and institutions for monitoring and controlling the halal meat chain.

Cross-sectional consumer data were collected through a survey with 367 Muslims during the summer of 2006 in Belgium. Findings reveal that Islamic institutions and especially the Islamic butcher receive in general most confidence for monitoring and controlling the halal status of meat, and for communicating about halal meat. However, based on Muslims' confidence, four distinct market segments were identified: indifferent (29.1%), concerned (9.7%), confident (33.1%) and Islamic idealist (26.7%). These segments differ significantly with respect to trust in information sources and institutions, health and safety perception of halal meat, perceived halal meat consumption barriers, behavioural variables (halal meat consumption frequency and place of purchase), and socio-cultural (acculturation and self-identity) and individual characteristics. Indifferent consumers are rather undecided about who should monitor the halal status of meat, and they are most open to purchasing halal meat in the supermarket. Concerned Muslim consumers display higher confidence in Belgian than in Islamic institutions, which associates with perceiving a lack of information, poor hygiene and safety concern as barriers to purchasing halal meat. Confident consumers display a clear preference for Islamic institutions to monitor and communicate about halal. Islamic idealists, who are typified by younger age, second generation and high Muslim self-identity, differ from the confident consumers through their very low confidence in local Belgian sources and institutions.

Keywords: Consumer; Food; Meat; Trust; Halal; Market segmentation; Quality; Religion

E. Cummins, P. Nally, F. Butler, G. Duffy, S. O'Brien, Development and validation of a probabilistic second-order exposure assessment model for *Escherichia coli* O157:H7 contamination of beef trimmings from Irish meat plants, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 139-154, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4PKPH0X-1/2/950e288517ad7c27c2e9ca0bdd6ffebe>)

Abstract:

A second-order quantitative Monte Carlo simulation model was developed for *Escherichia coli* O157:H7 contamination of beef trimmings in Irish abattoirs. The assessment considers initial contamination levels, cross-contamination and decontamination events during the cattle slaughter process. The mean simulated prevalence of *E. coli* O157:H7 on trimmings was 2.36% and the mean simulated counts of *E. coli* O157:H7 on contaminated trimmings was $-2.69 \log_{10}$ CFU/g. A parallel validation survey provided some confidence in the model predictions. An uncertainty analysis indicated that microbial test sensitivity is a significant factor contributing to model uncertainty and requires further investigation while also indicating that risk reduction measures should be directed towards reducing the hide to carcass transfer (correlation coefficient 0.25) during de-hiding and reducing the initial prevalence and counts on bovine hides (correlation coefficients 0.19 and 0.16, respectively). A characterisation of uncertainty and variability indicating that further research is required to reduce parameter uncertainty and to achieve better understanding of microbial transfer in meat plants. The model developed in this study highlights the need for further development of quantitative risk assessments in the food industry.

Keywords: Exposure assessment; Simulation; *Escherichia coli* O157:H7; Beef

M.W. Schilling, V. Radhakrishnan, Y.V. Thaxton, K. Christensen, J.P. Thaxton, V. Jackson, The effects of broiler catching method on breast meat quality, *Meat Science*, Volume 79, Issue 1, May 2008, Pages 163-171, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4PJ6GP4-1/2/84f5745ece92c7b1b952bc795e6d94d1>)

Abstract:

Mechanical and hand catching of broilers ($n = 24$ per treatment for each trial) were performed to determine if differences existed in breast meat quality among catching methods. Two trials (summer and winter 2005) were conducted, and it was determined that there was greater variation

in meat quality in the summer in comparison to the winter within treatments in both catching methods. Neither catching method yielded breast meat with significant quality issues. Therefore, either catching method should be acceptable for catching broilers in respect to meat quality. However, mechanical catching and crating for 2 h yielded slightly better ($P < 0.05$) quality meat than hand catching in respect to averages and individual quality problems. These slight improvements in meat quality included higher ($P < 0.05$) 15 min pH, lower ($P < 0.05$) drip loss, and lower ($P < 0.05$) incidence of pale meat with a rapid pH decline in the summer.

Keywords: Machine catching; Hand catching; Broiler breast; Meat quality

N. Prieto, S. Andres, F.J. Giraldez, A.R. Mantecon, P. Lavin, Discrimination of adult steers (oxen) and young cattle ground meat samples by near infrared reflectance spectroscopy (NIRS), *Meat Science*, Volume 79, Issue 1, May 2008, Pages 198-201, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.08.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4PCXGMS-1/2/d751cf1c840c4b1b2535cc34cbf93a92>)

Abstract:

Near infrared reflectance spectroscopy (NIRS) was used to discriminate different types of ground beef samples. Fifty-three and sixty-seven samples of longissimus thoracis muscle corresponding to adult castrated steers (over 4 years old) and young cattle (under 14 months old), respectively, were homogenized and scanned over the NIR range (1100-2500 nm). The results showed that NIRS could successfully discriminate 100% of ground beef samples depending on the sort of animal, probably as a consequence of differences in the intramuscular fat and water contents. Thus, NIRS is a fast, inexpensive, and non-destructive method that can be used to discriminate these beef products.

Keywords: Discrimination; Beef; Meat; NIRS

T. Strohmeier, A. Duinker, O. Strand, J. Aure, Temporal and spatial variation in food availability and meat ratio in a longline mussel farm (*Mytilus edulis*), *Aquaculture*, Volume 276, Issues 1-4, 30 April 2008, Pages 83-90, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2008.01.043.

(<http://www.sciencedirect.com/science/article/B6T4D-4RTBRPV-1/2/6e384ce3b711826ee25eac2d6352be74>)

Abstract:

The influence of temporal and spatial variation in food availability on mussel meat ratio and biomass was studied in a longline mussel farm (100 m wide and 250 m long, *Mytilus edulis*) during an eight-month period. Current velocity and phytoplankton concentration were measured and mean mussel biomass, density, wet weight and meat ratio were determined. The longline farm aligned the current direction lengthwise through the farm and reduced the current speed and flow to approximately one half to one third of reference station. The mean fluorescence depletion in the centre of the farm was 11% and the phytoplankton concentration (cells L⁻¹) was 20 to 91% less in the centre of the farm compared to the reference station. The mean meat ratio increased 1.8 times through the spring phytoplankton bloom. The mean meat ratio (%) and biomass (kg) were spatially variable through the farm with low values in the centre and increasing values towards the edges of the farm. This variation in meat ratio and biomass was observed at all natural phytoplankton concentrations and attributed to spatial variation in food availability through the farm.

Keywords: Bivalve aquaculture; Current velocity; Food availability; Meat content; Mussel; *Mytilus edulis*; Seston depletion

S. Cofrades, A. Serrano, J. Ayo, J. Carballo, F. Jimenez-Colmenero, Characteristics of meat batters with added native and preheated defatted walnut, *Food Chemistry*, Volume 107, Issue 4, 15 April 2008, Pages 1506-1514, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.10.006.

(<http://www.sciencedirect.com/science/article/B6T6R-4PV94F7-4/2/348fa29cba46c6f5071e1279faab0403>)

Abstract:

Effects of incorporation of native and preheated defatted walnut on the physicochemical, emulsifying and rheological properties of meat batters, as affected by final heating temperature were investigated. Replacing meat protein with native defatted walnut in meat product formulations reduced ($P < 0.05$) gel strength and emulsifying properties and hence the firmness and stability of meat batters but enhanced water- and fat-binding properties and hence the yield of a processed meat product. However, incorporation of preheated defatted walnut, in addition to improving ($P < 0.05$) water- and fat-binding properties during thermal treatment, improved the gelling ability of myofibrillar proteins, probably because the preheating of the defatted walnut promoted interactions between walnut proteins and muscle proteins.

Keywords: Native and preheated walnut; Physicochemical properties; Rheological properties

Ana M. Herrero, Raman spectroscopy a promising technique for quality assessment of meat and fish: A review, *Food Chemistry*, Volume 107, Issue 4, 15 April 2008, Pages 1642-1651, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.10.014.

(<http://www.sciencedirect.com/science/article/B6T6R-4PW05HN-3/2/446fb26c331a00625279538fae4a05ed>)

Abstract:

Raman spectroscopy data have been compared to different traditional methodologies such as protein solubility, apparent viscosity, water holding capacity, instrumental texture methods, dimethylamine content, peroxide values, and fatty acid composition commonly used to determine quality in fish and meat muscle treated under different conditions of handling, processing and storage through the changes of proteins, water and lipids of muscle food. It has been shown that Raman spectroscopy data are related to the results obtained with these traditional quality methods and could be used to evaluate muscle food quality. In addition, Raman spectroscopy provides structural information about the changes of proteins, water and lipids of muscle food that occur during the deterioration. Raman spectroscopy can also be used for determining muscle food identification. Besides, this spectroscopy technique has several advantages compared to traditional methods since it is a direct and non-invasive technique which requires small portions of sample.

Keywords: Muscle food; Fish; Meat; Raman spectroscopy; Quality assessment; Authenticity

A.M. Gutierrez, S. Martinez-Subiela, A. Montes, M.D. Parra, J.J. Ceron, C-reactive protein measurements in meat juice of pigs, *Veterinary Immunology and Immunopathology*, Volume 122, Issues 3-4, 15 April 2008, Pages 250-255, ISSN 0165-2427, DOI: 10.1016/j.vetimm.2008.01.002.

(<http://www.sciencedirect.com/science/article/B6TD5-4RKTN7R-2/2/a5bab9726e1caa141d34c9561352371a>)

Abstract:

A time-resolved immunofluorometric assay was evaluated for measurement of C-reactive protein in meat juice from diaphragmatic muscle collected from slaughtered pigs. Analytical and clinical validation of the method was performed by using meat juice samples, obtained by freezing and thawing muscle pieces. The intra- and inter-assay coefficients of variation ranged from 2.2-5.8% to 7.9-14.3%, respectively. The limit of detection was 0.00038 $\mu\text{g/ml}$. The method measured the CRP concentrations in a linear manner with a good accuracy ($r = 0.99$). CRP concentrations in serum were highly correlated with those in diaphragmatic meat juice ($r = 0.90$; $p < 0.001$). CRP concentrations were significantly higher in clinically affected pigs compared to non-diseased pigs. The assay described here provides a sensitive method for measuring CRP concentrations in meat juice, which can represent a suitable alternative to serum or blood samples and simplifies the process of sampling collection at slaughter.

Keywords: C-reactive protein; Meat juice; TR-IFMA; Pigs

B. Mansoori, M. Modirsanei, M. Radfar, M.M. Kiaei, M. Farkhoy, J. Honarзад, Digestibility and metabolisable energy values of dried tomato pomace for laying and meat type cockerels, *Animal Feed Science and Technology*, Volume 141, Issues 3-4, 1 April 2008, Pages 384-390, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.06.029.

(<http://www.sciencedirect.com/science/article/B6T42-4PBG1G6-2/2/e5569d710c82449765ca97eba4edeab1>)

Abstract:

Dried tomato pomace (DTP), as an alternative for other ingredients in laying hen as well as broiler diets, has shown to produce comparable or even superior performance. However, there is no report on the digestibility coefficients of DTP in poultry. The coefficient of total tract apparent digestibility (CTTAD) of dry matter, nitrogen and ash as well as metabolisable energy values of DTP alone and with enzyme were determined in laying and broiler cockerels, using the force feeding method. In two consecutive experiments, 15 adult laying-type cockerels (Hy-Line W36, 35-week-old) and 21 meat-type cockerels (Ross 308, 8-week-old) were randomly grouped into three groups of five and seven replicates, respectively. Each bird received glucose solution (30 g/50 ml), DTP alone (30 g) and DTP with Avizyme 1502 (30 g + 20 mg) and the voided excreta were collected quantitatively, for 48 h.

Adult laying-type cockerels and broilers were similar in total output of endogenous dry matter, nitrogen, ash and energy. DTP increased ($P < 0.001$) total dry matter, nitrogen, ash and energy output of experimental birds. Enzyme neither reduced the output of dry matter, nitrogen, ash and energy from adult cockerels, nor improved the CTTAD of dry matter, nitrogen, ash and metabolisable energy values of DTP ($P > 0.05$). However, the enzyme reduced the loss of dry matter, nitrogen and energy from broiler cockerels fed on DTP by 17%, 16% and 14%, respectively. The added enzyme improved the CTTAD of dry matter and nitrogen as well as the metabolisable energy values of DTP ($P < 0.05$).

Keywords: Dried tomato pomace; Nitrogen digestibility; Metabolisable energy; Feed enzyme

Diego A. Guzman, Raul H. Marin, Social reinstatement responses of meat-type chickens to familiar and unfamiliar conspecifics after exposure to an acute stressor, *Applied Animal Behaviour Science*, Volume 110, Issues 3-4, April 2008, Pages 282-293, ISSN 0168-1591, DOI: 10.1016/j.applanim.2007.04.017.

(<http://www.sciencedirect.com/science/article/B6T48-4NWW6CX-1/2/bee0cb8a1728321a6b536e9027647bdc>)

Abstract:

Runway tests are considered indicative of underlying sociality in birds and their ability to make social discriminations. We evaluated whether experience of a prior stressor alters the subsequent affiliation responses of 9 or 10-day-old chicks simultaneously exposed to familiar (cagemates) and unfamiliar conspecifics placed in goal boxes at opposite ends of a runway. Birds were housed in groups of eight in home cages. Half of the birds in each home cage were used as either familiar or unfamiliar social stimuli in the goal boxes. The other half of the birds were randomly assigned either to a control (CON; $n = 51$) group that remained undisturbed until testing or to a stress-treatment (STR; $n = 52$) group that was exposed to a 5-min restraint stressor, returned to its home cage and then tested 1 h later. Birds were individually tested in the runway for 5 min and the behaviours video-recorded. During revision of tapes, the projected floor image of the runway was divided into squares and zones. The stressor decreased ($P < 0.01$) the time spent in close proximity (close zone; CZ) to conspecifics regardless of the familiarity of the stimulus birds. Regardless of treatment, test chicks showed shorter latencies to enter ($P < 0.05$) and spent longer time ($P < 0.02$) in the familiar than in the unfamiliar CZ suggesting that young chicks can discriminate between familiar and unfamiliar conspecifics encountered in novel surroundings.

While in close proximity to familiar conspecifics, STR birds showed a reduced ($P < 0.05$) number of squares entered compared to CONs. This reduced locomotor activity was not accompanied by an increased activity in other zones of the runway. At the end of the trial, both CON and STR birds showed a reduced ($P < 0.05$) locomotor activity in the unfamiliar CZ and an increased ($P < 0.05$) activity in the central zone of the runway. Interestingly, no differences were detected between CON and STR birds in the total number of squares entered during the trial. These results suggest that prior stressor exposure did not affect the overall amount of locomotion but altered the spatial distribution of it. Collectively, our findings suggest that exposure to an acute stressor event subsequently affects chicks' affiliation responses in runway tests. The way a bird will react depends on the identity (familiar or unfamiliar) of the conspecifics in its close environment.

Keywords: Meat-type chickens; Stress; Social discrimination; Runway

Fred Wheaton, Oyster shell-meat sensor, *Aquacultural Engineering*, Volume 38, Issue 2, April 2008, Pages 127-134, ISSN 0144-8609, DOI: 10.1016/j.aquaeng.2008.01.005.

(<http://www.sciencedirect.com/science/article/B6T4C-4RRFNBR-1/2/b731c84d0d2df9457ee5e27b2a4911aa>)

Abstract:

Oyster processing sometimes requires determining if the shucking process has been completed. One application of this requirement is in the automated Wheaton oyster shucking machine where one oyster shell valve is removed and it is necessary to determine before the oyster proceeds through the remaining machine components whether the valve has been removed. Failure to remove the valve will cause the oyster meat to be destroyed downstream in the processing system. Thus, an automated sensor was developed to view the oyster and determine automatically if the valve was removed. The sensor is based on the difference in light absorption between the oyster meat and shell. Light reflected from the oyster passing beneath the sensor enters the sensor and passes through a beam splitter. Each light beam passes through a different narrow band filter and into a photocell. The output difference between the two photocells was used to determine if an oyster meat or shell was passing beneath the sensor. The sensor output for the 875 nm shell sensor varied from 0.143 to 0.305 mV and for the 975 nm shell sensor varied from 0.27 to 0.615 mV. When looking at meat the 875 nm sensor output varied from 0.157 to 0.305 mV and the 975 nm sensor varied from 0.307 to 0.622 mV. Results show the sensor will detect the difference between the oyster shell and the meat as long as there are readings for both sensing elements for both the meat and the shell. With the Wheaton shucking machine the design configuration will provide only a wavelength readings for either the meat or the shell but not both. Suggestions are presented to modify the system to allow the sensor to differentiate between the oyster meat and shell.

Because the study was designed to determine if the sensor would perform as designed data on the sensor speed was not available. However, the sensor was designed as part of a shucking machine with a design shucking rate of 60 oyster/min. With the electronic processing needed and the available computer processing power today the sensor should be able to meet the 60 oyster/min for which the shucking machine was designed.

Keywords: Oysters; *Crassostrea virginica*; Meat-shell sensor; Instrumentation; Sensors

Guorong Liu, Yanni Lv, Pinglan Li, Kang Zhou, Jinglan Zhang, Pentocin 31-1, an anti-*Listeria* bacteriocin produced by *Lactobacillus pentosus* 31-1 isolated from Xuan-Wei Ham, a traditional China fermented meat product, *Food Control*, Volume 19, Issue 4, April 2008, Pages 353-359, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.04.010.

(<http://www.sciencedirect.com/science/article/B6T6S-4NMC87F-4/2/062949caee59eab5cac46d53c9461824>)

Abstract:

Strain 31-1 was isolated from the traditional China fermented Xuan-Wei Ham and identified as *Lactobacillus pentosus* 31-1, produced pentocin 31-1 at 640 arbitrary units (AU)/ml in MRS broth in the early stationary phase (i.e. after 24 h). After concentration by ammonium sulfate precipitation, followed by separation in SP-Sepharose fast flow cation exchange chromatography, the bacteriocin had a molecular weight of approximately 14.2 kDa when analyzed by Tricine-SDS-PAGE. Pentocin 31-1 showed a wide range of antimicrobial activity against *Listeria* spp., *Staphylococcus* spp., *Bacillus* spp., *Lactobacillus* spp., *Streptococcus* spp., *Pediococcus* spp. and *Escherichia* spp. All *Listeria* strains tested, including *Listeria monocytogenes*, were highly sensitive to the bacteriocin. Pentocin 31-1 was heat stable, pH resistant and protease sensitive. Tween 80, tween 20 and urea did not decrease the activity, however, SDS induced 75% activity loss. The bacteriocin exerted a bactericidal action on sensitive cells of *L. monocytogenes* 54002 in TSYE broth. It did not adhere to the surface of the producer cells. And 50% bacteriocin adsorption to the surface of *L. monocytogenes* 54002 cells was found at pH 6.0-7.5, whereas no bacteriocin adsorption was detected at pH 5.0-5.5.

Keywords: Xuan-Wei Ham; *Lactobacillus pentosus*; Pentocin 31-1

Maarten J. Nauta, Arie H. Havelaar, Risk-based standards for *Campylobacter* in the broiler meat chain, *Food Control*, Volume 19, Issue 4, April 2008, Pages 372-381, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.04.016.

(<http://www.sciencedirect.com/science/article/B6T6S-4NNYJ6N-1/2/58cf1152bb4c9163944e8cfdb50d2de0>)

Abstract:

To control the risks of *Campylobacter* in broiler meat, microbiological criteria in the food chain are proposed for testing and scheduling, that is testing the level of contamination in a flock and diverting highly contaminated flocks away from fresh meat production. By applying quantitative risk assessment, the effects of this strategy for different test sensitivities at different stages in the food chain are evaluated for their expected impact on consumer health risk and the percentage of flocks to be scheduled. This offers a practical tool to compare costs and benefits of different risk management options and demonstrates the use of quantitative risk assessment to set risk-based standards.

Keywords: Risk assessment; Risk management; Microbiological criteria; *Campylobacter*; Broiler meat

J.M. Miranda, M. Guarddon, B.I. Vazquez, C.A. Fente, J. Barros-Velazquez, A. Cepeda, C.M. Franco, Antimicrobial resistance in Enterobacteriaceae strains isolated from organic chicken, conventional chicken and conventional turkey meat: A comparative survey, *Food Control*, Volume 19, Issue 4, April 2008, Pages 412-416, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.05.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4NS2GF8-1/2/53c598819e1b9c90c68bf9a1bebe7762>)

Abstract:

Mean counts of Enterobacteriaceae were determined for 30 samples each of organic chicken meat, conventional chicken meat and conventional turkey meat to assess differences in contamination. Two strains from each sample were isolated to obtain a total of 180 strains, which were examined for resistance to ampicillin, chloramphenicol, cephalothin, doxycycline, ciprofloxacin, gentamicin, nitrofurantoin, and sulfisoxazole. The mean counts of Enterobacteriaceae from organic chicken meat were significantly higher than those obtained from conventional chicken ($P < 0.0001$) or conventional turkey ($P < 0.0001$) meat. However, the resistance data obtained showed that isolates from organic chicken meat were less resistant than isolates from conventional chicken meat to ampicillin ($P = 0.0001$), chloramphenicol ($P = 0.0004$), doxycycline ($P = 0.0013$), ciprofloxacin ($P = 0.0034$), gentamicin ($P = 0.0295$) and sulfisoxazole ($P = 0.0442$), and were less resistant than isolates from turkey meat to doxycycline ($P = 0.0014$) and

sulfisoxazole ($P = 0.0442$). Multidrug resistant isolates were found in every group tested, but rates of multidrug resistant strains were higher in conventional chicken (63.3%) and turkey (56.7%) than organic chicken (41.7%) meat. The rates obtained for antimicrobial resistance support the theory that although organic chicken meat contains more Enterobacteriaceae contamination, organic farming practices contribute to decreased dissemination of antibiotic resistance.

Keywords: Poultry; Organic; Enterobacteriaceae; Antimicrobial; Resistance

K. Oishi, A.K. Kahi, Y. Nagura, M. Fujita, H. Hirooka, Effect of culling age of does on milk and meat production in Japanese-Saanen goats, *Livestock Science*, Volume 114, Issues 2-3, April 2008, Pages 220-232, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.05.003.

(<http://www.sciencedirect.com/science/article/B7XNX-4P2S2JX-2/2/9993a788956f921a9320ce1b1253424f>)

Abstract:

A functional herd dynamics model was developed to estimate the effect of culling age on milk and meat production for Japanese-Saanen goats in relation to changes in prices of milk and meat. The model simulates life cycle production of bucks and does and their kids. Every production trait is first modelled as an individual trait and thereafter as a trait in the herd using a herd dynamics model. At the individual level, the survival curve function, the litter size function and the production traits function are combined. Data on growth and lactation were used to fit growth and lactation curves to estimated parameters using non-linear least squares regression technique and used in the production traits function. Using herd dynamics, the individual level functions are combined with the total number of animals function to estimate the total herd output and income efficiency at the herd level. Here, variables of culling days including the effect of difference in meat price value among goat categories (bucks, does, male kids and female kids) are used. Analysis of interrelations among the culling days of does, the price ratio and the income efficiency indicated that optimal culling days of does was shortened with an increase in the price ratio of meat to milk. However, when meat price value was different among goat categories according to actual situation of Japanese goat production, the optimal culling days of does could be fixed regardless of the change in price ratio and was calculated as 1730 days. This functional herd dynamics model can aid in decision-making regarding culling under several situations especially when there is a wide fluctuation in prices at local markets.

Keywords: Japanese-Saanen; Herd dynamics model; Culling age; Income efficiency

J.D. Wood, M. Enser, A.V. Fisher, G.R. Nute, P.R. Sheard, R.I. Richardson, S.I. Hughes, F.M. Whittington, Fat deposition, fatty acid composition and meat quality: A review, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 343-358, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-5/2/9207a43d00ed100e5ee91ed47c0d0e3c>)

Abstract:

This paper reviews the factors affecting the fatty acid composition of adipose tissue and muscle in pigs, sheep and cattle and shows that a major factor is the total amount of fat. The effects of fatty acid composition on meat quality are also reviewed. Pigs have high levels of polyunsaturated fatty acids (PUFA), including the long chain (C20-22) PUFA in adipose tissue and muscle. The full range of PUFA are also found in sheep adipose tissue and muscle whereas cattle 'conserve' long chain PUFA in muscle phospholipid. Linoleic acid ($18:2n - 6$) is a major ingredient of feeds for all species. Its incorporation into adipose tissue and muscle in relation to the amount in the diet is greater than for other fatty acids. It is deposited in muscle phospholipid at a high level where it and its long chain products eg arachidonic acid ($20:4n - 6$) compete well for insertion into phospholipid molecules. Its proportion in pig adipose tissue declines as fat deposition proceeds and is an index of fatness. The same inverse relationships are not seen in ruminant adipose tissue but in all

species the proportion of 18:2n - 6 declines in muscle as fat deposition increases. The main reason is that phospholipid, where 18:2n - 6 is located, declines as a proportion of muscle lipid and the proportion of neutral lipid, with its higher content of saturated and monounsaturated fatty acids, increases. Oleic acid (18:1cis - 9), formed from stearic acid (18:0) by the enzyme stearoyl Co-A desaturase, is a major component of neutral lipid and in ruminants the same enzyme forms conjugated linoleic acid (CLA), an important nutrient in human nutrition. Like 18:2n - 6, [alpha]-linolenic acid (18:3n - 3) is an essential fatty acid and is important to ruminants since it is the major fatty acid in grass. However it does not compete well for insertion into phospholipid compared with 18:2n - 6 and its incorporation into adipose tissue and muscle is less efficient. Greater biohydrogenation of 18:3n - 3 and a long rumen transit time for forage diets also limits the amount available for tissue uptake compared with 18:2n - 6 from concentrate diets. A positive feature of grass feeding is that levels of the nutritionally important long chain n - 3 PUFA are increased ie EPA (20:5n - 3) and DHA (22:6n - 3). Future research should focus on increasing n - 3 PUFA proportions in lean carcasses and the use of biodiverse pastures and conservation processes which retain the benefits of fresh leafy grass offer opportunities to achieve this. The varying fatty acid compositions of adipose tissue and muscle have profound effects on meat quality. Fatty acid composition determines the firmness/oiliness of adipose tissue and the oxidative stability of muscle, which in turn affects flavour and muscle colour. Vitamin E is an essential nutrient, which stabilises PUFA and has a central role in meat quality, particularly in ruminants.

Keywords: Fatty acids; Meat quality; Pigs; Sheep; Cattle; Diets; Genetics; Lipid oxidation; Flavour

M. Pascual, M. Pla, Changes in collagen, texture and sensory properties of meat when selecting rabbits for growth rate, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 375-380, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4P6M66N-3/2/ed6f9faab11634b796e47509e8903283>)

Abstract:

The consequences of selection for growth rate and the associated decrease of maturity at slaughter in rabbits on collagen content, collagen solubility, meat texture (Warner-Bratzler shear device) and the sensory properties of the m. Longissimus were studied. Sixty rabbits from the 7th generation of a line selected for growth rate (group C) were compared to 60 rabbits from the 23rd generation of the same line (group S). Both groups were contemporarily reared and slaughtered at 2000 g. No changes on collagen content were found, but group S had a higher (5%) collagen solubility. Shear force, shear firmness and area or total work needed to cut the sample were not different between groups, and hardness evaluated in the panel test was not relevantly changed. Most of the sensory properties studied did not differ relevantly between groups. Group S had 8% less aniseed odour and 10% more juiciness.

Keywords: Selection; Collagen; Texture; Sensory analysis; Rabbit; Bayesian analysis

M.P. Serrano, D.G. Valencia, M. Nieto, R. Lazaro, G.G. Mateos, Influence of sex and terminal sire line on performance and carcass and meat quality of Iberian pigs reared under intensive production systems, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 420-428, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4P61NCR-2/2/a21b6b120cdef1657f4fafca0c1cc867>)

Abstract:

A trial was conducted to study the effects of sex (castrated males; females) and terminal sire line (DD, Danish Duroc; SD, Spanish Duroc; RIB, Retinto Iberian) on performance and carcass and meat quality of pigs slaughtered at 145 kg body weight. The female line was pure Iberian in all cases. Each treatment was replicated five times (six pigs). Females were more efficient, had less carcass and inter- and intramuscular fat and more trimmed primal cuts yield than castrated males.

Duroc sired pigs grew faster and had better feed conversion and carcass quality than RIB sired pigs. Crossbreeds from SD had less carcass yield than crossbreeds from DD or RIB. We conclude that productive performance and primal cuts yield were higher for females than for castrated males. Danish Duroc sires are an alternative to Spanish Duroc and Retinto Iberian sires for production of heavy pigs destined for the dry cured industry.

Keywords: Iberian pigs; Duroc pigs; Sex; Terminal sire line; Performance traits; Carcass and meat quality

P. Hernandez, V. Cesari, A. Blasco, Effect of genetic rabbit lines on lipid content, lipolytic activities and fatty acid composition of hind leg meat and perirenal fat, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 485-491, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-2/2/d9ab49b563edbd959bc3e9e575ac637e>)

Abstract:

The influence of genetic origin on lipid content, lipolytic activities and fatty acid composition of rabbit leg meat and perirenal fat was studied and changes in free fatty acids and oxidative parameters during refrigerated storage evaluated. Three rabbits lines were used, line R selected for growth rate and lines V and A selected for litter size at weaning. Line R had higher fat contents and higher lipolytic activities in the meat of the hind leg than lines A and V. Differences between lines were found in the fatty acids of the meat and perirenal fat. Lower SFA and higher PUFA percentages were found in line A. Free fatty acids and oxidative parameters were little influenced by rabbit line. Animals were measured at the same stage of maturity, thus it can be considered that differences found between lines are genetic differences and not differences due to the degree of maturity.

Keywords: Rabbits; Breeds; Lipids; Fatty acids; Lipolysis; Oxidation

Jacob Gotterup, Karsten Olsen, Susanne Knochel, Karsten Tjener, Louise H. Stahnke, Jens K.S. Moller, Colour formation in fermented sausages by meat-associated staphylococci with different nitrite- and nitrate-reductase activities, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 492-501, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-3/2/3f816ffc13f168a8d40df84773afd03c>)

Abstract:

Three *Staphylococcus* strains, *S. carnosus*, *S. simulans* and *S. saprophyticus*, selected due to their varying nitrite and/or nitrate-reductase activities, were used to initiate colour formation during sausage fermentation. During fermentation of sausages with either nitrite or nitrate added, colour was followed by L*a*b measurements and the content of nitrosylmyoglobin (MbFeIIINO) quantified by electron spin resonance (ESR). MbFeIIINO was rapidly formed in sausages with added nitrite independent of the presence of nitrite reducing bacteria, whereas the rate of MbFeIIINO formation in sausages with added nitrate depended on the specific *Staphylococcus* strain. Strains with high nitrate-reductase activity showed a significantly faster rate of pigment formation, but other factors were of influence as well. Product stability for the sliced, packaged sausage was evaluated as surface colour and oxidation by autofluorescence and hexanal content, respectively. No significant direct effect of the *Staphylococcus* addition was observed, however, there was a clear correspondence between high initial amount of MbFeIIINO in the different sausages and the colour stability during storage. Autofluorescence data correlated well with hexanal content, and may be used as predictive tools. Overall, nitrite- and nitrate-reductase activities of *Staphylococcus* strains in nitrite-cured sausages were of limited importance regarding colour development, while in nitrate-cured sausages strains with higher nitrate reductase activity were crucial for ensuring optimal colour formation during initial fermentation stages.

Keywords: Fermented sausage; Staphylococcus; Nitrate-reductase; Nitrite-reductase; Nitrosylmyoglobin; Cured colour formation

P. Costa, L.C. Roseiro, R.J.B. Bessa, M. Padilha, A. Partidario, J. Marques de Almeida, C.R. Calkins, C. Santos, Muscle fiber and fatty acid profiles of Mertolenga-PDO meat, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 502-512, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-7/2/4fffaee17050152042965a2d25d48441>)

Abstract:

The influence of phenotype and muscle type on intramuscular total lipids (ITL) neutral lipid (NL) and phospholipid (PL) compositions, cholesterol, [alpha]-tocopherol and haem iron contents were evaluated in Semitendinosus (St), Longissimus dorsi (Ld) and Supraspinatus (Ss) muscles from 39 Mertolenga young bulls. The results showed that lipid, [alpha]-tocopherol, cholesterol and haemic iron contents were not influenced by phenotype. Furthermore, the individual effect of phenotype was not a significant source of variation on ITL, NL and PL fatty acid composition. Muscle histological traits from Unicolor phenotype (n = 13) showed that Ss and Ld muscles exhibited higher proportion of type I (P < 0.001) and oxidative fibers (P < 0.001) and lower percentages of IIB fibers (P < 0.001) than St. The Ss muscle, with higher relative area occupied by oxidative fibers (P < 0.05-0.001) than Ld and St, had higher ITL (P < 0.001), NL (P < 0.001), PL (P < 0.05-0.01), [alpha]-tocopherol (P < 0.001), cholesterol (P < 0.01) and haem iron (P < 0.001) contents than its counterparts. Muscle type notably affected ITL, as a result of its influence on NL rather than in PL composition.

Keywords: Mertolenga-PDO meat; Fiber type; Fatty acids; Cholesterol; [alpha]-Tocopherol; Haem iron

Zouhaier Ben Belgacem, Mounir Ferchichi, Herve Prevost, Xavier Dousset, Mohamed Manai, Screening for anti-listerial bacteriocin-producing lactic acid bacteria from 'Gueddid' a traditionally Tunisian fermented meat, *Meat Science*, Volume 78, Issue 4, April 2008, Pages 513-521, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4P7R8D5-6/2/13e3db445f72429d98d243b7dde90503>)

Abstract:

Forty eight lactic acid bacteria strains isolated from 'Gueddid', a traditionally Tunisian fermented meat, were screened for bacteriocin production. Four strains named MMZ 04, 09, 13, and 17 showed antimicrobial activity and were identified as *Enterococcus faecium* by molecular methods based on the 16S-23S rDNA ISR, PCR-RFLP analysis of the 16S-23S rDNA ISR and species-specific primers. The four antimicrobial compounds were heat stable (121 [degree sign]C for 15 min), active over a wide pH range (3-9) and the antimicrobial activity was lost after treatment with trypsin, [alpha]-chymotrypsin and proteinase K but not by lysozyme and lipase. The mode of action of enterocin MMZ17 was identified as bactericidal. The MMZ17 bacteriocin was partially purified by ammonium sulphate precipitation and C18 Sep-Pack chromatography. The apparent molecular size of enterocin MMZ17 as indicated by activity detection after SDS-PAGE was lower than 6.5 KDa. According to these assays, enterocin MMZ17 can be classified as a small, heat-stable Listeria-active peptide, presumably belonging to class IIa bacteriocins.

Keywords: Gueddid; Bacteriocin; Enterococcus; Listeria; ITS; PCR-RFLP

Geoff Holds, Andrew Pointon, Michelle Lorimer, Andreas Kiermeier, Geoff Raven, John Sumner, Microbial profiles of carcasses and minced meat from kangaroos processed in South Australia, *International Journal of Food Microbiology*, Volume 123, Issues 1-2, 31 March 2008, Pages 88-92, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.12.007.

(<http://www.sciencedirect.com/science/article/B6T7K-4RDS1HD-4/2/1f16063fd71c888411cccf3d54aa388a>)

Abstract:

The microbiological profiles of kangaroo carcasses and minced meat at game meat processing plants in South Australia were determined in surveys undertaken in 2002 and 2004. In 2002 mean values for log₁₀ total viable counts (TVC) on carcasses at individual plants ranged from 0.9 to 3.9 log₁₀ cfu/cm², with the mean for all plants being 2.3 log₁₀ cfu/cm². In 2004 the between plant range was narrower, by about 1 log unit, and the mean value for carcasses at all plants was 1.2 log₁₀ cfu/cm². Minced kangaroo meat, was sampled in 2002 only. The overall mean log₁₀ TVC was 3.9 log₁₀ cfu/g, with mean counts at individual plants ranging from 3.1 to 4.6 log₁₀ cfu/g. The overall prevalence of *E. coli* was 70%, with mean numbers of 2.1 log₁₀ cfu/g on positive samples. *Salmonella* was not detected in any of 60 samples from carcasses in 2002. However, in 2004 *Salmonella* was detected in 4/385 samples (1.04%, 95% CI: 0.28%-2.64%). In minced kangaroo meat, *Salmonella* was detected in 9/50 (18%, 95% CI: 9%-31%) samples. The abdominal cavity, sampled in 2004, was found to be highly contaminated, with *E. coli* isolated from 46% of samples and the mean number for positive samples being 2.7 log₁₀ cfu/cm²; *Salmonella* was isolated from 14/120 (12%; 95% CI: 6.52%-18.80%) of abdominal cavities. The practice of collecting carcasses together and pushing grouped carcasses into the chiller likely leads to cross contamination of carcasses from the abdominal cavities of others. To align results of sampling by swabbing for domestic purposes with excision sampling, required for export purposes, both methods were used to sample opposite sides of each of the 50 carcasses sampled in 2004. The results obtained with the two methods of sampling were similar.

Keywords: Kangaroo carcasses; Minced kangaroo meat; *Escherichia coli*; *Salmonella*; Total viable counts

Tonu Pussa, Regina Pallin, Piret Raudsepp, Riina Soidla, Meili Rei, Inhibition of lipid oxidation and dynamics of polyphenol content in mechanically deboned meat supplemented with sea buckthorn (*Hippophae rhamnoides*) berry residues, *Food Chemistry*, Volume 107, Issue 2, 15 March 2008, Pages 714-721, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.08.090.

(<http://www.sciencedirect.com/science/article/B6T6R-4PP2D16-2/2/4adb760c0d83b9769bc395aa0fa87bc9>)

Abstract:

Mechanically deboned meat (MDM) contains about 10 times more polyunsaturated fatty acids (PUFAs) and also more hemoproteins than hand deboned meat (HDM) and is essentially more susceptible to both chemical and biochemical oxidation. The oxidation, leading to the formation of potentially mutagenic and carcinogenic derivatives of PUFAs, can be inhibited by berry extracts rich in antioxidant polyphenols. Using the 2-thiobarbituric acid reactive substances (TBARS) method, we have established that the ethanol slurry of the juice-free solid residue of sea buckthorn (*Hippophae rhamnoides* - SB) berries inhibits oxidation of unsaturated fatty acids, of both chicken and turkey MDM. The polyphenols, mainly flavonols, responsible for this inhibition, are comparatively stable during short-term cooking and 6-day storage of cooked SB-MDMs at +6 [degree sign]C. About half of the polyphenols are lost, obviously oxidised, during the storage of the uncooked samples of turkey 2%SB-MDM at +6 [degree sign]C. The loss of polyphenols is much smaller in the case of chicken MDM, which is characterised by an in situ lower content of fatty acids, including the polyunsaturated ones. The liquid chromatography-diode array detection-tandem mass spectrometry (LC-DAD-ESI-MS/MS) method was used for identification and ranking of the potent polyphenolic antioxidants in the berry residue.

Keywords: Mechanically deboned meat (MDM); Functional food; Sea buckthorn; Polyphenols; LC-MS/MS-ESI; TBARS

Sweetie R. Kanatt, Ramesh Chander, Arun Sharma, Chitosan and mint mixture: A new preservative for meat and meat products, Food Chemistry, Volume 107, Issue 2, 15 March 2008, Pages 845-852, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.08.088.

(<http://www.sciencedirect.com/science/article/B6T6R-4PKXBWB-F/2/52dd6dd7c6966aef8c5305447b7f4438>)

Abstract:

Meat is prone to both microbial and oxidative spoilage and therefore it is desirable to use a preservative with both antioxidant and antimicrobial properties. Mint extract alone had good antioxidant activity but poor antimicrobial activity, while chitosan alone showed poor antioxidant activity with excellent antimicrobial properties. Therefore, the potential of chitosan and mint mixture (CM), as a preservative for meat and meat products, was investigated. Addition of chitosan to mint extract did not interfere with the antioxidant activity of mint. In the case of 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay, the IC₅₀ value for CM (17.8 [μ g/ml]) was significantly (p [less-than-or-equals, slant] 0.05) lower than that for mint extract (23.6 [μ g/ml]). CM efficiently scavenged superoxide and hydroxyl radicals. The antimicrobial activities of CM and chitosan were comparable against the common food spoilage and pathogenic bacteria, the minimum inhibitory concentration being 0.05%. CM was more effective against Gram-positive bacteria. The shelf life of pork cocktail salami, as determined by total bacterial count and oxidative rancidity, was enhanced in CM-treated samples stored at 0-3 [degree sign]C.

Keywords: Chitosan mint mixture; Antioxidant; Antimicrobial; Meat products

Jun WANG, Chang-yan DENG, Yuan-zhu XIONG, Bo ZUO, Feng-e LI, Ming-gang LEI, Rong ZHENG, Jia-lian LI, Si-wen JIANG, Association of Single Nucleotide Polymorphisms in Exon 3 of Porcine LMCD1 Gene with Meat Quality and Carcass Traits, Agricultural Sciences in China, Volume 7, Issue 3, March 2008, Pages 370-374, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60078-4.

(<http://www.sciencedirect.com/science/article/B82XG-4SM1NR4-H/2/407d9a89f8e9cde4423d2baf8feb2dfd>)

Abstract:

LIM domain proteins are found to be important regulators in cell growth, cell fate determination, cell differentiation, and remodelling of the cell cytoskeleton by their interaction with some structural proteins, kinases, transcriptional regulators, etc. The presence of LIM domains in LMCD1 gene implies it may be involved in skeletal muscle protein-protein interactions. This study was to investigate polymorphisms of LIM and cysteine-rich domain 1 (LMCD1) gene and its effect on meat quality and carcass traits in pig. The polymorphism (G294A) in exon 3 region of porcine LMCD1 gene, which is synonymous mutation, was genotyped in the population of 178 F₂ pigs of a Large White x Meishan resource family. Statistical results indicated the distribution of allele G (with a A --> G mutation) and A (without mutation). Analysis of variance showed that the polymorphism of LMCD1 gene was associated with variation in several carcass traits of interest for pig breeding. Some carcass traits and meat quality traits are close to significance by association. An analysis of more animals is necessary to analyze the polymorphisms in exon 3 of porcine LMCD1 gene if it was selected as a marker for the pig carcass traits.

Keywords: porcine; LIM and cysteine-rich domain 1 (LMCD1); PCR-SSCP; carcass traits; meat quality traits

Y.J. Chen, I.H. Kim, J.H. Cho, J.S. Yoo, Q. Wang, Y. Wang, Y. Huang, Evaluation of dietary l-carnitine or garlic powder on growth performance, dry matter and nitrogen digestibilities, blood profiles and meat quality in finishing pigs, Animal Feed Science and Technology, Volume 141, Issues 1-2, 1 March 2008, Pages 141-152, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.025.

(<http://www.sciencedirect.com/science/article/B6T42-4NXGSC3-3/2/9a2ea76e6d9e6708c84214927670fa14>)

Abstract:

The effects of dietary l-carnitine or garlic powder supplementation on growth performance, coefficient of total tract apparent digestibility (CTTAD) for dry matter and nitrogen (N), blood profiles and meat quality were investigated in a 10-week feed trial. A total of 80 [(Landrace x Yorkshire) x Duroc] pigs with an initial body weight (BW) of 59 +/- 1.8 kg were randomly assigned to four dietary treatments with five replications per treatment and four pigs per pen. A maize-soybean meal-based diet was formulated as a control diet and other treatment diets were supplemented with 250 mg l-carnitine/kg and 1 g garlic powder/kg or 2 g garlic powder/kg, respectively. After the feeding period, meat samples were collected from those pigs, which reached market body weight (BW). During the feeding period, growth performance was not affected by dietary treatments. CTTAD for both DM and N were improved by supplementation of 1 g garlic powder/kg ($P < 0.05$). White blood cell (WBC) and lymphocyte concentrations were increased by l-carnitine addition at the end of experiment whereas garlic powder supplementation did not affect any tested blood profiles. Backfat thickness was decreased and muscle percentage was increased by the l-carnitine supplementation ($P < 0.05$). Pigs administered with 1 g garlic powder/kg had better meat colour, pH value and water holding capacity (WHC). In conclusion, dietary supplementation of l-carnitine (250 mg/kg) can increase WBC and lymphocyte concentration and decrease backfat thickness, while garlic powder supplementation at the level of 1 g/kg can improve CTTAD and meat quality in finishing pigs.

Keywords: l-Carnitine; Garlic powder; Digestibility; Meat quality; Finishing pigs

Mingmin Xiong, Yumei Zhang, Xianbiao Li, Changwei Ma, Effects of dietary Chinese cured meat on lipid metabolism in rats, *Food Chemistry*, Volume 107, Issue 1, 1 March 2008, Pages 60-67, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.07.048.

(<http://www.sciencedirect.com/science/article/B6T6R-4P940TK-1/2/ddffacf928d9224e4318f63697b0804c>)

Abstract:

The effects of different fats on animal lipid metabolism were investigated in order to clarify the safety of cured meat. The physical effect of nitrite in the cured meat was also explored due to an increased concern of this compound as a food additive. Body weight, food intake, organ/body weight ratio and plasma lipid profiles were analyzed. Rats fed with cured meat fat did not show any differences in body weight and food intake, compared with the control, and no significant difference was observed among groups. However, lard-fed rats showed marked morphological alternations in aortic intima and liver tissue. The cured meat group did not show apparent morphological changes on aorta intima compared to the control. Rats that received lard diet had significantly elevated TC (2.27 +/- 0.46 mmol/ml), higher LDL-C (0.78 +/- 0.31 mmol/ml) but lower HDL-C (1.55 +/- 0.14 mmol/ml). Lard-fed rats had elevated oxidized LDL in serum and MDA level in blood and liver. However, diets containing fresh fat (with/without added nitrite) or cured meat fat failed to show these detrimental effects.

Keywords: Chinese cured meat; Organ/body weight ratio; Plasma lipid profile; Lipid oxidation

Efsun Karabudak, Murat Bas, Gul Kiziltan, Food safety in the home consumption of meat in Turkey, *Food Control*, Volume 19, Issue 3, March 2008, Pages 320-327, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.04.018.

(<http://www.sciencedirect.com/science/article/B6T6S-4NP9814-2/2/e3b20db13c4ec0c380d71603862081d1>)

Abstract:

In this study, we investigated consumer meat-handling practices in Turkey. We conducted face-to-face interviews with 1090 consumers who included meat in their diet and were the primary

shopper and food handler in their home. The subjects also completed a questionnaire about their meat-handling practices. We found that many of those individuals failed to store meat at the correct temperature or did not correctly defrost meat. Food-handling practices varied according to the socioeconomic group and level of education of the respondent, and gaps in food safety knowledge were noted. Turkish meat consumers must be informed about the safe handling of meat products to prevent foodborne illness and ensure optimal food safety.

Keywords: Food safety; Meat; Home; Consumer

Jean-Louis Damez, Sylvie Clerjon, Said Abouelkaram, Jacques Lepetit, Beef meat electrical impedance spectroscopy and anisotropy sensing for non-invasive early assessment of meat ageing, *Journal of Food Engineering*, Volume 85, Issue 1, March 2008, Pages 116-122, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.07.026.

(<http://www.sciencedirect.com/science/article/B6T8J-4PCGRPF-5/2/32e12fe311af0e104e24477e935d2ae0>)

Abstract:

The objective of this work was to study the electrical anisotropy behaviour of beef meat during maturation for the purpose of early assessment of meat ageing. Early assessment of beef meat fibre strength allows customised ageing of raw materials and optimisation of refrigerated storage times. During the maturation phase connection proteins break down, causing structural changes, fragmentation of myofibrils and degradation of the cytoskeleton. These modifications produce effects on the strongly anisotropic character of the muscle structure that can be observed using a sensor based on the emission of a polarised wave. For example, by tracking variations in impedance according to the angle between the electrical field direction and the main direction of fibres, a measurement of structural state, and thus of maturation state, can be obtained. In this study, two specific directions were used: along and across meat fibres. A simple method using a sensor with aligned electrodes was used to measure lineic impedances and study contact impedances as parameters of interest. A lineic impedance index was defined as the difference between lineic impedance across and along meat fibres. The lineic impedance index and the contact impedance were shown to be closely correlated to meat fibres strength. These two parameters can therefore be used to predict meat maturation state.

Keywords: Meat ageing; Tenderness; Electrical impedance spectroscopy; Anisotropy; Impedance; Sensor

Y.M. Choi, Y.C. Ryu, S.H. Lee, G.W. Go, H.G. Shin, K.H. Kim, M.S. Rhee, B.C. Kim, Effects of supercritical carbon dioxide treatment for sterilization purpose on meat quality of porcine longissimus dorsi muscle, *LWT - Food Science and Technology*, Volume 41, Issue 2, March 2008, Pages 317-322, ISSN 0023-6438, DOI: 10.1016/j.lwt.2007.02.020.

(<http://www.sciencedirect.com/science/article/B6WMV-4N7SBYG-2/2/3e9178c9b04cc801754cd58fdaaa1b1a>)

Abstract:

The objective of this study was to investigate the effect of supercritical carbon dioxide (SC-CO₂) treatment for the sterilization purpose on meat quality and protein denaturation of the porcine longissimus dorsi muscle. The conditions of SC-CO₂ treatment were 7.4 and 15.2 MPa at 31.1 [degree sign]C for 10 min. SC-CO₂ treatment had no effect on muscle pH, tenderness, and water-holding capacity (WHC). However, the samples treated at 7.4 MPa had a higher lightness value (52.97 vs. 46.94, P<0.001) and a more pronounced extent of sarcoplasmic protein denaturation (73.80 vs. 80.73, P<0.01) than the control samples. These results suggest that the paler color of samples treated with SC-CO₂ was associated with the sarcoplasmic protein denaturation, and the major denaturated proteins were determined to be phosphorylase b (PH), creatine kinase (CK), triosephosphate isomerase (TPI), and one unknown protein. On the other hand, other quality traits were generally unaffected by the SC-CO₂ treatments at 7.4 or 15.2 MPa.

Keywords: Supercritical carbon dioxide; Meat quality; Protein denaturation

C. Rehfeldt, A. Tuchscherer, M. Hartung, G. Kuhn, A second look at the influence of birth weight on carcass and meat quality in pigs, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 170-175, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4P1G9SR-3/2/dc6fd587eff44f106499409a63c94385>)

Abstract:

To re-examine the relationship of birth weight with carcass and meat quality of pigs at market weight, offspring (n = 378) of 63 sows were assigned to three birth weight groups; 25% low weight (LW), 50% middle weight (MW), and 25% heavy weight (HW), with runts (<800 g) being excluded. LW pigs exhibited the lowest postnatal growth performance, the lowest lean mass and the greatest degree of fatness in terms of perirenal fat compared with MW and HW pigs. Only in females, but not in male castrates, the lean percentage was highest in HW pigs. Characteristics of longissimus muscle technological quality declined either in LW (pH, drip loss) or HW (conductivity, lightness) compared with MW pigs. In contrast, intramuscular fat percentage (IMF) was highest in LW pigs. The results suggest that the most desirable carcass composition is obtained with HW pigs, whereas optimum technological pork quality, except for IMF, is achieved with MW pigs.

Keywords: Birth weight; Carcass quality; Pork quality; Fat; Lean meat

E. Wiklund, G. Finstad, L. Johansson, G. Aguiar, P.J. Bechtel, Carcass composition and yield of Alaskan reindeer (*Rangifer tarandus tarandus*) steers and effects of electrical stimulation applied during field slaughter on meat quality, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 185-193, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4P2J0CX-3/2/2a5037e02b1bac8c82855fd1d1b00bb6>)

Abstract:

Twenty six adult reindeer steers (>3 years old) were used in a study to evaluate the effect of electrical stimulation (ES) on the quality of hot-boned, rapidly frozen shoulder meat and of the striploin (*M. longissimus*, LD) from carcasses held at +3 [degree sign]C for 48 h. Carcass yield and composition was determined from the left carcass half from which the shoulder meat was not removed. The shoulder meat was processed frozen into cubed, sliced or ground products. Proximate composition of the LD, meat color and water-holding capacity were very similar for the ES (n = 15) and non-electrical stimulation (NES; n = 11) groups. Ultimate pH and shear force values were significantly lower in the ES meat (LD), however a trained sensory panel could not detect differences between the two groups in any of the measured sensory attributes. Consumer preference tests demonstrated that ES increased tenderness in the cubed and sliced products made from field slaughtered reindeer shoulder meat. ES in combination with hot boning and processing of boneless frozen meat can be used in field slaughter systems for reindeer to improve meat quality and to increase the potential value of the carcass.

Keywords: Meat quality; Low voltage stimulation; Carcass composition; Shear force; Trained sensory panel; Consumer test

N. Mach, A. Bach, A. Velarde, M. Devant, Association between animal, transportation, slaughterhouse practices, and meat pH in beef, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 232-238, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4P4FV93-1/2/dac92559f078e2f92985d3664ee0e9fe>)

Abstract:

The objective of this study was to evaluate the influence of factors related to animal, farm, transportation, and animal handling at the slaughterhouse, as well as their interactions, on pH of

beef meat. A total of 5494 cattle (343 +/- 45 d of age) from 181 different Spanish farms were surveyed during three seasons (spring, summer, and winter) and a total of 25 pre-slaughter variables were recorded. Meat pH was measured at the Longissimus dorsi 24 h post-mortem (pH24). After a variable selection procedure, a mixed-effects logistic regression model was conducted with 5 variables (1 random and 4 fixed) to identify the main factors, and their interactions, affecting meat pH24. Average incidences of meat pH24 greater than 5.8 and 6.0 were 13.89% and 4.02%, respectively. The variability of meat pH24 explained with studied factors and their interactions was only 4.9%, a value too low to allow making technical decisions to improve meat pH24 in the Spanish market considering the variables studied.

Keywords: Beef; Meat pH; Pre-slaughter management

H.E. Warren, N.D. Scollan, G.R. Nute, S.I. Hughes, J.D. Wood, R.I. Richardson, Effects of breed and a concentrate or grass silage diet on beef quality in cattle of 3 ages. II: Meat stability and flavour, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 270-278, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4P2YWX8-4/2/fb91fe72572341c8181d932244239c97>)

Abstract:

This study examined the effect of breed and diet on meat quality, defined as lipid stability, colour shelf life and sensory quality. Ninety-six steers were used, half Aberdeen Angus (AA) cross and half Holstein-Friesian (HF). They were reared from 6 months of age on a standard concentrate diet or grass silage and slaughtered at 14, 19 or 24 months of age. Breed had small effects on quality with lower lipid stability in muscle of 24 month-old HF ($P < 0.05$). Sensory scores were similar between the breeds, the few differences being in favour of AA. Diet had the biggest effects on meat quality, in all 3 age groups. The grass silage diet produced higher plasma and muscle levels of vitamin E, lower lipid oxidation in loin steaks measured at 4 and 7 days of retail display and better colour stability (saturation) during shelf life in MAP (O₂:CO₂; 75:25) (all $P < 0.001$). The high values for lipid oxidation in the concentrate-fed steers were linked to high muscle PUFA concentrations and low levels of vitamin E.

Keywords: Beef; Sensory quality; Vitamin E; Colour; Lipid stability

M.B. Linares, R. Bornez, H. Vergara, Effect of stunning systems on meat quality of Manchego suckling lamb packed under modified atmospheres, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 279-287, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4P2YWX8-5/2/84a60b2570a49cba93ae83862a593d4b>)

Abstract:

The effects of the type of stunning (TS) [electrically vs. gas] and packing in modified atmospheres (MA) [MA-A: 30% CO₂/70% O₂; MA-B: 30% CO₂/69.3% N₂/0.7% CO; MA-C: 40% CO₂/60% N₂] on meat quality (pH), drip losses (DL), water holding capacity (WHC), shear force (SF) and instrumental colour (L*, and C* chroma) of suckling lamb of the Spanish Manchego breed at 7, 14 and 21 d post-packing was studied. Acceptance of meat samples (on the basis of colour and odour) was determined. In general neither the TS nor the MA affected the pH values. Meat from the gas stunned lambs had the lowest DL ($P < 0.001$ at 14 d post-packing), but lower WHC (more water expelled; $P < 0.01$ at 14 and 21 d post-packing), was more tender ($P < 0.01$) and had higher L* ($P < 0.001$ at 14 d post-packing) and C* values ($P < 0.001$) than the electrically stunned group. Similar values of WHC and SF were observed for all MA types but the use of CO in the packs (MA-B) caused less DL, gave the highest C* values, acceptability and colour stability with time of storage.

Keywords: Lamb meat; Stunning; Electrical; Carbon dioxide (CO₂); Modified atmospheres; Carbon monoxide (CO)

Martine Morzel, Claudia Terlouw, Christophe Chambon, Didier Micol, Brigitte Picard, Muscle proteome and meat eating qualities of Longissimus thoracis of 'Blonde d'Aquitaine' young bulls: A central role of HSP27 isoforms, Meat Science, Volume 78, Issue 3, March 2008, Pages 297-304, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4P429G3-4/2/1d9b41f3bb7a5bdf1a88f73d544427a4>)

Abstract:

Longissimus thoracis (LT) of 10 Blonde d'Aquitaine young bulls were sampled at slaughter. Protein composition of fresh muscle and of meat aged for 14 days was investigated by two-dimensional electrophoresis. Cooked meat properties were also evaluated by sensory analysis.

When searching for early predictors of tenderness, abundance of succinate dehydrogenase (SDH) was the best common predictor of initial and overall tenderness, explaining 65.6% and 57.8% of variation of these palatability traits. Study of the evolution of the protein content during ageing allowed to identify targets of postmortem proteolysis. They were mainly structural (actin, MyBPH) and chaperone (HSP27, [alpha]-crystallin) proteins. Furthermore, in a regression analysis modelling sensory tenderness, levels of HSP27 in fresh muscle and levels of HSP27 fragments in aged meat explained up to 91% of variation in sensory scores. Data suggest the existence of an underlying HSP27-related cellular mechanism, with consequences on tenderness development.

Keywords: Beef; Blonde d'Aquitaine; Proteome; Tenderness; HSP27; SDH

E. Boselli, D. Pacetti, F. Curzi, N.G. Frega, Determination of phospholipid molecular species in pork meat by high performance liquid chromatography-tandem mass spectrometry and evaporative light scattering detection, Meat Science, Volume 78, Issue 3, March 2008, Pages 305-313, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4P47GRB-3/2/379b4fd69b8e6ed581049fae443d64ab>)

Abstract:

Normal phase high performance liquid chromatography has been optimized for both evaporative light scattering detection and tandem mass spectrometry in order to characterize the natural phospholipids (PL) (classes and molecular species) of raw and cooked pork meat. The PL fraction included phosphatidylcholine (PC) (42.9% +/- 4.5 for raw vs 42.6% +/- 8.0 for cooked meat), plasmalogen-phosphatidylethanolamine (pPE) and phosphatidylethanolamine (PE) (26.7% +/- 3.1 vs 28.5% +/- 2.3), cardiolipin (CL) (8.3% +/- 2.9 vs 6.3% +/- 0.7), sphingomyelin (Sph) (7.5% +/- 0.9 vs 8.3% +/- 2.1), phosphatidylinositol (PI) (6.8% +/- 0.7 vs 6.5% +/- 2.1) phosphatidylserine (PS) (4.9% +/- 0.5 vs 4.6% +/- 1.4) and lysophosphatidylcholine (LPC) (2.9% +/- 1.3 vs 3.3% +/- 2.6). Arachidonic acid (absent in Sph) was mainly present in pPE and PI and formed molecular species with a saturated fatty acid, such as stearic (as in PI, PS, PE and PC) or palmitic acid (as in PE and PC), or the respective vinyl ethers in pPE (p18:0 and p16:0); however, in PC, arachidonic acid also formed combinations with oleic and linoleic acid. Palmitic acid formed the most abundant molecular species in PC, but not in CL, PE, PI and PS. Unexpectedly, the cooked pork meat showed an increased content of the molecular species of PI and LPC with more unsaturated fatty acids (18:0/20:4 and 18:2, respectively) with respect to raw meat.

Keywords: Pork meat lipids; Phospholipids; High performance liquid chromatography; Tandem mass spectrometry; Evaporative light scattering detection; Fatty acids

Violeta Fajardo, Isabel Gonzalez, Irene Martin, Mari'a Rojas, Pablo E. Hernandez, Teresa Garcí'a, Rosario Martin, Differentiation of European wild boar (*Sus scrofa scrofa*) and domestic swine (*Sus scrofa domestica*) meats by PCR analysis targeting the mitochondrial D-loop and the nuclear melanocortin receptor 1 (MC1R) genes, Meat Science, Volume 78, Issue 3, March 2008, Pages 314-322, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4P47GRB-4/2/11096f9bba3486ae2040bc8a85520a61>)

Abstract:

This work describes the differentiation of European wild boar (*Sus scrofa scrofa*) and domestic swine (*Sus scrofa domestica*) meats by PCR targeting sequences from two molecular markers: the mitochondrial displacement loop (D-loop) region and the nuclear melanocortin receptor 1 (MC1R) gene. A polymorphic D-loop fragment (~270 bp) was amplified and sequenced in a number of wild and domestic *Sus scrofa* meat samples, to find a nucleotide region suitable for PCR-RFLP analysis. Sequence data showed the presence of only a few point mutations across *Sus scrofa* D-loop sequences, not allowing direct discrimination between wild boar and domestic swine meats. Later, the MC1R gene was targeted and *Sus scrofa*-specific primers designed to amplify a 795 bp MC1R fragment. Subsequent RFLP analysis of the MC1R swine-specific amplicons allowed selection of BspHI and BstUI endonucleases to carry out intraspecific *Sus scrofa* differentiation. Digestion of MC1R amplicons with the chosen enzymes generated characteristic PCR-RFLP profiles that allowed discrimination among meats from wild and domestic swine specimens. The technique also enabled the detection of samples that yielded heterozygous profiles, suggesting hybrids resulting from wild boar and domestic pig breeding. The PCR-RFLP reported here, targeting the MC1R gene may be routinely applied to verify the correct labelling of game products.

Keywords: European wild boar; Domestic swine; D-loop; MC1R gene; PCR-RFLP

Caroline Rigault, Frederic Mazue, Arnaud Bernard, Jean Demarquoy, Françoise Le Borgne, Changes in l-carnitine content of fish and meat during domestic cooking, *Meat Science*, Volume 78, Issue 3, March 2008, Pages 331-335, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4P37JPJ-2/2/963f026f5121c517e2ce5adfb2d3106f>)

Abstract:

Human adults store around 20 g of l-carnitine. In the human body, l-carnitine is not metabolized but excreted through the kidney. Lost l-carnitine has to be replenished either by a biosynthetic mechanism or by the consumption of foods containing l-carnitine. Today, there is no 'official' recommended daily allowance for l-carnitine but the daily need for l-carnitine intake has been estimated in the wide range of 2-12 [μ]mol/day/kg body weight for an adult human. In this study we evaluated the effect of freezing and of different cooking methods on the l-carnitine content of red meat and fish. l-carnitine was abundantly present in all beef products analyzed. The amounts in the various cuts were similar and our data showed that freezing or cooking did not modify l-carnitine content. Salmon contained about 12 times less l-carnitine than beef but except in smoked salmon, cooking or freezing did not alter l-carnitine content. This study confirms the important role that meat products play for providing adequate amount of l-carnitine to the human body.

Keywords: l-Carnitine; Food composition; Domestic cooking; Meat; Salmon

Vikram Kestens, Jean Charoud-Got, Andrea Bau', Alexander Bernreuther, Hakan Emteborg, Online measurement of water content in candidate reference materials by acousto-optical tuneable filter near-infrared spectrometry (AOTF-NIR) using pork meat calibrants controlled by Karl Fischer titration, *Food Chemistry*, Volume 106, Issue 4, 4th International Workshop on Water in Foods, 15 February 2008, Pages 1359-1365, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.081.

(<http://www.sciencedirect.com/science/article/B6T6R-4P2S96B-3/2/de7f83c48def35b6684cb05cd376269b>)

Abstract:

Certified reference materials (CRMs) are prepared from a wide variety of matrices. Water removal is an excellent way of achieving increased matrix lifetime and hence CRM stability. High-speed acousto-optical tuneable filter near-infrared spectrometry (AOTF-NIR) has been implemented for measurement of water content in powder matrix reference materials in amber glass vials. Almost

50,000 spectra were collected from 1300 to 2100 nm with a 2 nm increment for powders of meat, rye grass, potato, cotton seed and sugar beet. The AOTF-NIR instrument was placed in a capping machine, with a measurement frequency of 10-15 vials/min and a trigger signal for reproducible collection of spectra. The calibrants comprised 19 pork meat powder samples equilibrated with different hygrostatic solutions or subjected to oven drying to achieve different water concentrations. Mixtures of powders with different water content were also prepared in order to obtain a calibration range from 0.5 to 8.3% water (m/m). All calibration samples were measured by volumetric Karl Fischer titration (V-KFT), accredited under ISO 17025. The calibrants were then measured by AOTF-NIR together with the samples. Multiplicative scatter correction (MSC) was applied to the absorbance spectra in order to correct for the scattering of light in the different powders and scattering effects from the vials. A partial least squares regression model (PLS) based on two principal components was created and applied for prediction of water content in the samples with a standard error of 0.5% water (m/m).

The AOTF-NIR has the potential of rapidly monitoring a large number of samples of different materials with good accuracy as demonstrated by the good agreement with V-KFT. Nevertheless, it is necessary to expand the number of calibration models for different vial sizes as it turns out that MSC cannot correct properly for the influence of scattering of light due to the different vial sizes, in this case 100 mL and 10 mL vials. The influence of the matrix seems not to be critical because the prediction of the water content in a wide variety of matrices was successful using the meat powder as a universal calibrant.

Keywords: Certified reference materials; Reference material processing; Water content; AOTF-NIR; Karl Fischer titration; MSC; PLS; Pork meat; Cotton seed; Potato; Sugar beet; Rye grass

Afef Najjari, Hadda Ouzari, Abdellatif Boudabous, Monique Zagorec, Method for reliable isolation of *Lactobacillus sakei* strains originating from Tunisian seafood and meat products, International Journal of Food Microbiology, Volume 121, Issue 3, 10 February 2008, Pages 342-351, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.11.045.

(<http://www.sciencedirect.com/science/article/B6T7K-4R7J5Y0-2/2/e3877d97b6c12e136703b139ffcde7f4>)

Abstract:

In Tunisia, several food products derived from meat or seafood are naturally processed, without any addition of bacterial starters. Such fermented, dried-cured, salted, or marinated products, as well as the raw meat or fish may thus provide a source to isolate the natural microflora colonizing such environments. We isolated lactic acid bacteria from a representative range of flesh-foods sold or manufactured in different parts of Tunisia, and selectively searched for *Lactobacillus sakei*, a lactic acid bacterium potentially useful as starter or protective culture. Eighty six (86) strains were isolated from various seafood (anchovy, sardine, sole, mullet, and octopus), or meat (pork, veal, beef, sheep, chicken, and turkey) products that were either fresh, or transformed by different traditional processes. Several methods were used in order to develop a rapid and reliable protocol for the direct identification of *L. sakei*. Amplified ribosomal DNA restriction analysis (ARDRA) classified the various isolates into 9 distinct groups. Search for the presence of the *L. sakei* specific *katA* gene indicated that all positive isolates were grouped in the same ARDRA group. Sequencing of 16S rDNA confirmed those isolates as *L. sakei*. Those 22 different *L. sakei* strains represent 25.6% of the total isolates, while other isolates found in the different ARDRA groups were tentatively ascribed to *Lactobacillus plantarum*, *Lactococcus lactis/garviae*, *Enterococcus avium*, *Streptococcus parauberis*, *Hafnia alvei*, *Pediococcus pentosaceus*, and *Lactobacillus curvatus* through 16S rDNA sequencing. A fast and reliable method to isolate and discriminate *L. sakei* from complex food environments is proposed.

Keywords: *Lactobacillus sakei*; Lactic acid bacteria; PCR

M.K. Fasseas, K.C. Mountzouris, P.A. Tarantilis, M. Polissiou, G. Zervas, Antioxidant activity in meat treated with oregano and sage essential oils, *Food Chemistry*, Volume 106, Issue 3, 1 February 2008, Pages 1188-1194, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.07.060.

(<http://www.sciencedirect.com/science/article/B6T6R-4P96263-2/2/36efb775de80789b1ae19578991f0ff9>)

Abstract:

The antioxidant activity of meat treated (homogenized) with oregano and sage essential oils, during meat storage, was determined using the following assays: a thiobarbituric acid (TBA) assay, a diphenylpicrylhydrazyl (DPPH) assay and a crocin assay. Porcine and bovine ground meat samples were divided into three experimental treatments, namely: control (no antioxidant), oregano (oregano essential oil 3% w/w) and sage (sage essential oil 3% w/w). Subsequently, the samples from each treatment were stored at 4 [degree sign]C, in the raw and cooked (at 85 [degree sign]C for 30 min) state, and the antioxidant activity was determined after 1, 4, 8 and 12 days of storage. The results showed that the essential oil treatments significantly reduced the oxidation, while the heat treatment and storage time significantly affected the antioxidant activity of the meat. The role of antioxidants appeared to be much more important in cooked meat than raw and the meat proteins greatly affected the antioxidant activity.

Keywords: Antioxidant; Oregano; Sage; Essential oil; TBA; DPPH; Crocin

Oleksandr Tokarskyy, Douglas L. Marshall, Immunosensors for rapid detection of *Escherichia coli* O157:H7 -- Perspectives for use in the meat processing industry, *Food Microbiology*, Volume 25, Issue 1, February 2008, Pages 1-12, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.07.005.

(<http://www.sciencedirect.com/science/article/B6WFP-4P9SND6-1/2/49ed9c9b4b7a2c2d63c862a4a34ff2fd>)

Abstract:

This review critically evaluates different types of immunosensors proposed for rapid identification of *Escherichia coli* O157:H7. The methods are compared with approved USDA-FSIS standard procedures for determination of this pathogen in raw or ready-to-eat meat products. Major advantages and disadvantages for each method are highlighted. Our analysis suggests that application of immunosensors in the meat-processing industry may be limited to identification of uncontaminated samples after conventional selective enrichment in broth. Use for detection appears limited at the present time.

Keywords: *Escherichia coli* O157:H7; Immunosensors; Food safety

Rhys J. Jones, Hassan M. Hussein, Monique Zagorec, Gale Brightwell, John R. Tagg, Isolation of lactic acid bacteria with inhibitory activity against pathogens and spoilage organisms associated with fresh meat, *Food Microbiology*, Volume 25, Issue 2, February 2008, Pages 228-234, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.11.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4R53SXW-2/2/b8675129abf58bcb535fee92fb89a837>)

Abstract:

The use of lactic acid bacteria (LAB) as protective cultures in vacuum-packed chill-stored meat has potential application for assuring and improving food quality, safety and market access. In a study to identify candidate strains suitable for evaluation in a meat model, agar-based methods were employed to screen 181 chilled meat and meat process-related LAB for strains inhibitory to pathogens and spoilage organisms of importance to the meat industry. Six meat-derived strains, including *Lactobacillus sakei* and *Lactococcus lactis*, were found to be inhibitory to one or more of the target strains *Listeria monocytogenes*, *Brochothrix thermosphacta*, *Campylobacter jejuni* and *Clostridium estertheticum*. The inhibitory agents appeared to be either cell-associated or molecules released extracellularly with bacteriocin-like properties. Variations detected in the antimicrobial activity of LAB associated with changes to test parameters such as substrate

composition underlined the importance of further in situ evaluation of the inhibitory strains in stored meat trials.

Keywords: Lactic acid bacteria; Bio-preservation; Meat; Hypothiocyanate; *Lactobacillus sakei*; *Lactococcus lactis*

I. Habib, I. Sampers, M. Uyttendaele, D. Berkvens, L. De Zutter, Performance characteristics and estimation of measurement uncertainty of three plating procedures for *Campylobacter* enumeration in chicken meat, *Food Microbiology*, Volume 25, Issue 1, February 2008, Pages 65-74, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.07.010.

(<http://www.sciencedirect.com/science/article/B6WFP-4PDC182-1/2/7aaa7a536e55cb12bd454428b2b18df0>)

Abstract:

In this work, we present an intra-laboratory study in order to estimate repeatability (r), reproducibility (R), and measurement uncertainty (U) associated with three media for *Campylobacter* enumeration, named, modified charcoal cefoperazone deoxycholate agar (mCCDA); Karmali agar; and CampyFood ID agar (CFA) a medium by Biomerieux(R) SA. The study was performed at three levels: (1) pure bacterial cultures, using three *Campylobacter* strains; (2) artificially contaminated samples from three chicken meat matrixes (total $n=30$), whereby samples were spiked using two contamination levels; ca. 103 cfu *Campylobacter*/g, and ca. 104 cfu *Campylobacter*/g; and (3) pilot testing in naturally contaminated chicken meat samples ($n=20$).

Results from pure culture experiment revealed that enumeration of *Campylobacter* colonies on Karmali and CFA media was more convenient in comparison with mCCDA using spread and spiral plating techniques. Based on artificially contaminated samples testing, values of repeatability (r) were comparable between the three media, and estimated as 0.15 log₁₀ cfu/g for mCCDA, 0.14 log₁₀ cfu/g for Karmali, and 0.18 log₁₀ cfu/g for CFA. As well, reproducibility performance of the three plating media was comparable. General R values which can be used when testing chicken meat samples are; 0.28 log₁₀, 0.32 log₁₀, and 0.25 log₁₀ for plating on mCCDA, Karmali agar, and CFA, respectively. Measurement uncertainty associated with mCCDA, Karmali agar, and CFA using spread plating, for combination of all meat matrixes, were ± 0.24 log₁₀ cfu/g, ± 0.28 log₁₀ cfu/g, and ± 0.22 log₁₀ cfu/g, respectively. Higher uncertainty was associated with Karmali agar for *Campylobacter* enumeration in artificially inoculated minced meat (± 0.48 log₁₀ cfu/g).

The general performance of CFA medium was comparable with mCCDA performance at the level of artificially contaminated samples. However, when tested at naturally contaminated samples, non-*Campylobacter* colonies gave similar deep red colour as that given by the typical *Campylobacter* growth on CFA. Such colonies were not easily distinguishable by naked eye.

In general, the overall reproducibility, repeatability, and measurement uncertainty estimated by our study indicate that there are no major problems with the precision of the International Organization for Standardization (ISO) 10272-2:2006 protocol for *Campylobacter* enumeration using mCCDA medium.

Keywords: *Campylobacter* enumeration; Repeatability; Reproducibility; Measurement uncertainty

T. Bigwood, J.A. Hudson, C. Billington, G.V. Carey-Smith, J.A. Heinemann, Phage inactivation of foodborne pathogens on cooked and raw meat, *Food Microbiology*, Volume 25, Issue 2, February 2008, Pages 400-406, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.11.003.

(<http://www.sciencedirect.com/science/article/B6WFP-4R5VYST-3/2/d23ca3648f5f3616f074f5366a60957b>)

Abstract:

Phages infecting *Salmonella* Typhimurium PT160 and *Campylobacter* jejuni were added at a low or high (10 or 104) multiplicity of infection (MOI) to either low or high (<100 or 104 cm⁻²) densities of host bacteria inoculated onto raw and cooked beef, and incubated at 5 and 24 [degree sign]C to

simulate refrigerated and room temperature storage. Counts of host bacteria were made throughout the incubation period, with phages being counted at the first and last sampling times. Host inactivation was variable and depended on the incubation conditions and food type. Significant host inactivations of the order of 2-3 log₁₀ cm⁻² at 5 [degree sign]C and >5.9 log₁₀ cm⁻² at 24 [degree sign]C were achieved compared to phage-free controls using the Salmonella phage under optimal conditions (high host cell density and MOI). These results alongside those already published indicate that phages may be useful in the control for foodborne pathogens.

Keywords: Campylobacter; Salmonella; Bacteriophage; Food safety; Biocontrol

Desj Simeoni, Lucia Rizzotti, Piersandro Coconcelli, Simona Gazzola, Franco Dellaglio, Sandra Torriani, Antibiotic resistance genes and identification of staphylococci collected from the production chain of swine meat commodities, Food Microbiology, Volume 25, Issue 1, February 2008, Pages 196-201, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.09.004.

([http://www.sciencedirect.com/science/article/B6WFP-4PNM47S-](http://www.sciencedirect.com/science/article/B6WFP-4PNM47S-1/2/906f0a6e9427adaf517aa6ac397b3a16)

[1/2/906f0a6e9427adaf517aa6ac397b3a16](http://www.sciencedirect.com/science/article/B6WFP-4PNM47S-1/2/906f0a6e9427adaf517aa6ac397b3a16))

Abstract:

Staphylococci harbouring antibiotic resistance (AR) genes may represent a hazard for human health and, as other resistant food-related bacteria, they contribute to the spread of AR. In this study, we isolated resistant staphylococci from an entire swine production chain and investigated the occurrence of 11 genes [aac(6')Ie-aph(2'')Ia, bla_Z, mecA, vanA, vanB, ermA, ermB, ermC, tet(M), tet(O) and tet(K)] encoding resistance to some antibiotics largely used in clinical practice. The 66 resistant staphylococcal isolates were identified as *Staphylococcus epidermidis* (27 isolates), *Staphylococcus aureus* (12), *Staphylococcus xylosus* (12), *Staphylococcus simulans* (5), *Staphylococcus pasteurii* (4), *Staphylococcus carnosus* (3), *Staphylococcus lentus* (2) and *Staphylococcus sciuri* (1). Specific-PCR detection of AR genes showed the prevalence of the tet(K) gene in most of the isolates (89.4%), followed by tet(M) and ermC (about 75%); mecA was detected in more than half of *S. aureus* and *S. epidermidis* isolates. The genes vanA and vanB were not retrieved. It was found that a high proportion of coagulase-positive and -negative isolates are multidrug-resistant and some of them carry up to six AR genes. Our findings show that the swine production chain is a source of antibiotic-resistant staphylococci suggesting the importance of resistance surveillance in the food production environment.

Keywords: Antibiotic resistance genes; PCR detection; Food chain; *Staphylococcus*; Multidrug resistance

Hyun Joung Jin, Changes in South Korean consumers' preferences for meat, Food Policy, Volume 33, Issue 1, February 2008, Pages 74-84, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2007.05.004.

([http://www.sciencedirect.com/science/article/B6VCB-4P0VD8Y-](http://www.sciencedirect.com/science/article/B6VCB-4P0VD8Y-1/2/2168e49586fc23ecad9384a292435a30)

[1/2/2168e49586fc23ecad9384a292435a30](http://www.sciencedirect.com/science/article/B6VCB-4P0VD8Y-1/2/2168e49586fc23ecad9384a292435a30))

Abstract:

This study analyzes the South Korean meat demand system, and the empirical results show that there are two statistically significant structural changes in Korean consumers' meat preferences, respectively in August 1998 and October 2001. The first break point is related to the Asian financial crisis and the second one coincides with the BSE outbreak in Japan. This implies that South Korean consumers reacted by taking defensive actions to lower their level of health risk by responding to a myriad of mass media reports regarding the Japanese BSE outbreak, although there was no case of BSE in South Korea.

Keywords: Food safety; BSE; Consumer preferences; Meat demand; Revealed preference test

R.G.M. van der Sman, Prediction of enthalpy and thermal conductivity of frozen meat and fish products from composition data, Journal of Food Engineering, Volume 84, Issue 3, February 2008, Pages 400-412, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.05.034.

(<http://www.sciencedirect.com/science/article/B6T8J-4NXRMD0-1/2/5204d5128b184b4d601d4e0b49d57385>)

Abstract:

In this paper we present models predicting thermophysical properties of frozen meat products purely using their composition data. Based on our previous model, predicting the water activity of (frozen) meat and fish products, while taking into account the non-ideality of the unfrozen solution, we can compute the ice fraction as a function of temperature. Knowing the composition and ice formed, the temperature dependency of heat capacities and latent heat, we can readily compute the enthalpy. For predicting the thermal conductivity a model is constructed taking into account the meat (fibrous) structure, the anisotropy of ice crystals, and the distribution of the composition over dispersed and continuous phases. Comparison model predictions to literature data on enthalpy and thermal conductivity shows that we can obtain reasonable prediction within engineering accuracy of 10%. The thermal conductivity model gives significant differences in conductivity parallel and perpendicular to meat fibres, in accordance with experimental data.

Keywords: Freezing; Predictions; Enthalpy; Thermal conductivity; Meat

Claudio Mondini, Maria Luz Cayuela, Tania Sinicco, Miguel Angel Sanchez-Monedero, Eleonora Bertolone, Laura Bardi, Soil application of meat and bone meal. Short-term effects on mineralization dynamics and soil biochemical and microbiological properties, *Soil Biology and Biochemistry*, Volume 40, Issue 2, February 2008, Pages 462-474, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2007.09.010.

(<http://www.sciencedirect.com/science/article/B6TC7-4PVR2TX-4/2/65c20007865f3888d12ce5562629ff07>)

Abstract:

Meat and bone meal (MBM) utilization for animal production was banned in the European Union since 2000 as a consequence of the appearance of transmissible spongiform encephalopathies. Soil application could represent a lawful and effective strategy for the sustainable recycling of MBM due to its relevant content of nutritive elements and organic matter. The effectiveness of MBM as organic fertilizer needs to be thoroughly investigated since there is a lack of knowledge about the mineralization dynamics of MBM in soil and the impact of such residues, in particular the high content of lipids, on soil biochemical and microbiological properties. For this aim, a defatted (D) and the correspondent non-defatted (ND) MBM were added at two rates (200 and 400 kg N ha⁻¹) to two different moist soils and incubated at 15 and 20 [degree sign]C for 14 d. MBM mineralization dynamics was studied by measuring CO₂ evolution. Water extractable organic C, K₂SO₄-extractable NO₃⁻ and NH₄⁺, microbial biomass ninhydrin-reactive N, enzymatic activities (FDA, urease, protease, alkaline phosphatase) and microbial composition (aerobic and anaerobic bacteria, fungi) were measured 2 and 14 d after MBM addition to the soil. The rate of CO₂ evolution showed a maximum 2-3 d after the addition of MBM, followed by a decrease approaching the control. MBM mineralization was fast with, on average, 54% of total CO₂ evolved in the first 4 d of incubation at 20 [degree sign]C. The percentage of added C which was evolved as CO₂ at the end of the incubation period ranged between 8% and 16% and was affected by temperature, soil type and MBM treatment (ND > D). Soil amendment with MBM caused a noteworthy increase in both extractable NH₄⁺ and NO₃⁻ (about 50% of added N) which was higher for ND. The addition of MBM also enhanced microbial content and activity. Microbial biomass increased as a function of the rate of application and was higher for ND with respect to D. The increase in numbers of aerobic and anaerobic bacteria and fungi caused by MBM addition was, in general, more pronounced with ND. Enzymatic activity in amended soils showed an enhancement in nutrient availability and element cycling. At the rate of application of present work, lipids did not cause adverse effects on soil microorganisms.

The potential of MBM as effective organic fertilizer was supported by the large increase in available N and the enhancement of the size and activity of soil microorganisms.

Keywords: Available N; Enzymatic activity; Lipids; Meat and bone meal; Mineralization; Soil microbial biomass

S. Rousset, P. Schlich, A. Chatonnier, L. Barthomeuf, S. Droit-Volet, Is the desire to eat familiar and unfamiliar meat products influenced by the emotions expressed on eaters' faces?, *Appetite*, Volume 50, Issue 1, January 2008, Pages 110-119, ISSN 0195-6663, DOI: 10.1016/j.appet.2007.06.005.

(<http://www.sciencedirect.com/science/article/B6WB2-4P29K5S-1/2/9d5e6cb498fcfbfa7e98742a73a29d42>)

Abstract:

The aim of the present study was to test if the social context represented by eaters' faces expressing emotions can modulate the desire to eat meat, especially for unfamiliar meat products. Forty-four young men and women were presented with two series of photographs. The first series (non-social context) was composed of eight meat pictures, four unfamiliar and four familiar. The second series (social context) consisted of the same pictures presented with eaters expressing three different emotions: disgust, pleasure or neutrality. For every picture, the participants were asked to estimate the intensity of their desire to eat the meat product viewed on the picture. Results showed that meat desire depended on interactions between product familiarity, social context and the participant's gender. In the non-social context, the men liked the familiar meat products more than the women, whereas their desire to eat unfamiliar meat products was similar. Compared to the non-social context, viewing another person eating with a neutral and a happy facial expression increased the desire to eat. Furthermore, the increase in the desire to eat meat associated with happy faces was greater for the unfamiliar than for the familiar meat products in men, and greater for the familiar than for the unfamiliar meats in women. In the presence of disgusted faces, the desire to eat meat remained constant for unfamiliar products in all participants whereas it only decreased for familiar products in men.

Keywords: Eating; Emotion; Meat; Faces; Familiarity

Jean-Christophe Augustin, Brice Minvielle, Design of control charts to monitor the microbiological contamination of pork meat cuts, *Food Control*, Volume 19, Issue 1, January 2008, Pages 82-97, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.02.007.

(<http://www.sciencedirect.com/science/article/B6T6S-4N49VHP-2/2/f4c0d1e8e050b2b0d4fab2e6f6fe6f0a>)

Abstract:

The microbiological contamination of pork meat cuts was characterized from Enterobacteriaceae and Pseudomonas counts obtained by 9 French cutting plants on 14 different meat cuts from 1999 to 2003. Contaminations were lognormally distributed with Enterobacteriaceae mean log counts ranging from 0.6 to 2.2 log₁₀ cfu cm⁻² and Pseudomonas log counts ranging from 1.1 to 4.4 log₁₀ cfu cm⁻² depending on the year of processing, the type of meat cut and mainly on the cutting plant. The variability of log counts was also characterized with a standard deviation approximately equal to 0.6 log₁₀ cfu cm⁻² whatever the microorganism under consideration. These results were used to propose control charts to detect more or less large increases of the microbiological contamination (i.e., 0.3-1.0 log₁₀ cfu cm⁻²). The performances of non-cumulative and cumulative attributes control charts, Shewhart (X and X-bar) and moving average control charts were compared and a moving average control chart calculated on five consecutive samples of one unit with a sampling rate of two samples per week was chosen as a process hygiene criterion to help operators to detect a breaking in their hygiene procedures.

Keywords: Pork meat cuts; Statistical process control; Enterobacteriaceae; Pseudomonas; Process hygiene criteria

C. Dalvit, M. De Marchi, C. Targhetta, M. Gervaso, M. Cassandro, Genetic traceability of meat using microsatellite markers, *Food Research International*, Volume 41, Issue 3, 2008, Pages 301-307, ISSN 0963-9969, DOI: 10.1016/j.foodres.2007.12.010.

(<http://www.sciencedirect.com/science/article/B6T6V-4RJ3WCF-2/2/6c2d699872c8ee1ff4dbc661c481cc33>)

Abstract:

Traceability systems have become necessary, especially for beef products, to protect consumers' health. Aims of this study were to validate and to test a set of 12 microsatellite (STR) markers for the assessment of a genetic traceability system in six cattle breeds. The probability to find, by chance, two individuals sharing the same profile at the studied loci, was computed considering different number of STR, pooling the alleles in each breed, in the total population and in the dairy and beef population separately. Best results were then obtained considering match probabilities per breed. In this study, genotyping the five most polymorphic loci, the probability of finding two identical animals was approximately five in one million. Match probability values increased when the pooled marker sets were used, but were still satisfactory; moreover, use of the pooled marker sets will reduce the cost of analyses.

Keywords: Genetic traceability; Meat; Individual identification; Match probability; Cattle breeds; Microsatellite

Pedro Fito, Fidel Toldra, Symposium on meat safety: From abattoir to consumer, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Page 1, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4PXDM85-1/2/7abdd80c13bdb6e683a5f4b8b49c8d8>)

John N. Sofos, Challenges to meat safety in the 21st century, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 3-13, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4P96265-1/2/35ca99c35796b19ef8f45ea5d3ceb832>)

Abstract:

The safety of meat has been at the forefront of societal concerns in recent years, and indications exist that challenges to meat safety will continue in the future. Major meat safety issues and related challenges include the need to control traditional as well as 'new,' 'emerging,' or 'evolving' pathogenic microorganisms, which may be of increased virulence and low infectious doses, or of resistance to antibiotics or food related stresses. Other microbial pathogen related concerns include cross-contamination of other foods and water with enteric pathogens of animal origin, meat animal manure treatment and disposal issues, foodborne illness surveillance and food attribution activities, and potential use of food safety programs at the farm. Other issues and challenges include food additives and chemical residues, animal identification and traceability issues, the safety and quality of organic and natural products, the need for and development of improved and rapid testing and pathogen detection methodologies for laboratory and field use, regulatory and inspection harmonization issues at the national and international level, determination of responsibilities for zoonotic diseases between animal health and regulatory public health agencies, establishment of risk assessment based food safety objectives, and complete and routine implementation of HACCP at the production and processing level on the basis of food handler training and consumer education. Viral pathogens will continue to be of concern at food service, bacterial pathogens such as *Escherichia coli* O157:H7, *Salmonella* and *Campylobacter* will continue affecting the safety of raw meat and poultry, while *Listeria monocytogenes* will be of concern in ready-to-eat processed products. These challenges become more important due to changes in animal production, product processing and distribution; increased international trade;

changing consumer needs and increased preference for minimally processed products; increased worldwide meat consumption; higher numbers of consumers at-risk for infection; and, increased interest, awareness and scrutiny by consumers, news media, and consumer activist groups. Issues such as bovine spongiform encephalopathy will continue to be of interest mostly as a target for eradication, while viral agents affecting food animals, such as avian influenza, will always need attention for prevention or containment.

Keywords: Meat; Safety; Pathogens; Hazards; Bacteria

B. Norrung, S. Buncic, Microbial safety of meat in the European Union, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 14-24, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4PC8RNT-1/2/bb4c2051dddabba4ae8efa864a9e7971>)

Abstract:

The two most frequently reported zoonotic diseases in humans in the EU in 2005 were *Campylobacter* and *Salmonella* infections with incidences of 51.6 and 38.2 cases per 100,000 population, respectively. Reported human infections caused by *Yersinia* spp., Verocytotoxigenic *Escherichia coli*, and *Listeria monocytogenes* had comparably lower incidences of 2.6, 1.2 and 0.3 cases per 100,000 population, respectively. Meat and meat products are important sources for these infections but knowledge on exactly how important they are compared with other types of food, drinking water and environmental exposure is quite limited. Occurrences of zoonotic pathogens in raw meat are variable, although most often are between 1% and 10%, depending on the organism, geographical factors, farming and/or meat production practices, etc.

Zoonotic pathogens in meat have to be controlled through a complete, continuous farm-to-fork system. It is of utmost importance to control faecal contamination of carcasses through efficient HACCP-based process hygiene management systems.

Keywords: Meat; Meat chain; Meat hygiene; Meat safety; Foodborne zoonoses; Foodborne pathogens; Foodborne outbreaks

Gianfranco Brambilla, Anna Laura Iamiceli, Fabiola Ferri, Alessandro di Domenico, Normative and pre-normative aspects for the management of actual and perspective POPs in meat and meat products, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 25-33, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.034.

(<http://www.sciencedirect.com/science/article/B6T9G-4PC8RNT-5/2/db32fd64727b07908e7a7498ae2b9bd8>)

Abstract:

With the acronym POPs we intend a group of persistent organic pollutants framed within the Stockholm Convention [Stockholm Convention on Persistent Organic Convention (POPs) (2004). Available from <http://www.pops.int/>]. POPs are a subgroup of the wide family of the aforesaid chemicals present in the environment, that are primarily of industrial origin. According to their physical-chemical properties, bioaccumulative behaviour in lipid tissues, and possible toxicological effects, they represent a relevant and growing concern for human beings. Foodstuffs of animal origin represent the main source of exposure. Monitoring data from national residue plans report only few non-compliances with respect to regulatory limits. However, the estimated intake, as in the case of polychloro-p-dibenzodioxins (PCDD), polychlorodibenzofurans (PCDF) and dioxin-like polychlorobiphenyls (DL-PCBs) may result close to the correspondent safety guidance value (i.e., the Tolerable Daily Intake), thus indicating the need to reduce the overall exposure. In animal productions, the sources of contamination may be the commercial feedingstuffs as well as the contact with contaminated soil and bedding materials and the overall quality of the environment where animal productions are carried out. In this light, a number of safety challenges are

envisaged to produce meat, such as: (a) characterization of the environment, (b) identification of the animal-based risk factors, (c) model-based approaches, able to predict bioaccumulation, and (d) teaching and training of stockmen.

Keywords: Persistent organic pollutants; Meat production; Environment; Food quality control

Milagro Reig, Fidel Toldra, Veterinary drug residues in meat: Concerns and rapid methods for detection, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 60-67, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4PC8RNT-3/2/e1d973b5c9824b4c2b9d900373008a1a>)

Abstract:

The use of substances having hormonal or thyreostatic action as well as [beta]-agonists is banned in the European Union. However, sometimes forbidden drugs may be added to feeds for illegal administration to farm animals for promoting increased muscle development or increased water retention and thus obtain an economical benefit. The result is a fraudulent overweight of meat but, what is worse, residues of these substances may remain in meat and may pose a real threat to the consumer either through exposure to the residues, transfer of antibiotic resistance or allergy risk. This has exerted a great concern among European consumers.

The control of the absence of these forbidden substances in animal foods and feeds is regulated in the European Union by Directive 96/23/EC on measures to monitor certain substances and residues in live animals and animal products. Analytical methodology, including criteria for identification and confirmation, for the monitoring of compliance was also given in Decisions 93/256/EEC and 93/257/EEC. More recently, Decision 2002/657/EC provided rules for the analytical methods to be used in testing of official samples. A crucial step is the screening of veterinary drug residues in live animals, feeds and animal products in view of the remarkable number of samples and large variety of residues to be analysed. In recent years, different rapid methods having easy performance, high sensitivity and high throughput have been proposed and are being extensively used. These methods as well as other new methods are reviewed in this manuscript.

Keywords: Veterinary drugs; Residues detection; Screening methods; Animal-origin foods; Food safety; Immunological methodologies; Chromatographic techniques

Karl-Otto Honikel, The use and control of nitrate and nitrite for the processing of meat products, *Meat Science*, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 68-76, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4P2J0CX-1/2/0543c00b7dc904455f9738774ce840e5>)

Abstract:

Nitrate and nitrite are used for the purpose of curing meat products. In most countries the use of both substances, usually added as potassium or sodium salts, is limited. Either the ingoing or the residual amounts are regulated by laws.

The effective substance is nitrite acting primarily as an inhibitor for some microorganisms.

Nitrite added to a batter of meat is partially oxidized to nitrate by sequestering oxygen - thus it acts as an antioxidant - a part of nitrite is bound to myoglobin, forming the heat stable NO-myoglobin, a part is bound to proteins or other substances in meat. Nitrate may be reduced to nitrite in raw meat products by microorganisms.

As oxidation and reduction may occur the concentrations of nitrite plus nitrate in a product has to be controlled and measured especially if the residual amounts are regulated.

This sum of both compounds is important for the human body. Intake of nitrate with food leads to its absorption over the digestive tract into the blood. In the oral cavity nitrate appears again where

it is reduced to nitrite. With the saliva the nitrite is mixed with food, having the same effect as nitrite in a batter (inhibiting growth of some pathogenic microorganisms) and swallowed. In the stomach nitrite can eventually form carcinogenic nitrosamines in the acidic environment.

Keywords: Nitrite; Nitrate; Meat products

George-John E. Nychas, Panos N. Skandamis, Chrysoula C. Tassou, Konstantinos P. Koutsoumanis, Meat spoilage during distribution, Meat Science, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 77-89, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4P47GRB-2/2/ddd4a7cdea0979262030f5538490a50e>)

Abstract:

Meat spoilage during distribution can be considered as an ecological phenomenon that encompasses the changes of the available substrata (e.g., low molecular compounds), during the prevailing of a particular microbial association, the so-called specific spoilage organisms (SSO). In fact, spoilage of meat depends on an even smaller fraction of SSO, called ephemeral spoilage organisms (ESO). These ESO are the consequence of factors that dynamically persist or imposed during, e.g., processing, transportation and storage in the market. Meanwhile spoilage is a subjective judgment by the consumer, which may be influenced by cultural and economic considerations and background as well as by the sensory acuity of the individual and the intensity of the change. Indeed, when spoilage progresses, most consumers would agree that gross discoloration, strong off-odors, and the development of slime would constitute the main qualitative criteria for meat rejection.

On the other hand, meat industry needs rapid analytical methods or tools for quantification of these indicators to determine the type of processing needed for their raw material and to predict remaining shelf life of their products. The need of an objective evaluation of meat spoilage is of great importance. The use of metabolomics as a potential tool for the evaluation of meat spoilage can be of great importance. The microbial association of meat should be monitored in parallel with the estimation of changes occurring in the production and/or assimilation of certain compounds would allow us to evaluate spoilage found or produced during the storage of meat under different temperatures as well as packaging conditions.

Keywords: Meat spoilage; Quantitative microbiology; Chemometrics; Bioinformatics; Predictive modelling; Chill chain; ANN; Machine learning; Meat chemistry; Metabolomics

Veronique COMA, Bioactive packaging technologies for extended shelf life of meat-based products, Meat Science, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 90-103, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.035.

(<http://www.sciencedirect.com/science/article/B6T9G-4R46FG4-1/2/f3e0bc89c9a6cc7391e7b548734436c2>)

Abstract:

To prevent the development and spread of spoilage and pathogenic microorganisms via meat foodstuffs, antimicrobial packaging materials could be a potential alternative solution. Instead of mixing antimicrobial compounds directly with food, incorporating them in films allows the functional effect at the food surface - where the microbial growth is mostly found - to be localized. Antimicrobial packagings include systems such as adding a sachet into the package, dispersing bioactive agents in the packaging, coating bioactive agents on the surface of the packaging material, or utilizing antimicrobial macromolecules with film forming properties or edible matrices. The potential of these technologies are evaluated for the preservation of meat and meat products.

Keywords: Antimicrobial packaging; Meat; Active matrices

Frank Vandendriessche, Meat products in the past, today and in the future, Meat Science, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 104-113, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.10.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4PXDM85-2/2/5a45a3d8fb59a5b05664714b797bb00c>)

Abstract:

An illustrative overview is given of the history of meat products, emphasizing the present situation. Three different consecutive and complementary periods can be defined in terms of realisations, threats and opportunities. The 'Quality' period started about 15 years ago and was characterised by the introduction of the ISO Quality Systems Standards. A trend from product control towards system control for guaranteeing Food Safety and Quality was obvious. The 'Food Safety' Period started with the introduction of HACCP. Pushed by Food Safety scandals this period is characterised by a growing influence of authorities and legislation besides an increase in distribution requirements. The 'Nutrition and Health' period has only just started. Global health problems related to food and the (potential) answers of the meat industry are highlighted. For meat products the energy (fat) level, the sodium level and fat quality in terms of fatty acid composition are the main priorities.

Keywords: Food safety; Nutrition and health; Quality; Meat processing

T. Aymerich, P.A. Picouet, J.M. Monfort, Decontamination technologies for meat products, Meat Science, Volume 78, Issues 1-2, Symposium on Meat safety: From Abattoir to Consumer, January-February 2008, Pages 114-129, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.07.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4P6M66N-5/2/6a21b004a76298ede59bc0bfeffa8017>)

Abstract:

Consumers demand high quality, natural, nutritious, fresh appearance and convenient meat products with natural flavour and taste and an extended shelf-life. To match all these demands without compromising safety, in the last decades alternative non-thermal preservation technologies such as HHP, irradiation, light pulses, natural biopreservatives together with active packaging have been proposed and further investigated. They are efficient to inactivate the vegetative microorganisms, most commonly related to food-borne diseases, but not spores. The combination of several non-thermal and thermal preservation technologies under the so-called hurdle concept has also been investigated in order to increase their efficiency. Quick thermal technologies such as microwave and radiofrequency tunnels or steam pasteurization bring new possibilities to the pasteurization of meat products especially in ready to eat meals. Their application after final packaging will prevent further cross-contamination during post-processing handling. The benefits of these new technologies and their limitations in an industrial application will be presented and discussed.

Keywords: Non-thermal and thermal technologies; Meat; Irradiation; High hydrostatic pressure; Biopreservation and natural antimicrobials; Active packaging; Radio frequency and microwave heating; Ohmic heating; Steam pasteurization

C.J. Lupton, J.E. Huston, J.W. Hruska, B.F. Craddock, F.A. Pfeiffer, W.L. Polk, Comparison of three systems for concurrent production of high quality mohair and meat from Angora male kids, Small Ruminant Research, Volume 74, Issues 1-3, January 2008, Pages 64-71, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2007.03.008.

(<http://www.sciencedirect.com/science/article/B6TC5-4NKB1XH-1/2/e790a7017a0f18b56cc1b8df6066f280>)

Abstract:

Castrated Angora kids (n = 210, initial BW = 25.4 +/- 4.0 kg) approximately 7 months of age were used in two consecutive years (2002 and 2003) to evaluate three production systems and coats in

terms of animal performance, carcass traits, mohair production and quality, and production costs. In both years, half the animals were assigned to an innovative feeding system (RF) that consisted of an open-sided barn having a raised, slatted floor, and the remaining goats were assigned in equal numbers to traditional feedlot (FL) and pasture (P) systems. Half the goats in each system were fitted with coats. Treatments and coat groups were blocked by body weight. The FL and RF goats had ad libitum access to rations formulated to produce high and moderate growth rates, respectively. Goats in the P treatment were supplemented three times a week to produce moderate growth. After shearing, fleeces were weighed and fully characterized using objective measurements. In 2002 (only), the goats were slaughtered and carcass traits were measured. The rations and supplements were formulated to produce weight gains and fleece weights that should have ranked FL > RF >= P. In fact, the FL and RF goats gained faster and grew more than the P goats. Overall gain rates were 124, 61, and 135 g/day for FL, P, and RF, respectively, while corresponding shorn body weights were 37, 30, and 38 kg. The larger animals in the FL and RF systems produced more mohair than goats in the P system (3.3 kg versus 2.8 kg, greasy). Mohair from RF goats was coarser than that from P goats (31.5 [μ m] versus 29.6 [μ m]) and contained lower curvature (18.8[$^{\circ}$]/mm versus 20.6[$^{\circ}$]/mm). System did not affect any of the other measured traits including scoured yield, mohair production efficiency (mohair production/kg BW), medullation, staple length, or any of the measures of trait variability (CV). System had no effect on dressing percentage but the consistent trend for carcass weight, back fat thickness, and body wall thickness, was consistent with live weights, FL = RF > P. As planned, coated produced higher yielding (74% versus 71%) fleeces compared to those from uncoated animals. Coats did not affect any other measured trait. Fiber and meat production were most expensive in the RF system and least expensive in the P system. Even with coats, mohair produced in the FL and P systems was not clean enough to qualify for the hand spinner niche market. The RF coated fleeces exhibited exceptional visual cleanliness that permitted them to be sold for several multiples of the prevailing mohair commodity price.

Keywords: Angora goat; Goat meat; Mohair; Niche market; Production system

J.H. Lee, G. Kannan, K.R. Eega, B. Kouakou, W.R. Getz, Nutritional and quality characteristics of meat from goats and lambs finished under identical dietary regime, *Small Ruminant Research*, Volume 74, Issues 1-3, January 2008, Pages 255-259, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2007.05.004.

(<http://www.sciencedirect.com/science/article/B6TC5-4P9T9MP-1/2/bd344576c3e83cae8181d1c0ed3155de>)

Abstract:

This experiment was conducted to compare the chemical composition and quality characteristics of chevon and lamb from animals raised under similar conditions. Crossbred goats (n = 16) and lambs (n = 16) raised under the same management conditions were slaughtered using standard procedures. After 24 h of cooler storage (2 [$^{\circ}$ C]), each carcass was fabricated into primal cuts. The loin chops (2.5-cm thick) from the left side were allotted for determination of cooking loss and Warner-Bratzler shear force (WBSF) values, and the chops from the right side were used to measure fresh meat color (CIE L* a* b* values). Subsequently, the Longissimus muscle (LM) and subcutaneous fat were excised from the right side chops to determine metmyoglobin percentages, thiobarbituric acid reactive substances (TBARS), proximate compositions, and fatty acid profiles. No differences (P > 0.05) were found in moisture, protein, and fat percentages between the LM of goats and lambs. However, the ash content in the LM of goats (1.73%) was higher (P < 0.05) than that of lambs (1.17%). Compared to lambs, goats had higher (P < 0.05) levels of palmitic (16.8% versus 21.6%), palmitoleic (2.91% versus 4.09%), and oleic (31.3% versus 36.6%) acids and a lower (P < 0.05) level of stearic acid (24.7% versus 20.0%) in the LM. Goats also had a higher (P < 0.05) level of tridecanoic acid (0.33% versus 0.93%) and a lower (P < 0.05) level of margaric acid (1.36% versus 1.20%) in subcutaneous fat

compared to lambs. The a^* values (redness) of lamb chops were higher ($P < 0.05$) compared with chevon chops. Percent metmyoglobin, TBARS, and cooking loss were not different ($P > 0.05$) between chevon and lamb chops. The WBSF values were lower ($P < 0.05$) in lamb chops compared with chevon chops. The results indicated that chevon has a healthier fatty acid composition compared to lamb, since it had lower levels of hypercholesteremic fatty acids and higher levels of unsaturated fatty acids. However, lamb may have better color and tenderness properties than chevon.

Keywords: Chevon; Lamb; Fatty acid; Color; Tenderness

Karin Nuernberg, Andreas Fischer, Gerd Nuernberg, Klaus Ender, Dirk Dannenberger, Meat quality and fatty acid composition of lipids in muscle and fatty tissue of Skudde lambs fed grass versus concentrate, *Small Ruminant Research*, Volume 74, Issues 1-3, January 2008, Pages 279-283, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2007.07.009.

(<http://www.sciencedirect.com/science/article/B6TC5-4PMYXMV-1/2/1d291d60a300488b0f895c0483e69f03>)

Abstract:

The objective of the experiment was to accumulate n-3 fatty acids and conjugated linoleic acids (CLA) in muscle and subcutaneous fat in Skudde lambs by feeding grass to concentrate. In total, 14 male lambs were allotted into two feeding groups at 18 kg live weight. Lambs were kept either on pasture (pasture, $n = 6$) or in stable (concentrate, $n = 8$). The daily gain of concentrate fed Skudde lambs (113 g/d) was lower compared to pasture kept animals (127 g/d). The carcass composition and meat quality was only slightly affected by the two feeding systems. Meat colour was significantly ($P < 0.05$) darker in lambs fed on concentrate. The linolenic acid (C18:3n-3) of grass was absorbed and deposited in the intramuscular ($P < 0.05$) and tail fat. Pasture feeding increased the concentration of CLAcis-9,trans-11 ($P < 0.05$; 11.3 versus 21.3 mg/100 g) and C18:1trans-11 (TVA; $P < 0.05$; 21.7 versus 45.6 mg/g) in muscle fat of Skudde lambs. The ratio of n-6/n-3 fatty acids was significantly lower in grass fed lamb muscle and adipose tissue fat ($P < 0.05$) but even in concentrate fed lambs the ratio was beneficial low.

Keywords: Fatty acids; Muscle; Tail fat; Meat quality lamb

Jacob Gotterup, Karsten Olsen, Susanne Knochel, Karsten Tjener, Louise H. Stahnke, Jens K.S. Moller, Relationship between nitrate/nitrite reductase activities in meat associated staphylococci and nitrosylmyoglobin formation in a cured meat model system, *International Journal of Food Microbiology*, Volume 120, Issue 3, 15 December 2007, Pages 303-310, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.08.034.

(<http://www.sciencedirect.com/science/article/B6T7K-4PKFGWT-2/2/0fe92bec8c8f3a49561e149550314602>)

Abstract:

Quantitative determination of catalase, nitrate reductase, nitrite reductase and nitric oxide synthase activities (NOS) was performed on 11 different bacterial strains, mainly staphylococci, isolated from fermented sausages, bacon brine or cured meat products. All except one strain possessed catalase activity in the range from 1.0 to 6.1 [μ]mol min⁻¹ ml⁻¹. Ten out of 11 bacteria strains showed nitrate reductase activity in the range between 50 and 796 nmol min⁻¹ ml⁻¹ and nine showed nitrite reductase activity in the range between 6 and 42 nmol min⁻¹ ml⁻¹. No evidence of NOS activity of the selected strains was detected. In a colour formation assay containing myoglobin all strains affected nitrosylmyoglobin (MbFeIIINO) formation in assays containing nitrite, whereas only strains having nitrate reductase activity generated MbFeIIINO in assays containing nitrate as the sole nitrosylating agent. The quantitative nitrate and nitrite reductase activity did not fully explain or correlate well with the observed rate of formation of MbFeIIINO, which seemed to be more affected by the growth rate of the different strains. The mechanism of the reduction of nitrite into NO of strains not having nitrite reductase activity remains

to be fully elucidated, but could be due to a dual-mode action of nitrate reductase capable of acting on nitrate.

Keywords: Staphylococcus; Nitrate-reductase; Nitrite-reductase; Nitrosylmyoglobin; Cured meat colour; Specific enzyme activities

W.J. Wang, S.P. Wang, Y.S. Gong, J.Q. Wang, Z.L. Tan, Effects of vitamin A supplementation on growth performance, carcass characteristics and meat quality in Limosin x Luxi crossbreed steers fed a wheat straw-based diet, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 450-458, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKXWRM-4/2/ffb6f4941a38efafc8a1a586fe00f89c>)

Abstract:

Three experiments were conducted to examine the effects of dietary vitamin A supplementation on performance and carcass parameters in Limosin x Luxi crossbreed finishing steers fed a wheat straw-based diet. Sixteen 12-month old (301 +/- 22 kg) steers, 16 12-month old (309 +/- 15 kg) steers and 16 24-month old (411 +/- 20 kg) steers were used in experiment 1 for 6 months feeding period, in experiment 2 for three months feeding period and in experiment 3 for three months feeding period, respectively. Sixteen steers of each experiment were randomly divided into the four groups of four animals. Treatments consisted of four vitamin A supplementation levels (0, 1100, 2200 and 4400IU/kg DM). The growth rate was affected by dietary vitamin A level in experiment 1 and 2, revealing that the suitable amount of vitamin A supplementation increased the growth rate; excessive vitamin A in the ration decreased the growth rate of 12-month-old finishing steers. The marbling deposition decreased with the increment of vitamin A supplementation level, but possibly associated with vitamin A supplementing duration. Furthermore, the suitable dietary vitamin A level probably decreased lipid and pigment oxidation, and increased the tenderness of beef meat. Vitamin A supplementation had no significant effect on chemical composition of gluteus medius muscle and longissimus dorsi muscle.

Keywords: Steers; Vitamin A; Meat quality; Performance

C. Jurie, B. Picard, J.-F. Hocquette, E. Dransfield, D. Micol, A. Listrat, Muscle and meat quality characteristics of Holstein and Salers cull cows, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 459-466, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKJ0MR-6/2/c94849445bfe490eaa23dff8c8c98850>)

Abstract:

Muscle characteristics and sensory rating of meat were determined in *M. longissimus thoracis* (LT), *M. semimembranosus* (SM), *M. semitendinosus* (ST) and *M. triceps brachii* (TB) from seven Holstein (HO, dairy breed) and six Salers (SA, beef breed) cull cows slaughtered at 6-7 years of age at the same fat score. Significant differences ($P < 0.001$) among muscle types were observed: ST was the more glycolytic and TB the more oxidative; total collagen: ST > SM = TB > LT; initial and overall tenderness: LT > TB = SM > ST, juiciness: TB > LT = SM > ST. Flavour differed only between breeds: HO > SA ($P < 0.01$). Three tenderness classes (high, intermediate, low) were determined from scores for sensory overall tenderness for all 52 meats: the lower total and insoluble collagen contents, the more oxidative metabolism, the more tender was the meat. Muscle type, and not breed explained most of the variability of meat quality from dairy and beef cull cows slaughtered at the same age and fat score.

Keywords: Cows; Breed; Muscle characteristics; Meat quality

M. Pascual, M. Pla, Changes in carcass composition and meat quality when selecting rabbits for growth rate, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 474-481, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKJ0MR-7/2/db483c522274627b316c4c48acf5e59f>)

Abstract:

Sixty rabbits from the 23rd generation (group S) of a line selected for growth rate were compared to sixty rabbits from the 7th generation of the same line (group C) to study possible relevant changes in carcass composition and meat quality due to the selection and the consequent decrease in degree of maturity at slaughter weight (2000 g). The only relevant changes in carcass composition were an increase in kidneys, liver and dissectible fat percentages and a decrease in meat to bone ratio of the hind leg. In m. Longissimus, group S had lower yellowness of the carcass and higher redness and yellowness of the meat. ICDH activity increased and the aldolase:ICDH ratio decreased. In the hind leg, group S had higher values of PUFA, PUFA/SFA ratio and n - 3 fatty acids.

Keywords: Selection; Carcass composition; Meat quality; Rabbit; Bayesian analysis

Daniel Morlein, Gregor Link, Carsten Werner, Michael Wicke, Suitability of three commercially produced pig breeds in Germany for a meat quality program with emphasis on drip loss and eating quality, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 504-511, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4NRK4PT-2/2/f42dc2d77a43cace9e565571940c92b9>)

Abstract:

This study aimed at characterising 606 crossbred pigs of three commercially available breed types in terms of their carcass and meat quality. Breed G and H were German Large White (LW) x German Landrace (LR) sows sired with Pietrain (PI) boars, i.e. PI x (LW x LR). Breed S was 25% Duroc (DU), i.e. PI x (DU x LR). Most of the parameters were affected by breed and/or date of slaughter. The meat of crossbred pigs with 25% Duroc proportion appeared most favourable because of higher intramuscular fat content, lower drip loss and higher sensory liking scores. Conductivity is closely related to drip loss while the data suggests that the relationship is dependent on breed and carcass weight. The application of conductivity and lean meat yield thresholds to select carcasses with uniform and superior meat quality effectively decreased drip loss and increased intramuscular fat content as well as sensory liking scores. The variation of meat quality traits remains high, though.

Keywords: Pork; Meat quality; Conductivity; Drip loss; Intramuscular fat; Duroc

Jean-Louis Damez, Sylvie Clerjon, Said Abouelkaram, Jacques Lepetit, Dielectric behavior of beef meat in the 1-1500 kHz range: Simulation with the Fricke/Cole-Cole model, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 512-519, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4NR18KV-3/2/f2a14eb7817793e48f395f411b952e1a>)

Abstract:

The electrical properties of biological tissues have been researched for many years. Impedance measurements observed with increasing frequencies are mainly attributed to changes in membrane conductivity and ion and charged-molecule mobility (mainly Na⁺, K⁺, Cl⁻ ions). Equivalent circuits with passive electrical components are frequently used as a support model for presentation and analyses of the behavior of tissues submitted to electrical fields. Fricke proposed an electrical model where the elements are resistive and capacitive. The model is composed of a resistive element (R_p) representing extracellular fluids (ECF) placed in parallel with a capacitive element (C_s) representing insulating membranes in series and a resistive element (R_s) representing intracellular fluids (ICF). This model is able to describe impedance measurements: at lower frequencies, most of the current flows around the cells without being able to penetrate them,

while at higher frequencies the membranes lose their insulating properties and the current flows through both the extracellular and intracellular compartments. Since meat ageing induces structural change, particularly in membrane integrity, the insulating properties of membranes decrease, and intracellular and extracellular electrolytes mix, thus driving changes in their electrical properties. We report a method combining the Fricke and Cole-Cole models that was developed to monitor and explain tissues conductivity changes in preferential directions during beef meat ageing.

Keywords: Dielectric properties; Electrical conduction; Biomathematics; Inverse modeling; Membrane; Beef ageing; Muscle structure

G.R. Nute, R.I. Richardson, J.D. Wood, S.I. Hughes, R.G. Wilkinson, S.L. Cooper, L.A. Sinclair, Effect of dietary oil source on the flavour and the colour and lipid stability of lamb meat, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 547-555, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4NS2GP9-2/2/82d35cc5cbc37e74ddacb376eeeeafb06>)

Abstract:

This study investigated the influence of five sources of dietary oil (linseed oil (LO), fish oil (FO), a protected lipid supplement (PLS, 18:2 to 18:3 ratio 3:1), fish oil/marine algae (FOMA) and PLSMA) on the colour and lipid stability of lamb muscle and the flavour of grilled loin chops. LO produced the highest proportion of 18:3n-3 in muscle phospholipid, the highest ratings for lamb flavour intensity and overall liking and the lowest ratings for abnormal flavour intensity. PLS increased the proportion of 18:2n-6 which reduced lamb flavour intensity and increased abnormal lamb flavour intensity. Diets containing FO or MA increased proportions of the longer chain n-3 fatty acids and similar reduced ratings for lamb flavour as the PLS diet. FO-containing diets increased fishy flavour notes, especially when in combination with MA. 'Putty' and 'fish oil' odours were recognised as being present more frequently in cooked subcutaneous lamb fat from lambs fed FO and FOMA than other diets. Lambs fed MA, FO and the combination of the two produced meat that was oxidatively less stable and had a reduced colour and lipid oxidative shelf-life, which was at least partially due to the lower vitamin E content of the muscle.

These results have significant implications for the formulation of diets that may improve nutritional ratios in lamb meat but which adversely affect flavour and meat stability.

Keywords: Lamb; Dietary oils; Fatty acids; Sensory ratings; Colour stability; Lipid oxidation

Xue Zhang, Baohua Kong, Youling L. Xiong, Production of cured meat color in nitrite-free Harbin red sausage by *Lactobacillus fermentum* fermentation, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 593-598, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4NS2GP9-3/2/1b899b7a8407aa6bc23001e40b77b045>)

Abstract:

Lactobacillus fermentum was substituted for nitrite to produce cured pink color in a Chinese-style sausage. Treatments included inoculations (104, 106, and 108 CFU/g meat) followed by fermentation at 30 [degree sign]C for 8 h and then at 4 [degree sign]C for 16 h. Control sausage (with sodium nitrite, 60 mg/kg meat) was cured at 4 [degree sign]C for 24 h without *L. fermentum*. The UV-Vis spectra of pigment extract from *L. fermentum*-treated sausage were identical to that of nitrosylmyoglobin (NO-Mb) formed in nitrite-treated control. The NO-Mb concentration and the colorimetric a^* value of sausage treated with 108 CFU/g meat of *L. fermentum* essentially replicated those in nitrite-cured meat. Free amino acid content in sausage treated with *L. fermentum* was greater and the pH slightly lower compared with the nitrite-cured control sample. This study showed that *L. fermentum* has the potential to substitute for nitrite in the sausage production.

Keywords: Sausage; *Lactobacillus fermentum*; Nitrite; Nitrosylmyoglobin

P. Polidori, M. Antonini, D. Torres, D. Beghelli, C. Renieri, Tenderness evaluation and mineral levels of llama (*Lama glama*) and alpaca (*Lama pacos*) meat, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 599-601, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4NTBFNP-1/2/4013b9634bca36986bbccdd1fcf0f3a8b>)

Abstract:

Tenderness and mineral levels were determined in the Longissimus thoracis taken from 20 llama and 30 alpaca males reared in Peru and slaughtered at 25 months of age. Mineral contents were determined using an inductively coupled plasma emission spectrometer. Tenderness evaluation was determined two and seven days post slaughter using a Warner-Bratzler shear force device. Potassium is the mineral with the highest content, with a significant difference ($P < 0.05$) between the two species of camelids. The other mineral contents were, in decreasing order, phosphorus, sodium, magnesium and calcium, in addition to smaller percentages of zinc and iron. Shear force values determined seven days post slaughter were significantly ($P < 0.01$) lower in both the species compared with the results obtained two days post slaughter.

Keywords: Llama; Alpaca; Minerals; Tenderness

A.L. Mayer, J.S. Smith, D.H. Kropf, J.L. Marsden, G.A. Milliken, A comparison in the composition of recovered meat produced from beef neckbones processed using hand boning, a traditional Advanced Meat Recovery (AMR) system, and a Desinewated Minced Meat system, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 602-607, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4NTRT7P-1/2/fc4d366a4d3b2c5ae1c4266c67de54ad>)

Abstract:

Beef neckbones were processed through a traditional Advanced Meat Recovery system (TAMR), a Desinewated Minced Meat machine with/without prior use of Jarvis saw for removal of spinal cord (DMMJ/DMMNJ), or hand boned with/without Jarvis saw (HJ/HNJ). This study investigated the composition of meat recovered by these five methods.

Ranking from the most to least total fat percentage was TAMR (22.02%), HNJ (18.37%), HJ (14.69%), DMMNJ (11.14%), and DMMJ (9.76%); higher fat was related to less moisture. Protein was most for HJ (18.32%) and least for TAMR (15.79%). TAMR and HJ were similar ($P > 0.05$) in ash content. Calcium was most in DMMJ (79.81 mg); the least was found in the hand boned (HJ, 20.86 mg/100 g and HNJ, 23.66 mg) lean. All samples contained calcium below the required limits set by USDA-FSIS. Total iron was the highest in TAMR (5.28 mg of iron/100 g), followed by DMMJ (3.65 mg), DMMNJ (3.46 mg), HJ (2.77 mg), and HNJ (2.18 mg).

Keywords: Advanced Meat Recovery; Beef neckbones; Hand boning; Desinewated Minced Meat

Pedro P. Fernandez, Pedro D. Sanz, Antonio D. Molina-Garcia, Laura Otero, Berengere Guignon, Sergio R. Vaudagna, Conventional freezing plus high pressure-low temperature treatment: Physical properties, microbial quality and storage stability of beef meat, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 616-625, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4NWCDGV-4/2/bc3e802072babfd0cc4328279277b671>)

Abstract:

Meat high-hydrostatic pressure treatment causes severe decolouration, preventing its commercialisation due to consumer rejection. Novel procedures involving product freezing plus low-temperature pressure processing are here investigated. Room temperature (20 [degree sign]C) pressurisation (650 MPa/10 min) and air blast freezing (-30 [degree sign]C) are compared

to air blast freezing plus high pressure at subzero temperature (-35 [degree sign]C) in terms of drip loss, expressible moisture, shear force, colour, microbial quality and storage stability of fresh and salt-added beef samples (Longissimus dorsi muscle). The latter treatment induced solid water transitions among ice phases. Fresh beef high pressure treatment (650 MPa/20 [degree sign]C/10 min) increased significantly expressible moisture while it decreased in pressurised (650 MPa/-35 [degree sign]C/10 min) frozen beef. Salt addition reduced high pressure-induced water loss. Treatments studied did not change fresh or salt-added samples shear force. Frozen beef pressurised at low temperature showed L, a and b values after thawing close to fresh samples. However, these samples in frozen state, presented chromatic parameters similar to unfrozen beef pressurised at room temperature. Apparently, freezing protects meat against pressure colour deterioration, fresh colour being recovered after thawing. High pressure processing (20 [degree sign]C or -35 [degree sign]C) was very effective reducing aerobic total (2-log₁₀ cycles) and lactic acid bacteria counts (2.4-log₁₀ cycles), in fresh and salt-added samples. Frozen + pressurised beef stored at -18 [degree sign]C during 45 days recovered its original colour after thawing, similarly to just-treated samples while their counts remain below detection limits during storage.
Keywords: High pressure processing; Freezing; Beef meat; Colour; Microbial inactivation

V.A.C. Santos, S.R. Silva, E.G. Mena, J.M.T. Azevedo, Live weight and sex effects on carcass and meat quality of 'Borrego terrincho-PDO' suckling lambs, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 654-661, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.019.
(<http://www.sciencedirect.com/science/article/B6T9G-4NVTB48-2/2/cebe9167c0071132f8b6f8747aef144f>)

Abstract:

Fifty seven suckling lambs (28 males and 29 females) of the Churra da Terra Quente breed were used to evaluate the effects of live weight and sex on carcass composition and meat quality traits. Lambs were slaughtered at three weight classes (<8 kg, 8-11 kg and >11 kg) according to 'Borrego Terrincho-PDO' specifications. The left sides of the carcasses were totally dissected. The longissimus thoracis and lumborum muscle was used for meat quality determination. Dressing proportion and carcass fatness were not affected by weight class or sex. Muscle proportion was similar in all carcass joints for the three weight classes. The percentage of bone decreased at the higher weight class, while that of subcutaneous and intermuscular fat increased. Female lambs had higher muscle proportions and greater muscle/bone ratios in the carcass side than males. Muscle pH, colour, cooking losses and tenderness were not affected by gender and weight class. Female lambs and weight classes 8-11 kg and >11 kg had higher proportions of intramuscular fat.
Keywords: Suckling lambs; Carcass composition; Meat quality; Slaughter weight

R. Morales, X. Serra, L. Guerrero, P. Gou, Softness in dry-cured porcine biceps femoris muscles in relation to meat quality characteristics and processing conditions, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 662-669, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.020.
(<http://www.sciencedirect.com/science/article/B6T9G-4NWNCVK-1/2/3e7d1219415a051e82ec15066b7e8f5c>)

Abstract:

The aim of the study was to quantify the effect of meat quality characteristics and some processing conditions on the softness of dry-cured biceps femoris (BF) muscles. The BF muscles were dissected from forty hams and classified according to their pHBF into three groups: LpH (pH < 5.66), MpH (5.66 [less-than-or-equals, slant] pH [less-than-or-equals, slant] 6.00) and HpH (pH > 6.00). BF muscles within each pHBF group were distributed into three different Salting levels (1%, 2% or 4% of added NaCl). Muscles were salted, vacuum-packed and stored at 3 [degree sign]C for 30 days. The post-salting BF muscles were classified into two intramuscular fat (IMF) levels: Low (IMF < 4%) and High (IMF [greater-or-equal, slanted] 4%). Thereafter, the muscles were divided into two pieces and dried at two of the three different Drying levels (1.5, 2 and 2.5 g H₂O/g

desalted dry matter). Then, each piece was divided into two samples that were packed in N₂ and stored at 5 [degree sign]C or 30 [degree sign]C for 1 month. Stress Relaxation was used to evaluate texture. Dry-cured BF muscles with initial pH > 6.0, with IMF > 4% or with added NaCl levels less than 2% were more prone to show soft texture. Softness in dry-cured muscles can be reduced by applying an ageing temperature of 30 [degree sign]C for 30 days, despite increasing proteolysis. The softness reduction by ageing at 30 [degree sign]C compared with 5 [degree sign]C is expected to be higher when applied to drier samples, which show a smaller increase in proteolysis.

Keywords: Softness; Stress Relaxation test; Meat quality; Salting level; Ageing temperature; Pig; Dry-cured muscles

Tim Brown, Janet E.L. Corry, Judith A. Evans, Humidification of unwrapped chilled meat on retail display using an ultrasonic fogging system, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 670-677, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4NWNCVK-2/2/8bd43c36aa48b088d5010ffa774a3245>)

Abstract:

The effects of an ultrasonic humidification system on unwrapped meat in a chilled retail display cabinet were assessed. Humidification raised the relative humidity of the cabinet air from a mean of 76.7% to just below saturation at 98.8%. This reduced the mean evaporative weight loss from whole samples of meat after 14 h from 1.68% to 0.62% of their initial weight. The rate of deterioration in the appearance of the meat due to dehydration was reduced to the extent that while the unhumidified trial was terminated after 14 h because all samples were judged to be unacceptable, the humidified trial was continued for 24 h without any major changes in appearance.

Levels of presumptive pseudomonas bacteria were relatively high in water samples taken from the humidification system and defrost water during the humidified trial, but *Legionella* spp. were not isolated. Significant increases in the numbers of bacteria on the meat during either trial were only found in one case, that of humidified minced beef. However, some of the samples had high counts even before display, and this may have masked any effect due to humidification. Differences in levels of air-borne contamination were small and inconsistent.

Air temperatures were raised by humidification by between 1 and 2 [degree sign]C and this was reflected in similarly raised product temperatures. Temperatures of air leaving the evaporator indicated that this was due to icing of the evaporator in the periods leading up to defrosts.

Keywords: Retail display; Meat; Fogging; Humidification; Weight loss; Microbiology

Cristina M.M. Alfaia, Paulo J.L.C. Ribeiro, Maria J.P. Trigo, Antonio J.I. Alfaia, Matilde L.F. Castro, Carlos M.G.A. Fontes, Rui J.B. Bessa, Jose A.M. Prates, Irradiation effect on fatty acid composition and conjugated linoleic acid isomers in frozen lamb meat, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 689-695, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4NWWWKH-1/2/17d4f07ee06d32d6f8c9bd20a5133aab>)

Abstract:

The effect of gamma radiation processing on the lipid content, fatty acid composition and conjugated linoleic acid (CLA) profile in frozen lamb meat was investigated. Samples of longissimus thoracis muscle from lambs fed lucerne basal diets either unsupplemented or supplemented with polyunsaturated vegetable oils were irradiated (7 kGy) and analysed. CLA contents in lamb meat did not affect ($P > 0.05$) the levels of lipid oxidation induced by the irradiation. No significant differences ($P > 0.05$) were observed for fatty acid composition, related nutritional indexes (n - 6/n - 3 and PUFA/SFA), as well as for total lipid and CLA contents, between non-irradiated (control) and irradiated meat samples. In contrast, meat irradiation affected the

relative proportions of total trans, trans and cis/trans CLA isomers ($P < 0.001$), in addition to the percentage of some minor individual CLA isomers (t11, t13 and t9, t11, with $P < 0.05$ and $P < 0.001$, respectively). The percentage of total cis/trans CLA isomers slightly decreased in irradiated samples, while the relative proportion of total trans, trans isomers slightly increased. This observation may be explained by the higher susceptibility to autoxidation of the cis double bond relative to the trans configuration.

Keywords: Fatty acid composition; CLA isomers; Irradiation; Lamb meat

R. Bodas, A.B. Rodriguez, S. Lopez, B. Fernandez, A.R. Mantecon, F.J. Giraldez, Effects of the inclusion of sodium bicarbonate and sugar beet pulp in the concentrate for fattening lambs on acid-base status and meat characteristics, *Meat Science*, Volume 77, Issue 4, December 2007, Pages 696-702, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.05.024.

(<http://www.sciencedirect.com/science/article/B6T9G-4NWNCVK-5/2/71c2c5441c6d5e814ac51471dd2727fe>)

Abstract:

Thirty-six young Merino lambs (15.3 kg live weight) were allocated into four equal groups to study the effects of the inclusion of sodium bicarbonate ('Bic', 0 vs. 2%) and sugar beet pulp ('SBP', 0 vs. 12%) in the concentrate on meat characteristics. Lambs were fed barley straw and concentrate ad libitum. When they reached 25 kg a blood sample was taken and the animal slaughtered. After 24 h meat characteristics (pH, colour, water holding capacity, Warner-Bratzler shear force, chemical and fatty acid - 'FA' - composition) were measured on *M. longissimus thoracis et lumborum*. SBP replacing 24% of the barley in the concentrate caused an increase in shear force ($P < 0.05$) and saturated FA ($P < 0.05$), decreasing meat unsaturated FA ($P < 0.05$). SB increased blood base excess ($P < 0.05$) and meat yellowness ($P < 0.05$) and decreased meat pH ($P < 0.05$), without altering any other meat characteristics.

Keywords: Sugar beet pulp; Sodium bicarbonate; Rumen; Young lambs; Meat; Fatty acids

R.A. Garcia, R.A. Flores, C.E. Mazenko, Factors contributing to the poor bulk behavior of meat and bone meal and methods for improving these behaviors, *Bioresource Technology*, Volume 98, Issue 15, November 2007, Pages 2852-2858, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.09.053.

(<http://www.sciencedirect.com/science/article/B6V24-4MD4641-2/2/1d60e5e75cf695ad512eca79bc9cdf7>)

Abstract:

Meat and bone meal (MBM), a product of the rendering industry, is a potential feedstock for numerous bio-based applications. Design of processing equipment for MBM is difficult due to MBM's bulk behaviors; it flows less easily than many other granular materials, and it tends to foul the surfaces of processing equipment. This study examines the major factors contributing to MBM's poor bulk behavior, including moisture content, fat content, particle size distribution and temperature, and the relative importance of these factors. Potential methods for improving MBM's bulk properties, including use of an anti-caking agent, dehydration, fat extraction, milling and refrigeration are also studied. The effects of these factors were determined by a standard laboratory measurement, the Hausner ratio, as well as by the rate of surface-fouling and dust generation using a pilot-scale aspirator. In contrast to past studies with other granular materials, moisture content was shown to have an insignificant effect on MBM's bulk behavior. The results, however, show that MBM fat content is a major determinant of the bulk behavior of the MBM. Reduction of fat content resulted in major changes in MBM's bulk behavior, by all measures used. Less dramatic changes were achieved through refrigeration to solidify the fat and/or treatment with an anti-caking agent.

Keywords: Meat and bone meal; Powder; Cohesivity; Granular material; Hausner ratio; Aspirator; Anti-caking agent; Dust; Bulk density; Caking

Udith Jayasinghe-Mudalige, Spencer Henson, Identifying economic incentives for Canadian red meat and poultry processing enterprises to adopt enhanced food safety controls, *Food Control*, Volume 18, Issue 11, November 2007, Pages 1363-1371, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.08.010.

(<http://www.sciencedirect.com/science/article/B6T6S-4M93P5B-1/2/90bbcfcaf7e0ca741b8348c645efd7d4>)

Abstract:

This article presents the results of stage-one of a two-stage program of research study to identify the factors motivating adoption of enhanced food safety controls in the red meat and poultry processing enterprises in Canada. The results are reported in the form of illustrative quotations drawn from the in-depth interviews (n = 34) with food safety and quality assurance managers of these firms operate in Ontario. It highlights that decisions at the level of the firm are complex and motivated by a number of market-based, regulatory and liability incentives, and the impact of each incentive on the adoption of food safety controls highly depend on the characteristics of the firm and the market where it operate in. It emphasizes the importance of adopting an 'incentive-based regulatory approach' in the Canadian food processing industry.

Keywords: Economic incentives; Food safety controls; Red meat and poultry processing sector

Gale Brightwell, Robyn Clemens, Shelley Ulrich, Jackie Boerema, Possible involvement of psychrotolerant Enterobacteriaceae in blown pack spoilage of vacuum-packaged raw meats, *International Journal of Food Microbiology*, Volume 119, Issue 3, 1 November 2007, Pages 334-339, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.08.024.

(<http://www.sciencedirect.com/science/article/B6T7K-4PJ04PS-1/2/ef31c38397d71cf7be166093215d2abc>)

Abstract:

Recent investigations of blown pack spoilage in New Zealand chilled vacuum-packaged meats have found moderate to high numbers of Enterobacteriaceae in the spoilage flora, but no clostridia, such as *C. estertheticum* and *C. gasigenes*, that are usually associated with blown pack spoilage. This study showed that psychrotolerant Enterobacteriaceae produced gas in a lamb homogenate model under anaerobic conditions and that these organisms could cause blown pack spoilage of vacuum-packaged chilled meats. Significant gas production was observed with the majority of the psychrotolerant Enterobacteriaceae strains tested including presumptive species of *Enterobacter*, *Serratia*, *Hafnia* and *Rahnella*. However, no gas was produced in lamb homogenates inoculated with presumptive species of *Ewingella americana* or *Yersinia enterocolitica*. Gas production was also confirmed in vacuum-packaged lamb shoulders stored at 4 [degree sign]C for 21 days after being inoculated with individual representative Enterobacteriaceae isolates. Biochemical characterisation proved to be more useful than genotype-based typing of 16S rRNA genes for discriminating different psychrotolerant Enterobacteriaceae from naturally contaminated meat microflora.

Keywords: Psychrotolerant Enterobacteriaceae; Gas production; Vacuum-packaged; Blown pack spoilage

Grzegorz Probola, Lidia Zander, Application of PCA method for characterisation of textural properties of selected ready-to-eat meat products, *Journal of Food Engineering*, Volume 83, Issue 1, Future of Food Engineering - Selected Papers from the 2nd International Symposium of CIGR Section VI on Future of Food Engineering, November 2007, Pages 93-98, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.02.052.

(<http://www.sciencedirect.com/science/article/B6T8J-4N61FR0-1/2/27c1dc611c602bec090c8b51448dc19e>)

Abstract:

Mechanical tests, chemical composition analysis and sensory evaluation have been used to assess textural quality characteristics of two products manufactured from minced turkey meat. Mechanical properties of the samples analysed displayed greater variability than chemical composition and sensory assessment. The particular magnitudes were bound together showing significant correlations. Principal component analysis (PCA) enabled differentiation between two product brands tested in terms of textural properties and their reproducibility. The experiments and data analysis performed have shown that the simple penetration test may be the useful method for rapid control of the textural properties of this kind of product to be applied in the industry, meanwhile the applicability of shear test might be limited.

Keywords: Texture; PCA; Variability; Minced meat product

C. Chenoll, A. Heredia, L. Segui, P. Fito, Application of the systematic approach to food engineering systems (SAFES) methodology to the salting and drying of a meat product: Tasajo, *Journal of Food Engineering*, Volume 83, Issue 2, EFFoST 2005 Annual Meeting: Innovations in Traditional Foods, November 2007, Pages 258-266, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.02.024.

(<http://www.sciencedirect.com/science/article/B6T8J-4N3WYCJ-9/2/3c4751b69092dd14362c9cab9c4ffad4>)

Abstract:

Tasajo is a salted meat-based product made in Cuba, as a version of charqui, a traditional product consumed in many South American countries. Traditionally, meat is salted and afterwards sun dried, this is a long process which takes three weeks at least. In the industry, salting is done in two steps, first a wet salting step and afterwards a dry salting step. It is important to know the amount of salt and water in the final product in order to predict the spoilage of the product, the gaining of weight for financial considerations, etc. Safes methodology allows the analysis of different elements in a system: the components, phases and states of aggregation in the food during the different stages in the process, in order to understand these with a suitable level of complexity. It also analyzes the transport functions, chemical reactions and the phenomena occurring during the processing of the product. Using this methodology, shrinkage of cells has been found to be very similar to water loss in intracellular phase (48%). In this study, water and salt mass transfers during all the steps of the salting process have been quantified, pointing up and quantifying the changes in the state of aggregation of some components occurring in each step.

Keywords: Tasajo; SAFES; Salting; Drying

Atchara Tammatinna, Soottawat Benjakul, Wonnop Visessanguan, Munehiko Tanaka, Gelling properties of white shrimp (*Penaeus vannamei*) meat as influenced by setting condition and microbial transglutaminase, *LWT - Food Science and Technology*, Volume 40, Issue 9, November 2007, Pages 1489-1497, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.11.017.

(<http://www.sciencedirect.com/science/article/B6WMV-4N08V74-1/2/4d281d511047b6b718538f97869d8e3b>)

Abstract:

The properties of white shrimp (*Penaeus vannamei*) gel added with different levels of microbial transglutaminase (MTGase) and subjected to setting at 25 [degree sign]C for 2 h or 40 [degree sign]C for 30 min, prior to heating at 90 [degree sign]C for 20 min were studied. Breaking force of gels with and without setting increased with increasing MTGase amount added ($P < 0.05$). However, no changes in deformation in all samples were noticeable ($P > 0.05$). Directly heated gels showed the lower breaking force than those with prior setting at all MTGase levels added ($P < 0.05$). Generally, gels prepared by setting at 25 [degree sign]C exhibited the greater breaking force than those set at 40 [degree sign]C, possibly associated with the appropriate protein structure for cross-linking at 25 [degree sign]C and greater degradation at 40 [degree sign]C as evidenced by a greater trichloroacetic acid soluble peptide content ($P < 0.05$). Sodium dodecyl

sulfate polyacrylamide gel electrophoretic study revealed that myosin heavy chain (MHC) underwent polymerization to a higher extent in the presence of MTGase, but the strengthening effect on gel was dependent on setting temperature. Regardless of setting condition, microstructure of gel added with MTGase was finer with a smaller void, compared with those of gel without MTGase. Therefore, setting temperature played an essential role in gel property of white shrimp meat added with MTGase.

Keywords: MTgase; Setting; Cross-linking; Gelation; *Penaeus vannamei*; Gel; White shrimp

R. Ramirez, R. Cava, The crossbreeding of different Duroc lines with the Iberian pig affects colour and oxidative stability of meat during storage, *Meat Science*, Volume 77, Issue 3, November 2007, Pages 339-347, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.002.

([http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-](http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-4/2/c3946229371f7c711bc5333f77681bfe)

[4/2/c3946229371f7c711bc5333f77681bfe](http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-4/2/c3946229371f7c711bc5333f77681bfe))

Abstract:

Colour and oxidative stability of Longissimus dorsi (LD) and Biceps femoris (BF) muscles from 3 different Iberian x Duroc genotypes (GEN1: [male symbol] Iberian x [female symbol] Duroc1, GEN2: [male symbol] Duroc1 x [female symbol] Iberian; GEN3: [male symbol] Duroc2 x [female symbol] Iberian) were analysed during 10 days of refrigerated storage. GEN1 and GEN2 are reciprocal crosses, while the difference between GEN2 and GEN3 is the Duroc sire line. The genotype Duroc1 was selected for the manufacture of dry-cured-meat products while the genotype Duroc2 was selected for meat production. BF showed more intense colour and oxidative changes during storage than LD, which is in accordance with their different metabolic pattern, since BF is an intermediate oxidative muscle whereas LD is a glycolytic one. Important differences were found between crosses due to the genotype of the Duroc sire line; however, reciprocal crosses (GEN1 and GEN2) showed a similar pattern. The lowest post-mortem pH of GEN3 could be a deciding factor of the oxidative and colour stability during storage as GEN3 had higher drip and cook loss as well as higher susceptibility to iron-ascorbate-induced oxidation. In addition, chops from GEN3 were paler (lower L*) and showed a higher discolouration (higher decrease of a*) besides higher lipid (TBA-RS) and protein oxidation (carbonyl content) after the storage.

Keywords: Crossbreeding; Duroc; Iberian; Colour; pH; TBA-RS; Protein oxidation; Storage

Marios Mataragas, Panagiotis Skandamis, George-John E. Nychas, Eleftherios H. Drosinos, Modeling and predicting spoilage of cooked, cured meat products by multivariate analysis, *Meat Science*, Volume 77, Issue 3, November 2007, Pages 348-356, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.023.

([http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-](http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-5/2/6298b1ac9b0e4ce6a89db347182dc2a4)

[5/2/6298b1ac9b0e4ce6a89db347182dc2a4](http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-5/2/6298b1ac9b0e4ce6a89db347182dc2a4))

Abstract:

A cooked, cured meat product is a perishable product spoiled mainly by lactic acid bacteria (LAB). LAB cause discoloration, slime formation, off-odors and off-flavors as the result of their metabolic activity producing various products. These microbial products in conjunction with the microbial population could be used to assess the degree of spoilage of this type of product. The spoilage evaluation was achieved by following a multivariate approach. Cluster analysis, principal component analysis and partial least square regression were employed to associate spoilage with microbiological and physicochemical parameters. The developed model was capable of giving accurate predictions of spoilage describing the spoilage associations. The study might contribute to the improvement of quality assurance systems of meat enterprises.

Keywords: Meat product; Modeling; Multivariate analysis; Partial least square regression; Shelf life prediction; Spoilage

K.E. Neath, A.N. Del Barrio, R.M. Lapitan, J.R.V. Herrera, L.C. Cruz, T. Fujihara, S. Muroya, K. Chikuni, M. Hirabayashi, Y. Kanai, Protease activity higher in postmortem water buffalo meat than Brahman beef, *Meat Science*, Volume 77, Issue 3, November 2007, Pages 389-396, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKJ0MR-3/2/5b2bbd2103b5952f363241d5c7feb9e4>)

Abstract:

We previously demonstrated that postmortem water buffalo meat had higher tenderness than Brahman beef. In order to explain this difference in tenderness, the objective of the current study was to investigate the protease activity in these two meats. Five female crossbred water buffalo (Philippine Carabao x Bulgarian Murrah) and five female crossbred cattle (Brahman x Philippine Native) were slaughtered at 30 months of age, followed by immediate sampling of Longissimus thoracis muscle for measurement of protease activity. Results showed that buffalo meat had significantly higher protease activity compared to beef ($P < 0.05$). Furthermore, calpain inhibitor 1, a specific inhibitor of calpains 1 and 2, was the most effective inhibitor of protease activity. There was no difference in calpastatin activity, and no major differences were observed in calpains 1, 2, and calpastatin expression by Western blotting. This study suggests that higher calpain activity in early postmortem buffalo meat was responsible for the increased tenderness of water buffalo meat compared to beef.

Keywords: Water buffalo; Tenderness; Protease activity; Inhibitor; Calpain; Calpastatin

A.T. Ngwa, L.J. Dawson, R. Puchala, G. Detweiler, R.C. Merkel, I. Tovar-Luna, T. Sahlu, C.L. Ferrell, A.L. Goetsch, Urea space and body condition score to predict body composition of meat goats, *Small Ruminant Research*, Volume 73, Issues 1-3, November 2007, Pages 27-36, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.10.014.

(<http://www.sciencedirect.com/science/article/B6TC5-4M93PB8-2/2/ca5eadcb4aee1bd26b0bbaf86b479a12>)

Abstract:

Yearling Boer x Spanish goat wethers (40) were used to develop and compare body composition prediction equations for mature meat goats based on urea space (US) and body condition score (BCS). Before the experiment, one-half of the animals were managed to have high BW and BCS (1-5, with 1 being extremely thin and 5 very fat) and the others were managed to have low BW and BCS. During the 24-week experiment, initially fat wethers were fed to lose BW and BCS and initially thin wethers were fed to increase BW and BCS. BCS, US, and whole body chemical composition were determined after 0, 12, and 24 weeks. Mean, minimum, and maximum values were 42.1 (S.E. = 1.12), 24.5, and 59.0 kg for shrunk BW; 3.0 (S.E. = 0.11), 1.5, and 4.0 for BCS; 61.3 (S.E. = 1.01), 53.7, and 76.5% for water; 20.2 (S.E. = 1.11), 4.7, and 29.7% for fat; 15.6 (S.E. = 0.19), 13.3, and 18.1% for protein; and 2.9 (S.E. = 0.062), 2.2, and 3.7% for ash, respectively. For water, fat, and ash concentrations and mass, simplest equations explaining greatest variability (with independent variables of US, BCS, and (or) shrunk BW) based on BCS accounted for more variation than ones based on US, although in some cases differences were not large (i.e., water and ash concentrations and mass). Neither US nor BCS explained variability in protein concentration. Equations to predict protein mass based on shrunk BW and US or BCS were nearly identical in R^2 and the root mean square error. A 1 unit change in BCS corresponded to change in full BW of 8.9 kg (full BW (kg) = $17.902 + (8.9087 \times \text{BCS})$; $R^2 = 0.653$), fat concentration of 7.54% (%fat = $-5.076 + (7.5361 \times \text{BCS})$; $R^2 = 0.612$), and energy concentration of 3.01 MJ/kg (energy (MJ/kg) = $0.971 + (3.0059 \times \text{BCS})$; $R^2 = 0.615$). In summary, BCS may be used as or more effectively to predict body composition of meat goats than US. The primary determinant of BCS, within the range of BCS observed in this experiment, was body fat content.

Keywords: Goats; Body composition

Maria Teresa Osorio, Jose Maria Zumalacarregui, Ana Figueira, Javier Mateo, Fatty acid composition in subcutaneous, intermuscular and intramuscular fat deposits of suckling lamb meat: Effect of milk source, *Small Ruminant Research*, Volume 73, Issues 1-3, November 2007, Pages 127-134, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.12.005.

(<http://www.sciencedirect.com/science/article/B6TC5-4MWPV7W-3/2/d34e1fe7e1e2e7e9bca7171f4c2eafe8>)

Abstract:

A total of 20 Churra suckling lambs from a sheep dairy farm were divided into two groups and reared on ewes' milk (EM) or milk-replacer (MR). The suckling lambs were slaughtered at ages between 25 and 35 days. Fatty acid profiles of milk source fat as well as subcutaneous (SC), intermuscular (IN) and intramuscular (IR) fat of lamb carcasses were determined, and the effect of the rearing system investigated. As regards fat deposits, proportions of polyunsaturated (PUFA), saturated (SFA) and monounsaturated (MUFA) fatty acids showed high similarity between IN and SC fat, for either of EM or MR samples. However, and only for MR samples, IN fat had lower odd-chain fatty acid (OCFA) and branched-chain fatty acid (BCFA) contents than SC fat. In IR fat, when compared to the other fat deposits, significant differences in all PUFA contents, except for c9t11-C18:2, were found. As for rearing system, a significant effect of dietary fat on the contents of the majority of fatty acids for each fat deposit was observed. Differences in fatty acid contents between the two milk source fats resulted in concomitant differences for those fatty acids in the carcass fat deposits, with the exception of C18:2 n-6, C20:4 n-6, C18:3 n-3 and c9t11-C18:2. Both the n-6 and n-3 fatty acid contents appeared to be influenced by the dietary n-6/n-3 ratio. Meanwhile, c9t11-C18:2 content was slightly higher in MR carcass fat samples but lower in MR fat. A higher presence of some specific trans-C18:1 fatty acids in MR fat than in EM fat which can be precursors of c9t11-C18:2, might have resulted in a higher endogenous synthesis of c9t11-C18:2, via [Δ]⁹-desaturase.

Keywords: Suckling lamb; Milk-replacer; Ewes' milk; Fatty acid composition; CLA

Francisco Jimenez-Colmenero, Healthier lipid formulation approaches in meat-based functional foods. Technological options for replacement of meat fats by non-meat fats, *Trends in Food Science & Technology*, Volume 18, Issue 11, November 2007, Pages 567-578, ISSN 0924-2244, DOI: 10.1016/j.tifs.2007.05.006.

(<http://www.sciencedirect.com/science/article/B6VHY-4NWCGT8-1/2/7b04526cbe64262e8be37ae27bc67bf7>)

Abstract:

Healthier lipid formulation based on processing strategies is one of the most important current approaches to the development of potential meat-based functional foods. This article discusses the partial replacement of meat fats with various non-meat fats (of plant and marine origin) which are added to different meat products (fresh, cooked and fermented), using a variety of available technological options. It analyses factors associated with the composition and physicochemical properties of the new lipid materials used in meat processing. And it further discusses the consequences of changes in the composition of meat products as they relate to the potential contribution to fatty acid intake goals and lipid oxidation stability.

Shi-zheng GAO, Hong-mei HU, Ling-yun LIU, Xi ZHANG, Yong-gang LIU, Chang-rong GE, Effects of the Sheep Polyclonal Antibodies Against the Porcine Adipocyte Plasma Membrane Proteins on Porcine Carcass Composition and Meat Quality, *Agricultural Sciences in China*, Volume 6, Issue 10, October 2007, Pages 1256-1261, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60170-9.

(<http://www.sciencedirect.com/science/article/B82XG-4R8H6TS-D/2/de9af23c5f29b77d4e417df8ed7543aa>)

Abstract:

To detect the effects of the polyclonal antibodies raised in sheep against porcine adipocyte plasma membranes on the porcine carcass composition and meat quality, 30 pigs assigned into 6 treatment groups were given intraperitoneal injections of sheep antipig adipocyte plasma membrane immunoglobulin (ASIg) or sheep nonimmune serum immunoglobulin (NSIg). At the end of the experiment, the pigs were slaughtered at 90 kg body weight, and carcasses and meat quality were evaluated. The results showed that when pigs intraperitoneally immunized with 20 or 30 mg ASIg at 15 kg body weight, 20 mg purified ASIg twice at 15 and 60 kg body weight, or 20 mg purified ASIg at 60 kg body weight, respectively, their lean meat percentage, fat meat percentage, backfat thickness, loin eye area leaf fat weight, caul fat weight, heart weight, liver weight, and kidney weight were significantly affected. However, the kidney weight, lung weight, dressing percentage, and spleen weight did not remarkably change. Our results indicated that pigs intraperitoneally immunized with 20 or 30 mg ASIg at 15 kg body weight, and 20 mg ASIg twice at 15 and 60 kg body weight, have significantly different drip loss rate, cooked meat ratio, tenderness, storage loss rate, muscle fiber diameter, moisture content, dry matter content, crude protein content, and crude fat content from the control group that received 20 mg NSIg at 15 kg body weight. However, meat pH, meat color value, meat marbling score, inosinate, and myohemoglobin were not significantly affected. Our results indicated ASIg could not significantly affect the content of most muscular amino acids and intramuscular fatty acids.

Keywords: polyclonal antibodies; pig; carcass composition; meat quality

Tatiana Koutchma, Advanced Technologies for Meat Processing, Leo M.L. Nollet, Fidel Toldra (Eds.). Taylor & Francis, CRC Press LLC, Boca Raton, FL (2006). 483pp., \$159.95, Hardback, ISBN:10:1574445871., Food Microbiology, Volume 24, Issues 7-8, October-December 2007, Pages 801-802, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.02.002.

(<http://www.sciencedirect.com/science/article/B6WFP-4N6NJWW-1/2/850aad9975ace015f011d6b61dd737bf>)

Iftikhar Hussain, Muhammad Shahid Mahmood, Masood Akhtar, Ahrar Khan, Corrigendum to 'Prevalence of Campylobacter species in meat, milk and other food commodities in Pakistan': [Food Microbiol. 24 (2007) 219-222], Food Microbiology, Volume 24, Issues 7-8, October-December 2007, Page 807, ISSN 0740-0020, DOI: 10.1016/j.fm.2007.04.002.

(<http://www.sciencedirect.com/science/article/B6WFP-4NMWR9F-3/2/b1a93a6dd5b117738c69d9580a4b7678>)

D. Alvarez, M. Castillo, F.A. Payne, M.D. Garrido, S. Banon, Y.L. Xiong, Prediction of meat emulsion stability using reflection photometry, Journal of Food Engineering, Volume 82, Issue 3, October 2007, Pages 310-315, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.02.031.

(<http://www.sciencedirect.com/science/article/B6T8J-4N3WYCJ-B/2/c3e7f858d91a8a6908155bc270c2eaae>)

Abstract:

Manufacture of finely comminuted meat products are operations that require improved control to produce stable products. Emulsion breakdown becomes evident during the cooking process, when it is too late for corrective actions. Two different emulsion formulations that produced high or low cooking loss tendencies were prepared. Emulsion ingredients were chopped and the mixture was sampled at different time intervals. CIELAB coordinates of each sample were measured and the samples cooked to determine cooking loss and gel firmness. L* values increased at the beginning of chopping, which was accompanied with increased gel firmness (P < 0.01) and reduced cooking loss (P < 0.001). After 8 min of chopping (emulsion temperature [greater-or-equal, slanted]22 [degree sign]C) a reduction in L* and b* values and in emulsion firmness was observed simultaneously with increasing cooking losses. These results suggest the feasibility of an on-line

optical sensor technology to predict the optimum endpoint of emulsification in the manufacture of finely comminuted meat products.

Keywords: Light reflectance; Monitoring; Process control; Emulsion stability; Cooking losses; Gel firmness

S.J. Eady, H. Garreau, A.R. Gilmour, Heritability of resistance to bacterial infection in meat rabbits, *Livestock Science*, Volume 112, Issues 1-2, Special section: Non-Ruminant Nutrition Symposium, October 2007, Pages 90-98, ISSN 1871-1413, DOI: 10.1016/j.livsci.2007.01.158.

(<http://www.sciencedirect.com/science/article/B7XNX-4N6NHSJ-1/2/f603a5b7bd4583d56b58175e9abdca16>)

Abstract:

Incidence of visual signs of bacterial infection and mortality, from causes related to bacterial infection, were recorded on a weekly basis in growing meat rabbits from 5 to 10 weeks of age. Heritability of Weekly Incidence of disease was highest in weeks 9 and 10 (0.05 +/- 0.02 and 0.06 +/- 0.02, respectively with linear model, and 0.10 +/- 0.06 and 0.12 +/- 0.05, respectively with a threshold model). Common litter effects accounted for 5-20% of the variance of disease incidence, while maternal genetic variance was small (0-3%). Individuals from small litters at weaning had higher disease incidence, and disease incidence reduced as litter parity of the doe increased ($P < 0.05$), when the disease trait was measured at week 9 and 10, but not for earlier weeks. Genetic correlations between disease incidence and mortality were imprecise and not different from zero. Phenotypic correlations were low to moderate, and positive. Although the mechanism at this stage is unknown, these findings suggest that there are common/shared immunological responses to bacterial challenge that are under genetic control. This study demonstrates that observed signs of bacterial infection in rabbits can be used as an indicator trait for resistance to bacterial infection, and the heritability of the trait is high enough to warrant further evaluation of the merit of including it in a breeding program. From one week to the next, rabbits exhibiting disease symptoms were more likely (10 to 50 times depending on week of measurement) to die than those that were healthy. The relative economic value of resistance to bacterial infection could be based on the relationship between disease incidence and survival, as well as the direct costs of effective disease control and treatment.

Keywords: Disease resistance; Breeding program; *Pasteurella multocida*; *Staphylococcus aureus*; Microbial antibiotic resistance

C.O. Gill, Microbiological conditions of meats from large game animals and birds, *Meat Science*, Volume 77, Issue 2, October 2007, Pages 149-160, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4N98876-1/2/33c08cde54529ab20cd0d70228478603>)

Abstract:

Large game animals and birds used for the commercial production of meat include deer of various species, wild boar and feral pigs, ostriches, emus and rheas, crocodiles and alligators, bison, and kangaroos. Meat from feral pigs and kangaroos is obtained from wild animals only, but much or most meat from the other game animals or birds is obtained from farmed animals. The microbiological conditions of meats from hunted animals can be compromised by poor placement of shots, the usual evisceration and sometimes further dressing of carcass in the field, and ageing of carcasses at ambient temperatures. However, the general microbiological conditions of carcasses from farmed game animals or birds slaughtered and dressed at suitable abattoirs can be comparable with or better than the microbiological conditions of carcasses from domestic animals or birds. The incidences of enteric pathogens on meat from wild or farmed game animals or birds can be less than those for meat from intensively reared domestic animals, but infection of some game meats with *Trichinella* or other foodborne parasites may occur.

Keywords: Game meats; Microbial spoilage; Escherichia coli; Salmonella; Yersinia enterocolitica; Campylobacter; Trichinella

Ines Essid, Hanen Ben Ismail, Sami Bel Hadj Ahmed, Rahik Ghedamsi, Mnasser Hassouna, Characterization and technological properties of Staphylococcus xylosus strains isolated from a Tunisian traditional salted meat, Meat Science, Volume 77, Issue 2, October 2007, Pages 204-212, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4N7XPFC-1/2/54acf2be2678e8a8a0ec16880d92532d>)

Abstract:

The technological properties of strains of Staphylococcus xylosus were studied to select the most suitable for use as starter cultures for the production of dried fermented meat products. Strains of S. xylosus were isolated from traditional salted Tunisian meat and were identified by biochemical and molecular methods. Thirty strains of S. xylosus were studied to evaluate their catalase, nitrate reductase, lipolytic, proteolytic and antibacterial activities as well as growth ability at different temperatures, pH's and NaCl concentrations. All strains of S. xylosus had catalase activity and were able to reduce nitrates to nitrites. The nitrate reductase activity increased when the strains were kept under anaerobic conditions. Proteolytic activity on milk and on gelatin agar was demonstrated for 100% and 83.3% of the S. xylosus isolates, respectively. However extracellular proteolytic activity as assessed by the azocasein method was poor in all the strains. Lipolytic activity as assessed by the agar method showed that 76.6% of strains of S. xylosus could hydrolyze Tween 20 against 33.3% that could hydrolyze tributyrin. Tween 80 was hydrolyzed by only 10% of strains. Strains of S. xylosus hydrolyzed pork fat better than beef and lamb fat. The majority of strains had antibacterial activity against Salmonella arizonae, Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli and Enterococcus faecalis.

Keywords: Traditional salted meat; Staphylococcus xylosus; Enzymatic activities; Technological properties

X.D. Chen, Q.G. Ma, M.Y. Tang, C. Ji, Development of breast muscle and meat quality in Arbor Acres broilers, Jingxing 100 crossbred chickens and Beijing fatty chickens, Meat Science, Volume 77, Issue 2, October 2007, Pages 220-227, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4N98876-2/2/0d045c83f89ca37a3ea500cccf290526>)

Abstract:

The objective of this experiment was to examine development of breast muscle and myofiber of M. pectoralis superficialis in three chicken breeds. Commercial broiler chickens (Arbor Acres broilers, AA), crossbred chickens (Jingxing 100 crossbred chickens, JXC) and Chinese native chickens (Beijing fatty chickens, BJF) were grown up to 98 d to estimate myofiber density, and size (area, and diameter of myofibers) in P. superficialis. At 42, 56, 70, 84, and 98 d of age, Pectoralis muscle was used to evaluate breast muscle weight, breast yield, and tenderness (shear force value). Results indicate that commercial broilers have higher breast weight, and higher shear force value than crossbred chickens and Chinese native chickens, that may be due to an increased myofiber diameter and area in Pectoralis muscle. It is suggested that histological properties of myofibers play an important role in increasing the shear force value of meat.

Keywords: Chinese native chicken; Broiler chicken; Histological properties; Shear force value; M. pectoralis superficialis

R.J. Lawrence, J.C. Doyle, R. Elliott, B.W. Norton, I. Loxton, Effect of biotin supplementation on meat quality of F1 Wagyu/Black Angus feedlot steers of known genotype, Meat Science, Volume 77, Issue 2, October 2007, Pages 228-237, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4NB99MM-1/2/ea9370f7271dc385557db18848cdd412>)

Abstract:

Biotin (D-biotin) was supplemented to F1 Wagyu/Black Angus steers fed a wheat-based ration to evaluate the effect on meat quality. One hundred and eight steers of known Wagyu sire lines were assigned to three biotin treatments (0, 10 and 20 mg/head/day) with each treatment replicated four times using an unfasted liveweight of 410.5 kg (+/-24.42 SD).

Biotin supplementation had no effect ($P > 0.05$) on beef marbling standard at either the 5/6th or 10/11th rib quartering site, 10/11th rib intra-muscular fat percentage, intra-muscular fat fatty acid composition or adipose melting points. Wagyu genotype had an effect ($P < 0.05$) on beef marbling standard and intra-muscular fat percentage at the 10/11th rib, inter-muscular and intra-muscular melting point and fatty acid composition of intra-muscular fat. A significant ($P < 0.001$) but poor correlation existed between beef marbling standard and intra-muscular fat percentage ($R^2 = 0.198$). Total conjugated linoleic acid had a highly significantly ($P < 0.0001$) positive correlation to intra-muscular fat percentage ($R^2 = 0.446$).

Keywords: Biotin; Wagyu; Marbling; Intra-muscular fat; Fatty acid composition

A. Sanches Silva, J.M. Cruz, R. Sendon Garcí'a, R. Franz, P. Paseiro Losada, Kinetic migration studies from packaging films into meat products, *Meat Science*, Volume 77, Issue 2, October 2007, Pages 238-245, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4N9DK37-1/2/992bfc8862e710a63f485820f7c8692f>)

Abstract:

One of the main concerns regarding safety of food packaging is the possible migration of chemical substances (monomers and other starting substances, additives, residues) from food contact materials into foods.

To evaluate the effect of the fat content and of the temperature of storage on the migration from plastics packaging films into meat products as an important class of foodstuffs, the kinetic mass transport of a model migrant (diphenylbutadiene) from low density polyethylene (LDPE) film in contact with different meat products was investigated. From the data, the diffusion coefficients were calculated for the applied test conditions, by use of a mathematical model.

The results showed that migration increased with fat content and storage temperature. Analysis of migration data corresponding to minced pork meat containing different amounts of fat, stored for 10 days at 25 [degree sign]C, revealed an excellent relationship between migration level and fat content. This behaviour was also found for other types of meat products (chicken and pork neck).

A simplifying mathematical model was applied to derive effective diffusion coefficients in the polymer which, however, do take kinetic effects in the meat also into account. In the case of pork meat contact, the effective diffusion coefficients derived from mathematical modelling were ten times higher for storage at 25 [degree sign]C ($1.88 \times 10^{-9} \text{ cm}^2 \text{ s}^{-1}$) than for storage at 5 [degree sign]C ($1.2 \times 10^{-10} \text{ cm}^2 \text{ s}^{-1}$).

Keywords: Food safety; Packaging; LDPE; Meat products; Migration; Mathematical modelling

Jose M. Lorenzo, Sidonia Martinez, Inmaculada Franco, Javier Carballo, Biogenic amine content during the manufacture of dry-cured lacon, a Spanish traditional meat product: Effect of some additives, *Meat Science*, Volume 77, Issue 2, October 2007, Pages 287-293, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4ND60MP-1/2/13d4250a010b583160a548c5744c4b27>)

Abstract:

The content of nine biogenic amines (agmatine, tryptamine, 2-phenylethylamine, putrescine, cadaverine, histamine, tyramine, spermidine and spermine) was determined throughout the

manufacture of dry-cured lacon, a traditional dry-salted and ripened meat product made in the north-west of Spain from the fore leg of the pig following a similar process to that of dry-cured ham. The effect of the use of additives (glucose, sodium nitrite, sodium nitrate, sodium ascorbate and sodium citrate) on the biogenic amine content during manufacture was also studied.

Tryptamine and spermine were the main biogenic amines in fresh meat, while tryptamine and cadaverine were the most abundant at the end of the manufacturing process. During ripening the total amine content increased significantly ($P < 0.05$) in the batches made both without and with additives. The use of additives significantly ($P < 0.05$) increased the total amine content and the content of tryptamine, tyramine and histamine. The total biogenic amine content at the end of the manufacturing process was low as expected for a product in which there is little active microbial metabolism during manufacture.

Keywords: Dry-cured lacon; Biogenic amines; Additives; Ripening; Cured meat products

C.J. Lupton, J.E. Huston, B.F. Craddock, F.A. Pfeiffer, W.L. Polk, Comparison of three systems for concurrent production of lamb meat and wool, *Small Ruminant Research*, Volume 72, Issues 2-3, October 2007, Pages 133-140, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.10.002.

(<http://www.sciencedirect.com/science/article/B6TC5-4M7K9WW-1/2/5715823a10a508931f7af0dc61c54b99>)

Abstract:

An innovative lamb-feeding facility with a raised-slatted floor (RF) was designed and built for the purposes of concurrently producing high-quality, high-value wool and large, lean lamb carcasses. A ration was formulated to provide a low rate of gain in order that lambs attained slaughter weight (59 kg) when they were approximately 12 month of age because a 12-month fleece is a prerequisite for high value in the targeted hand spinning niche wool market. A study was conducted to compare production and quality of wool and meat and associated economics of feeding lambs housed in the RF system versus two conventional systems, a feedlot (FL) and supplementation on pasture (P). For this purpose, 143 5-month-old, male, castrated Rambouillet lambs were obtained and assigned to a production system. Half of the lambs in the RF and FL systems were fitted with protective coats. As planned, daily gain was greater and days to slaughter were less in the FL versus the RF system, with P being intermediate. Final shorn bodyweights were similar in each system, but RF dressing percentage was considerably lower than those in the FL and P systems. This anomaly was likely due to the greater gut fill of RF lambs compared to those in the other two systems. Leaner carcasses were produced in the RF and P systems compared to the FL system. The RF fleeces were heavier than those produced in the FL system with P fleeces being intermediate. Average fiber diameter and variability did not differ among treatments. Though considerably longer than FL staples, wool produced in the RF system was more uniform (CV%) in terms of fiber diameter measured along the staple length. Importantly, coats did not affect rates of gain in either the FL or RF system and had minimal effects on other measured properties. Coated fleeces were only arithmetically higher yielding than uncoated fleeces (55.2% versus 53.4%), but the coated fleeces were visually cleaner and brighter than uncoated fleeces, which is very important for the targeted niche market. Price obtained for coated RF wool sold into a niche market was five times higher than conventionally marketed FL and P wool prices. Net income per head was negative for all three systems (-US\$ 0.11, -US\$ 2.20, and -US\$ 5.57 per head for FL, P, and RF, respectively). In this study, the substantially higher returns from the niche wool market did not compensate fully for the extra cost of production and the extra effort required for niche marketing.

Keywords: Lamb meat; Niche market; Production system; Rambouillet lambs; Wool

Chun-Lai Zhang, Mark R. Fowler, Nigel W. Scott, Graham Lawson, Adrian Slater, A TaqMan real-time PCR system for the identification and quantification of bovine DNA in meats, milks and

cheeses, *Food Control*, Volume 18, Issue 9, September 2007, Pages 1149-1158, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.07.018.

(<http://www.sciencedirect.com/science/article/B6T6S-4MMP2BG-1/2/583d1932df1ed0913bce3b1062f4d85e>)

Abstract:

Accurate quantitative assays are required for enforcing food labelling procedures and preventing food ingredient contamination, misdescription and fraud. Simplex and duplex TaqMan real-time PCR systems have been tested for the identification and quantification of DNA in meat, milk and cheese. DNA was isolated from meat and cheese using a standard CTAB protocol and from milk using a Promega Wizard Magnetic kit and purified by Qiagen silicon spin columns. High quality DNA isolated from beef mince was used for standard curve construction in the TaqMan real-time PCR assay using a bovine-specific primer pair for the mitochondrial cytb gene and a FAM-labelled mammalian-specific cytb probe. The real-time PCR assay can quantitatively detect as little as 35 pg bovine DNA and showed no cross-reaction with ovine, caprine or porcine DNA. The system has been successfully used to measure bovine DNA in fresh and processed meat, milk and cheese, and will prove useful for bovine species identification and quantitative authentication of animal-derived products.

Keywords: Real-time PCR; Bovine DNA; Quantitative detection; Meat; Milk; Cheese

E. Chouliara, A. Karatapanis, I.N. Savvaidis, M.G. Kontominas, Combined effect of oregano essential oil and modified atmosphere packaging on shelf-life extension of fresh chicken breast meat, stored at 4 [degree sign]C, *Food Microbiology*, Volume 24, Issue 6, September 2007, Pages 607-617, ISSN 0740-0020, DOI: 10.1016/j.fm.2006.12.005.

(<http://www.sciencedirect.com/science/article/B6WFP-4MT5JYY-1/2/1cb6f16c77d3b4e6af750e6c25937a70>)

Abstract:

The combined effect of oregano essential oil (0.1% and 1% w/w) and modified atmosphere packaging (MAP) (30% CO₂/70% N₂ and 70% CO₂/30% N₂) on shelf-life extension of fresh chicken meat stored at 4 [degree sign]C was investigated. The parameters that were monitored were: microbiological (TVC, *Pseudomonas* spp., lactic acid bacteria (LAB), yeasts, *Brochothrix thermosphacta* and *Enterobacteriaceae*), physico-chemical (pH, TBA, color) and sensory (odor and taste) attributes. Microbial populations were reduced by 1-5 log cfu/g for a given sampling day, with the more pronounced effect being achieved by the combination of MAP and oregano essential oil. TBA values for all treatments remained lower than 1 mg malondialdehyde (MDA) kg⁻¹ throughout the 25-day storage period. pH values varied between 6.4 (day 0) and 5.9 (day 25). The values of the color parameters L*, a* and b* were not considerably affected by oregano oil or by MAP. Finally, sensory analysis showed that oregano oil at a concentration of 1% imparted a very strong taste to the product for which reason these lots of samples were not scored. On the basis of sensory evaluation a shelf-life extension of breast chicken meat by ca. 3-4 days for samples containing 0.1% oregano oil, 2-3 days for samples under MAP and 5-6 days for samples under MAP containing 0.1% of oregano oil was attained. Thus oregano oil and MAP exhibited an additive preservation effect.

Keywords: Chicken meat; Shelf-life extension; Oregano oil; Modified atmosphere packaging

Janet E.L. Corry, Alan J. Hedges, Basil Jarvis, Measurement uncertainty of the EU methods for microbiological examination of red meat, *Food Microbiology*, Volume 24, Issue 6, September 2007, Pages 652-657, ISSN 0740-0020, DOI: 10.1016/j.fm.2006.10.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4MJBTKG-1/2/8f3e617aea25ad5a88734e3f2f8058ea>)

Abstract:

Three parallel trials were made of EU methods proposed for the microbiological examination of red meat using two analysts in each of seven laboratories within the UK. The methods involved determination of aerobic colony count (ACC) and Enterobacteriaceae colony count (ECC) using simulated methods and a freeze-dried standardised culture preparation. Trial A was based on a simulated swab test, Trial B a simulated meat excision test and Trial C was a reference test on reconstituted inoculum. Statistical analysis (ANOVA) was carried out before and after rejection of outlying data. Expanded uncertainty values (relative standard deviation x2) for repeatability and reproducibility, based on the log₁₀ cfu/ml, on the ACC ranged from +/-2.1% to +/-2.7% and from +/-5.5% to +/-10.5%, respectively, depending upon the test procedure. Similarly for the ECC, expanded uncertainty estimates for repeatability and reproducibility ranged from +/-4.6% to +/-16.9% and from +/-21.6% to +/-23.5%, respectively. The results are discussed in relation to the potential application of the methods.

Keywords: Measurement uncertainty; Precision; Bacterial counts; Repeatability; Reproducibility

H.C. Reinbach, L. Meinert, D. Ballabio, M.D. Aaslyng, W.L.P. Bredie, K. Olsen, P. Moller, Interactions between oral burn, meat flavor and texture in chili spiced pork patties evaluated by time-intensity, Food Quality and Preference, Volume 18, Issue 6, September 2007, Pages 909-919, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2007.02.005.

(<http://www.sciencedirect.com/science/article/B6T6T-4N7XP6R-2/2/917d4dcabe1b603d18cfc9e5e37e3cf2>)

Abstract:

Capsaicin is receiving increasing interest because of its metabolic enhancing and appetite regulation effects. Studies on formulating foods with adequate levels of capsaicin and related substances from both sensory and nutrition standpoints may help in developing more healthy and satisfying foods. In this study time-intensity (TI) evaluation of pork patties was performed to investigate the effect of textures and two different chili products on the intensity of oral burn and meat flavor of pork patties. The pork patties spiced with chili powder were perceived significantly hotter (larger Area, Tend and DurDec) and had less pronounced meat flavor than the minced chili patties. A multivariate PARAFAC2 model showed in agreement with univariate analysis that both chili products masked the meat flavor. No effect of texture was found on the perceived oral burn or meat flavor. Chili burn and meat flavor were perceived less intense to regular eaters of chili compared to non-eaters of chili.

Keywords: Time-intensity; Meat flavor; Capsaicin; Oral burn; Chili; Multiway analysis; PARAFAC2; Perception; Texture; Suppression

Anne D. Sorensen, Hilmer Sorensen, Charlotte Bjerregaard, Keld E. Andersen, Ib Sondergaard, Susanne Sorensen, Klaus Bukhave, Matrix effects of lupine (*Lupinus luteus* L.) and rapeseed (*Brassica napus* L.) products on in vitro non-haem iron availability from pork meat, Journal of Food Composition and Analysis, Volume 20, Issue 6, September 2007, Pages 515-522, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.12.007.

(<http://www.sciencedirect.com/science/article/B6WJH-4N2D2SK-3/2/acbd11aa30fe80c5a7b3b68bd04be211>)

Abstract:

Limited iron bioavailability is regarded as one of the most confounding factors responsible for low iron absorption and utilisation. In the gastrointestinal lumen of humans and monogastric animals, iron absorption is highly affected by dietary components that decrease or enhance iron availability. This study aims at investigating the matrix effects of lupine and rapeseed products on in vitro non-haem iron availability when included in meat-based diets. In vitro iron availability is measured as Fe(II) dialysability obtained by a method combining in vitro protein digestion and dialysis (IVPD dialysis). Aliquots were collected following digestion with pepsin or pepsin/pancreatin and investigated for their effects on Fe(II) dialysability. Thus, the IVPD imitates the conditions in the

duodenum and the proximal jejunum. The method confirms that the major effects on in vitro non-haem iron availability are achieved during duodenal conditions. The results showed a significant enhancing effect of pepsin-digested pork meat on Fe(II) dialysability and a pronounced effect of the plant components on Fe(II) dialysability from meat proteins. Lupine enhances Fe(II) dialysability after pepsin/pancreatin digestion in contrast to rapeseed. Moreover, lupine may constitute a valuable vegetable food component in enhancing iron availability and solubility more distally in the intestine than observed for other enhancers of iron absorption.

Keywords: In vitro iron availability; In vitro protein digestion; Meat-based diets; Matrix effects

Juan Xing, Michael Ngadi, Aynur Gunenc, Shiv Prasher, Claude Garipey, Use of visible spectroscopy for quality classification of intact pork meat, *Journal of Food Engineering*, Volume 82, Issue 2, September 2007, Pages 135-141, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.01.020.

(<http://www.sciencedirect.com/science/article/B6T8J-4N0X5J3-2/2/e23168ba62883f5580cb457e6367821b>)

Abstract:

Many quality characteristics of pork meat are associated with visible characteristics such as color. To develop an objective and nondestructive system to assess the quality of fresh pork meat, the potential of using visible spectroscopy to classify different quality classes of pork meat and to predict CIE L*, a* and b* values was investigated. Four different qualities of meat were considered namely RFN (red, firm and non-exudative), RSE (red, soft and exudative), PFN (pale, firm and non-exudative) and PSE (pale, soft and exudative). Reflectance spectra were acquired with a Minolta CM 3500d spectrophotometer in the range from 400 to 700 nm. The data analysis showed that it was possible to separate pale meat from red meat. In addition, PFN meat was distinguishable from PSE meat. However, the visible spectral information is not sufficient to separate all the four quality groups. The classification accuracy of using the reflectance spectra was better than using the L*, a* and b* values. The partial least squares regression was used to predict the L*, a* and b* values from the visible reflectance spectra. In general, the prediction for L* was better than for the a* and b* values.

Keywords: Pork; Quality; Color; Visible spectroscopy; CIE, L* a* b*

S. Kavitha, V.K. Modi, Effect of water activity and temperature on degradation of 5'-inosine monophosphate in a meat model system, *LWT - Food Science and Technology*, Volume 40, Issue 7, September 2007, Pages 1280-1286, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.07.014.

(<http://www.sciencedirect.com/science/article/B6WMV-4MGVPNT-1/2/f01c8be887a279ad53c638a98265244a>)

Abstract:

The influence of water activity (a_w) (0.7, 0.8 and 0.9) and temperature (80[degree sign] and 120 [degree sign]C) on the degradation of meat flavor precursor inosine monophosphate (IMP) was studied in a meat fiber model system. Breast and leg muscle from Indian domesticated layer chicken (*Gallus gallus*) were washed repeatedly with 0.1 mol/l phosphate buffer of pH 6 to obtain pigment free and with minimum content of natural IMP in muscle fiber. The freeze-dried breast and leg meat fiber had a protein content of 86.5+/-0.48% and 85.6+/-0.50%, respectively. The IMP contents (mg/100 g) of leg muscle fiber (7.3+/-0.60) was higher (P [less-than-or-equals, slant]0.05) than in the breast meat fiber (5.1+/-1.20). The degradation of IMP was temperature-dependent (P [less-than-or-equals, slant]0.05) in both types of meat fiber systems. In the samples of a_w 0.8, the IMP degradation in breast meat fiber system was lower (P [less-than-or-equals, slant]0.05) than in a_w at 0.7 and 0.9 samples, when treated at 80 [degree sign]C, whereas, there was no significance difference (P >0.05) in the degradation of IMP at a_w 0.7 and 0.9 when heated at 120 [degree sign]C. The degradation of IMP in leg meat fiber model system at higher a_w (0.9) was more (P [less-than-or-equals, slant]0.05) as compared to lower a_w (0.7 and 0.8) at 80 [degree sign]C.

sign]C, while the samples treated at 120 [degree sign]C, the degradation of IMP at aw 0.8 and 0.9 was more ($P \leq 0.05$) than at aw 0.7.

Keywords: Nucleotides; Inosine monophosphate; Inosine; Hypoxanthine; Chicken meat; Meat fibers; Water activity

Guanghong Zhou, 53rd International Congress of Meat Science and Technology, Beijing, China, 5-10th August 2007, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Page 1, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.06.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4P1WMY7-2/2/eae9de765abd22200bd32be94b2a06c1>)

T.A. McMeekin, Predictive microbiology: Quantitative science delivering quantifiable benefits to the meat industry and other food industries, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 17-27, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-C/2/5db95a00815bdb39997476a7bdb9f644>)

Abstract:

Predictive microbiology is considered in the context of the conference theme 'chance, innovation and challenge', together with the impact of quantitative approaches on food microbiology, generally. The contents of four prominent texts on predictive microbiology are analysed and the major contributions of two meat microbiologists, Drs. T.A. Roberts and C.O. Gill, to the early development of predictive microbiology are highlighted. These provide a segue into R&D trends in predictive microbiology, including the Refrigeration Index, an example of science-based, outcome-focussed food safety regulation.

Rapid advances in technologies and systems for application of predictive models are indicated and measures to judge the impact of predictive microbiology are suggested in terms of research outputs and outcomes. The penultimate section considers the future of predictive microbiology and advances that will become possible when data on population responses are combined with data derived from physiological and molecular studies in a systems biology approach.

Whilst the emphasis is on science and technology for food safety management, it is suggested that decreases in foodborne illness will also arise from minimising human error by changing the food safety culture.

Keywords: Predictive microbiology; Quantitative microbial ecology; Current R&D trends; Applications; Advances in technology; Human error and the food safety culture

P. Desmarchelier, N. Fegan, N. Smale, A. Small, Managing safety and quality through the red meat chain, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 28-35, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4NR18KV-4/2/a0bdc4712ce9dea0ee0080ed44df08ea>)

Abstract:

To successfully manage food safety and quality risks in meat production, a holistic approach is required. The ideal would be a fully integrated assurance system, with effective controls applied at all stages. However, the red meat industry is by nature somewhat fragmented, and a truly integrated system is not at present achievable in all but a few operations. This paper describes a variety of assurance initiatives, and explores how targeted research and development can be used to augment assurance programmes by providing underpinning knowledge, using the Australian beef and lamb industry as an example.

Keywords: Meat safety; Quality assurance; Supply chain

Yu Gao, Ran Zhang, Xiaoxiang Hu, Ning Li, Application of genomic technologies to the improvement of meat quality of farm animals, *Meat Science*, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 36-45, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-D/2/f558bfcac1092cd42c739d7f37a83454>)

Abstract:

Meat quality is of economic importance in farm animals. It is controlled by multigenes and the environment. During the past few decades, advances in molecular genetics have led to the identification of genes, or markers associated with genes, that affect meat quality. Work on sequencing farm animal genomes will help us to understand how genes function in various organisms and might be applied in the field to study the molecular control of meat quality. Candidate gene and genome scans are two main strategies to identify loci associated with the trait of meat quality. Several genes that influence meat quality have already been, or are close to being, identified. Some of them have been applied to the breeding of farm animals by marker-assisted selection. This will accelerate cumulative and permanent genetic improvement of herds.

Keywords: Genomic; QTL; Farm animals; Meat; Quality; Marker-assisted selection

R. Talon, S. Leroy, I. Lebert, Microbial ecosystems of traditional fermented meat products: The importance of indigenous starters, *Meat Science*, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 55-62, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4NN6TNP-2/2/da06d1219d904670724eb49e79e21a58>)

Abstract:

This paper reviews the diversity of microbiota, both in the environment and in traditional fermented European sausages. The environments of processing units were colonised at variable levels by resident spoilage and technological microbiota, with sporadic contamination by pathogenic microbiota. Several critical points were identified such as the machines, the tables and the knives - knowledge crucial for the improvement of cleaning and disinfecting practices. Traditionally fermented sausages generally did not present a sanitary risk. The great diversity of lactic acid bacteria and staphylococci was linked to manufacturing practices. Development of indigenous starters is very promising because it enables sausages to be produced with both high sanitary and sensory qualities. Our increasing knowledge of the genomes of technological bacteria will allow a better understanding of their physiology in sausages.

Keywords: Microbial ecosystem; Traditional fermented sausage; Indigenous starter; Lactic acid bacteria; Coagulase-negative cocci

C.R. Calkins, J.M. Hodgen, A fresh look at meat flavor, *Meat Science*, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 63-80, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKXWRM-1/2/3186e5f0ea5a32c39fb22755b3f665e9>)

Abstract:

Hundreds of compounds contribute to the flavor and aroma of meat. Complex interactions between various compounds influence the perception of meat flavor. Inherent flavor of a meat product can be influenced by oxidation, lipid content, feeding/diet, myoglobin, and pH. Diet plays an important role in both ruminants and nonruminants. New research reveals important relationships in flavor among multiple muscles within a single animal carcass. This animal effect

includes the presence of off-flavors. Diets high in polyunsaturated fatty acids may be contributing to the appearance of off-flavors in beef. Compounds associated with liver-like off-flavor notes in beef have been identified in raw tissue.

Keywords: Flavor; Meat; Beef; Off-flavor; Liver flavor

J. Arnau, X. Serra, J. Comaposada, P. Gou, M. Garriga, Technologies to shorten the drying period of dry-cured meat products, *Meat Science*, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 81-89, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4NB99MM-5/2/6c5e9fd3e5209b91ec3dd4edc49cff1b>)

Abstract:

Dry-cured meat products are well-known for their unique sensory characteristics. However, the traditional process is very time consuming. The process can be shortened especially by accelerating the drying period, which is the most time consuming. This paper deals with some technological, safety and sensorial aspects for producing fermented sausages and dry-cured hams when the process time is shortened. Different techniques, such as temperature increase and thickness reduction, and the effects of some ingredients and additives are discussed. A Quick-Dry-Slice process based on a continuous system that combines both convective and vacuum drying could accelerate the drying of slices after the desired pH is reached in fermented sausages.

There are safety concerns when processes are shortened, but possible additional hurdles, such as the introduction of bacteriocin-producing starter cultures and high-pressure treatments at the end of the process, could reduce them. Methods to speed up the development of typical colour, texture and flavour and their limitations are also discussed.

Keywords: Fermented sausages; Dry-cured ham; Accelerated production; Technology; Safety; Sensory properties

Kristin Hollung, Eva Veiseth, Xiaohong Jia, Ellen Mosleth Faergestad, Kjell Ivar Hildrum, Application of proteomics to understand the molecular mechanisms behind meat quality, *Meat Science*, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 97-104, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4NCJCYG-1/2/89de6239351e67119f44f06033f8f852>)

Abstract:

The proteome is expressed from the genome, influenced by environmental and processing conditions, and can be seen as the molecular link between the genome and the functional quality characteristics of the meat. In contrast to traditional biochemical methods where one protein is studied at a time, several hundred proteins can be studied simultaneously. Proteomics is a promising and powerful tool in meat science and this is reflected by the increasing number of studies emerging in the literature using proteomics as the key tool to unleash the molecular mechanisms behind different genetic backgrounds or processing techniques of meat. Thus understanding the variations and different components of the proteome with regard to a certain meat quality or process parameter will lead to knowledge that can be used in optimising the conversion of muscles to meat. At present, there has been focus on development of techniques and mapping of proteomes according to genotypes and muscle types. In the future, focus should be more towards understanding and finding markers for meat quality traits. This review will focus on the methods used in the published proteome analyses of meat, with emphasis on the challenges related to statistical analysis of proteome data, and on the different topics of meat science that are investigated.

Keywords: Proteomics; Proteome analysis; Two-dimensional electrophoresis; 2-DE; Mass spectrometry; Muscle proteome; Protein fractionation

M.E. Dikeman, Effects of metabolic modifiers on carcass traits and meat quality, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 121-135, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.04.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4NKJ0MR-1/2/f36452e9eb002ae7987f9fddccd37add>)

Abstract:

Much research has been conducted and published about metabolic modifiers that increase growth rate, improve feed efficiency, increase carcass leanness, and decrease carcass fatness. Most of these metabolic modifiers have been developed to improve efficiency and profitability of livestock production and to improve carcass composition, with fewer of them developed and researched specifically to improve meat quality. Some of the metabolic modifiers can have negative effects on visual and sensory meat quality, especially when not used as recommended. This review evaluates the various kinds of metabolic modifiers that have been researched for their effects on production efficiency, carcass composition, and meat quality. Nutritional composition of meat generally is improved from use of most of the metabolic modifiers, visual quality is improved by others, but some can have a negative effect on marbling and tenderness. Anabolic steroid implants are very cost effective and practical for beef cattle production but aggressive implants used within 70 days of slaughter or too frequent use of them will reduce tenderness and marbling. Somatotropin and approved [beta]-agonists are very effective in improving growth performance and carcass leanness in pigs, and [beta]-agonists are effective in cattle, but improper use of them can have negative effects on marbling and tenderness. Feeding supplemental levels of vitamin E is quite beneficial for improving meat color and shelf-life of beef, lamb, and pork, whereas not supplementing diets with vitamin A has potential for improving marbling in cattle. Immunocastration shows promise for capitalizing on the efficiency of muscle growth of young boars up to a few weeks before slaughter, at which time boar taint is prevented and marbling is improved by immunocastration. Potential exists for improving the fatty acid profile of lipids and increasing conjugated linoleic acid content in beef through dietary manipulation. Supplementing swine diets with conjugated linoleic acid can improve carcass composition of swine, but is not yet cost effective to use. Dietary inclusion of magnesium, manganese, or chromium in diets of pigs and sheep has potential to improve meat color and water-holding capacity. Although, not all of these metabolic modifiers are approved in all countries, proper use of the ones that are approved offers opportunities for economically improving production efficiency and carcass leanness while maintaining acceptable marbling and tenderness, while some provide opportunities to enhance meat color and quality.

Keywords: Metabolic modifiers; Growth performance; Meat quality; Dietary manipulation; Carcass traits

Joseph G. Sebranek, James N. Bacus, Cured meat products without direct addition of nitrate or nitrite: what are the issues?, Meat Science, Volume 77, Issue 1, 53rd International Congress of Meat Science and Technology (53rd ICoMST), September 2007, Pages 136-147, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4NGRRYN-8/2/a0e85a7db2078a606df44755a62782a2>)

Abstract:

The growing popularity of food products marketed in the United States as 'natural' and 'organic' has resulted in a proliferation of marketing efforts to meet consumer demands for these foods. Because natural and organic foods are not permitted to use chemical preservatives, the traditional curing agents used for cured meats, nitrate and/or nitrite, cannot be added to natural and organic processed meat products. However, alternative processes that utilize ingredients with high nitrate content, such as vegetable-based ingredients, and a nitrate-reducing starter culture can produce

processed meats with very typical cured meat properties. Because it is not possible to analytically measure the amount of nitrite produced by this process, several potential issues deserve consideration. Regulations, for example, should permit labeling that accurately reflects the process and products, manufacturing procedures must be standardized to achieve product consistency, marketing efforts should clearly communicate the nature of these products to consumers, product quality must be maintained, and microbiological safety must be assured.

Keywords: Organic; Natural; Cured meats; Nitrite; Nitrate

Holger Schonenbrucher, Amir Abdulmawjood, Katrin-Annette Gobel, Michael Bulte, Detection of central nervous system tissues in meat products: Validation and standardization of a real-time PCR-based detection system, *Veterinary Microbiology*, Volume 123, Issue 4, Recent Progress in Prion Research - Scientific Advances Reported at the Concluding Meeting of the German TSE Research Platform, German TSE Research Platform, 31 August 2007, Pages 336-345, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2007.04.003.

(<http://www.sciencedirect.com/science/article/B6TD6-4NFH0BB-9/2/a609a54e931860da0cd713eea20174c8>)

Abstract:

Several phenotypic as well as genotypic methods have been published describing the detection of central nervous system (CNS) tissues that are part of the bovine spongiform encephalopathy (BSE) risk material in food products. However, none of these methods is able to differentiate between CNS tissue of the banned ruminant species and tissues of other animal species.

A quantitative and species-specific real-time RT-PCR method has been developed that enables the reliable identification of CNS tissues in meat and meat products. This method is based on a messenger (m)RNA assay that uses bovine, ovine and caprine glial fibrillary acidic protein (GFAP) encoding gene sequences as markers. The in-house validation studies evaluated the tissue specificity of up to 15 bovine tissues and the standardization of absolute as well as relative quantitative measurement. The specific amplification of spinal cord and brain tissue GFAP cDNA has been shown previously. In addition, two commercially available ELISA kits were used for the comparative analysis of artificially contaminated minced meat. Small quantities of bovine brain that had been stored over the recommended period of 14 days were examined. The real-time PCR method proved to be suitable for the detection of 0.1% CNS tissue. No false negative results were observed.

The quantitative detection of GFAP mRNA using real-time RT-PCR seems a suitable tool in routine diagnostic testing that assesses the illegal use of CNS tissue in meat and meat products. The stability of the selected target region of the GFAP mRNA also allows the detection of CNS tissues after the meat has been processed.

Keywords: Real-time PCR; Central nervous system tissues; BSE risk material

S. Soncin, L.M. Chiesa, C. Cantoni, P.A. Biondi, Preliminary study of the volatile fraction in the raw meat of pork, duck and goose, *Journal of Food Composition and Analysis*, Volume 20, Issue 5, August 2007, Pages 436-439, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.09.001.

(<http://www.sciencedirect.com/science/article/B6WJH-4MR1RRF-1/2/d5020e34819f5b56ac1f69cb4597d064>)

Abstract:

In order to verify the significance of the volatile fraction obtained at room temperature from raw meat of different species, four samples of pork, duck and goose meat were analysed by gas chromatography-mass spectrometry (GC-MS) after solid-phase microextraction (SPME). Different chemical compositions were found in the three species. In three of the four samples of pork, only alcohols and ketones were present, while 2-pentylfuran was present in only one sample; in addition to these compounds, aldehydes and hexanoic acid were detected in duck samples. Thus endogenous compounds derived from lipid peroxidation were the predominant compounds in pork

and duck. On the contrary, carbon disulphide and a contaminant (p-dichlorobenzene) were the predominant components in the goose samples analysed. The information obtained by this rapid procedure is discussed.

Keywords: Raw meat; Volatile compounds; Pork; Duck; Goose; SPME; GC-MS

Garrett A. Keating, Kenneth T. Bogen, June M. Chan, Development of a Meat Frequency Questionnaire for Use in Diet and Cancer Studies, *Journal of the American Dietetic Association*, Volume 107, Issue 8, August 2007, Pages 1356-1362, ISSN 0002-8223, DOI: 10.1016/j.jada.2007.05.011.

(<http://www.sciencedirect.com/science/article/B758G-4P94VN5-M/2/90d0159889917cf7068232b48948b530>)

Abstract: Objective

To develop a meat frequency questionnaire to assess dietary heterocyclic amine intake. The meat frequency questionnaire is designed to obtain information on meat types, cooking methods, and doneness preferences that predict heterocyclic amine concentrations in different meats. Design Total and specific meat intakes were determined by a standard food frequency questionnaire (FFQ) and compared with that determined by the meat frequency questionnaire. Subjects/setting Three-hundred fourteen African-American males participating in a clinic-based study of prostate disease and heterocyclic amine intake were administered the two questionnaires in a cancer education center prior to undergoing screening evaluations for prostate disease. Main outcome measures

Fried, broiled, and grilled vs total meat intake was assessed using the meat frequency questionnaire vs FFQ, respectively. Specific meat items included in the meat frequency questionnaire were evaluated as factors potentially explaining discrepancies in meat intake estimated using the two questionnaires. Seasonal variation in meat intake was also examined. Statistical analysis

Correlation coefficients for intake of total meat and individual meat groups determined by FFQ vs meat frequency questionnaire were calculated. Seasonal differences in meat and estimated heterocyclic amine intakes were evaluated by t test, adjusted for multiple comparisons. Results Meat intakes determined by the two questionnaires were well-correlated (Pearson $r=0.69$); however, total meat assessed by the meat frequency questionnaire exceeded total meat assessed by the FFQ in 30% of participants. Total energy and intake of heterocyclic amine-associated meat were greatest when the meat frequency questionnaire was administered during winter months. Conclusions

The heterocyclic amine meat frequency questionnaire provided a fractional measure of total meat intake and identified specific heterocyclic amine-containing meat items underreported in a standard FFQ.

Jannie S. Vestergaard, Magni Martens, Pekka Turkki, Analysis of sensory quality changes during storage of a modified atmosphere packaged meat product (pizza topping) by an electronic nose system, *LWT - Food Science and Technology*, Volume 40, Issue 6, August 2007, Pages 1083-1094, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.06.009.

(<http://www.sciencedirect.com/science/article/B6WMV-4KWK4B7-1/2/dd5f7bca9200fe0baca64b1cd7231951>)

Abstract:

The objective of this study was to determine whether an electronic nose could be used for measuring and modelling sensory quality changes in a pizza topping product during storage. A method involving a minimum of sample preparation in combination with a short sampling cycle mimicking an on-line situation was developed. A multivariate data analysis strategy involving principal component analysis (PCA) and partial least squares regressions (PLSR) was applied to determine the relationships between the electronic nose data, sensory analysis data and storage

time. The results showed that the electronic nose was capable of detecting quality changes related to odour in the early stage and again from half-way to the last stage of the storage time, whereas the trained sensory panel could detect quality changes during the whole storage time. Applicability of the electronic nose for modelling the sensory perceived quality of the pizza topping product showed to be very promising indicating strong relationships between the electronic nose data and the perceived changes in odours during storage.

Keywords: Electronic nose; Ion mobility spectrometry; Sensory analysis; Quality; Meat; Multivariate data analysis

Jannie S. Vestergaard, Magni Martens, Pekka Turkki, Application of an electronic nose system for prediction of sensory quality changes of a meat product (pizza topping) during storage, *LWT - Food Science and Technology*, Volume 40, Issue 6, August 2007, Pages 1095-1101, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.06.008.

(<http://www.sciencedirect.com/science/article/B6WMV-4M04JHY-1/2/b16c582ff0a80cfc22da68c2f7ded582>)

Abstract:

The aim of the present study was to investigate the predictability of an electronic nose system based on ion mobility regarding storage time as well as sensory quality changes during storage of a pork meat pizza topping product. The study included two independent test sets; 'known' production samples and 'unknown' samples purchased from a local supermarket (all samples stored at +5 [degree sign]C after production or purchasing). Models for predicting storage time and sensory quality changes during storage from electronic nose data were estimated by projection of test set samples onto calibration models based on partial least square regression (PLSR). The results showed that storage time of 'known' samples was very well predicted. Also, the storage time of 'unknown' samples could be fairly well predicted. Sensory quality changes during storage were in general fairly well and significantly predicted for descriptors related to odour and colour, whereas only few descriptors related to texture were found fairly well predicted. Descriptors found predictable for individual test sets clearly related to different stages of the storage time characterizing samples in the test sets, e.g. the test set of 'known' samples comprised mainly of samples in the later stage of the storage time and thus descriptors mainly relating to the later stage of the storage time were well predicted, i.e. rancidity and greasy mouthfeel. Overall this study gave evidence of the electronic nose system to be a relevant device for future at- or on-line implementation in quality control (QC) of a pork meat pizza topping product.

Keywords: Electronic nose; Sensory analysis; Quality control; Multivariate data analysis; Storage; Meat

A. Poto, M. Galian, B. Peinado, Chato Murciano pig and its crosses with Iberian and Large White pigs, reared outdoors. Comparative study of the carcass and meat characteristics, *Livestock Science*, Volume 111, Issues 1-2, August 2007, Pages 96-103, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.12.005.

(<http://www.sciencedirect.com/science/article/B7XNX-4MWPYP3-2/2/36b4c1b27190ede2f9eccb5ae8b24099>)

Abstract:

The Chato Murciano pig is an autochthonous breed genetically adapted to the south-east of Spain local conditions and extensive production system. In this work we aimed to compare the quality of the carcass and meat of this local breed and its crosses in outdoor rearing conditions. Samples were taken from the longissimus lumbar muscle of 38 pigs, belonging to three different groups, Chato Murciano (CH), Chato Murciano crossed with Iberian (CH x IB) and Chato Murciano crossed with Large White (CH x LW). The pH values measured at 24 h postmortem were within the normal range. The levels of intramuscular fat were 10.47% for CH, 8.97% for CH x IB, and 11.17% for CH x LW. The CH x LW group showed the highest weights for the most valuable meat

cuts. The meat of the Chato Murciano pig and its crosses revealed high levels of iron, copper and phosphorus, and low levels of calcium and sodium.

Keywords: Chato Murciano; Iberian; Large White; Pig; Outdoor; Meat quality; Longissimus lumbar

J.A. Carcel, J. Benedito, J. Bon, A. Mulet, High intensity ultrasound effects on meat brining, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 611-619, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4N2TS54-4/2/c53a9ffe7231bc22d8e447bd3131012c>)

Abstract:

Pork loin (longissimus dorsi) samples of two different geometries, cylinders and slabs, were immersed in saturated NaCl brine for 45 min under different conditions: without brine agitation (STAT), with brine agitation (AG) and with ultrasound application (US) at eight levels of ultrasonic intensity. Moisture content change and NaCl gain were considered in order to evaluate the difference in the brining treatments. No significant differences were found in moisture and NaCl content of samples treated under STAT conditions and AG conditions, while the influence of ultrasound on the mass transfer process during meat brining depended on the intensity applied. There was an ultrasonic intensity threshold above which the influence of ultrasound appeared. At the highest level of intensity studied, the water content of samples was significantly higher than the initial water content of meat. As regards NaCl transfer, once above the intensity threshold, the increase in the NaCl content was proportional to the applied ultrasonic intensity. Not statistically significant differences were found for sample geometry.

Keywords: High power ultrasound threshold; Pork loin; Moisture; NaCl content; Dry matter

Chaoxin Zheng, Da-Wen Sun, Liyun Zheng, A new region-primitive method for classification of colour meat image texture based on size, orientation, and contrast, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 620-627, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4N3P09Y-1/2/d318af35bce9b644d40e2e7170c59297>)

Abstract:

A new structural method was developed to characterise texture of colour meat images. Structural primitives or region-primitives were constructed using a region-growing method with a global and automatically calculated threshold. A total of eight textural features under the consideration of size, orientation, and contrast, which are the primary factors of human perception of texture pattern, were obtained from the region-primitives. An experiment was set up to classify the texture pattern of a set of 60 cooked meat colour images consisting of 20 beef images, 20 lamb images, and 20 pork images using texture features obtained from the proposed region-primitive method and run-length matrix method, respectively. The proposed region-primitive method (error rate: 18.3%) was found to perform better than the run-length matrix method (error rate: 35.0%). Results also indicated that the texture features obtained by the proposed method carried adequate texture information for classification and that the proposed region-primitive method could be potentially used for the characterisation of irregular textural pattern in cooked meat images, which was inapproachable by conventional structural texture analysis techniques.

Keywords: Cooked meat; Structural texture; Nonparametric discrimination; Posterior probability estimate; Texture properties; Texture strength; Texture coarseness; Texture busyness; Texture complexity

M. Vestergaard, N.T. Madsen, H.B. Bligaard, L. Bredahl, P.T. Rasmussen, H.R. Andersen, Consequences of two or four months of finishing feeding of culled dry dairy cows on carcass characteristics and technological and sensory meat quality, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 635-643, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4N2KTN1-1/2/83feee98097df99ffc31265af06f91c9>)

Abstract:

Finishing feeding was evaluated as a way to improve carcass-, meat- and eating quality of culled dairy cows. In total, 125 Danish Friesian cows were purchased from commercial dairy herds. Cows were culled for various typical reasons at different stages of lactation, were non-pregnant and had milk yield at culling ranging from 1 to 25 kg/d and had LW varying from 330 to 778 kg. Cows were housed in tie-stalls and had free access to barley straw and water during a 7-d drying-off period. Cows were allocated to three equal treatment groups based on parity, LW, BCS, and culling reason. A control group (C) was slaughtered immediately after drying-off (n = 43), a group (F2) was finishing-fed for 63 days (n = 41), and a group (F4) was finishing-fed for 126 days (n = 41). In the finishing period, cows had free access to a TMR (10.6 MJ ME and 130 g CP per kg of DM). Cows on treatment, F2 and F4 gained 1.16 +/- 0.05 kg/d in the finishing period. Compared with C-cows, F2- and F4-cows had 56 and 97 kg higher carcass weight, 10% and 21% larger Longissimus muscle area, and 14 and 70% more backfat, respectively, at time of slaughter. EUROP conformation scores were 2.2 (C), 3.4 (F2) and 4.4 (F4) and EUROP fat scores were 1.9, 3.0 and 3.7. Finishing feeding increased IMF, improved meat flavour and colour, and tended to reduce shear force value and improve tenderness and juiciness. The F4 cows also had higher fat trim than C- and F2-cows. Cows were divided into two parity groups (1st parity and older cows). Compared with 1st parity cows, older cows ate 12% more feed, had similar daily gain, were heavier, and had higher BCS and fatness including IMF. The results show that it is possible to dry-off and finish-feed culled dairy cows resulting in larger muscles, increased fatness, improved overall carcass quality and better technological as well as sensory quality characteristics.

Keywords: Cull dairy cows; Finishing feeding; Carcass quality; Eating quality

V. Fajardo, I. Gonzalez, I. Lopez-Calleja, I. Martin, M. Rojas, T. Garcia, P.E. Hernandez, Rosario Martin, PCR identification of meats from chamois (*Rupicapra rupicapra*), pyrenean ibex (*Capra pyrenaica*), and mouflon (*Ovis ammon*) targeting specific sequences from the mitochondrial D-loop region, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 644-652, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4N2KTN1-2/2/abbc04cde4f02abdad10356ee74b58e6>)

Abstract:

A polymerase chain reaction (PCR) assay was developed for the identification of meats from chamois (*Rupicapra rupicapra*), pyrenean ibex (*Capra pyrenaica*), and mouflon (*Ovis ammon*) by using oligonucleotides targeting mitochondrial D-loop sequences. A D-loop region (~700-1000 bp) was firstly amplified and sequenced from various game and domestic meat DNAs, and three primer sets were then designed on the basis of nucleotide multialignment of the generated D-loop sequences. As expected from sequence analysis, PCR amplification of the targeted D-loop fragments was successfully achieved from chamois (88 bp), pyrenean ibex (178 bp), and mouflon (155 bp) meats, showing adequate specificity and reproducibility against a number of game and domestic meats. Mouflon and sheep meats were amplified together in accordance to the high nucleotide identity of their mt D-loop sequences. In this work, satisfactory amplification was also accomplished in the analysis of experimentally pasteurized (72 [degree sign]C for 30 min) and sterilized (121 [degree sign]C for 20 min) meats, with a detection limit of ~0.1% for each of the targeted species. The proposed PCR assay represents a rapid and straightforward method for the detection of possible adulterations in game meat products.

Keywords: Species identification; Caprinae; Chamois; Pyrenean ibex; Mouflon; Sheep; Goat; D-loop; Polymerase chain reaction (PCR)

Neelam Gupta, S.P.S. Ahlawat, D. Kumar, S.C. Gupta, Alok Pandey, Geetu Malik, Single nucleotide polymorphism in growth hormone gene exon-4 and exon-5 using PCR-SSCP in Black Bengal goats - A prolific meat breed of India, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 658-665, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4N3GFRM-1/2/6be091c07f5edc79aea8e2e8c7b75511>)

Abstract:

Single-strand conformation polymorphism (SSCP) showed 7 and 5 haplotypes in caprine GH gene exon-4 and exon-5 in Black Bengal, a prolific meat breed from India. All haplotypes revealed novel sequences. In exon-4 codons 6, 36 and 54 were polymorphic. At codon 6, AA arginine (R) changed to histidine (H) and proline (P), showing 6RR, 6HH and 6PP genotypes. At codons 36 three genotypes DD, VV and DV were observed due to SNP showing changed from aspartic acid (D) to valine (V). At codon 54, AA change from arginine to tryptophan (W) and 54RR and 54WW genotypes were observed. SNPs were also observed at codon 23 (serine to threonine) and at 37 (arginine to proline) in 8% of goats. In exon-5 nucleotide substitution (G/A) at codon 10 and (A/G) at 14 respectively changed AA from glycine (K) to glutamic acid (E). Silent mutations were also observed.

Keywords: Caprine; Growth hormone; Single-strand conformation polymorphism; Single nucleotide polymorphism; India

M.B. Linares, R. Bornez, H. Vergara, Effect of different stunning systems on meat quality of light lamb, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 675-681, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4N43S0H-2/2/77d52bc5753edcb9941a058867b4616b>)

Abstract:

The present study was proposed to compare the effect that different types of stunning (TS) had on the quality of refrigerated meat from light lambs of the Spanish Manchega breed at 24 h and 7 days post-mortem. Lambs were electrically stunned (ESL; n = 10), using CO₂ (GSL; n = 10) or slaughtered without previous stunning (USL; n = 10). Measurements on meat quality were carried out by evaluating pH, colour coordinates (L*, a*, b*), water holding capacity (WHC), cooking loss (CL), shear force (SF) and drip loss (DL). At 24 h post-mortem, no significant differences were found in any of the variables studied. However, at 7 days post-mortem, meat quality was affected by the different TS: pH, CL and DL were lower (P < 0.001) in the USL group and GSL obtained the lowest a* (redness) and b* (yellowness) values (P < 0.01) than in the other groups. Ageing of meat affected SF in the ESL group (P < 0.01), although there were no significant differences due to treatments at any of the ageing times.

Keywords: Slaughter; Stunning; Carbon dioxide (CO₂); Electrical; Meat quality; Light lamb

F. Perez-Rodriguez, A. Valero, E.C.D. Todd, E. Carrasco, R.M. Garcia-Gimeno, G. Zurera, Modeling transfer of *Escherichia coli* O157:H7 and *Staphylococcus aureus* during slicing of a cooked meat product, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 692-699, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4N49VSC-1/2/afc2b51c9933ac4b74d8a5e5da1a4fc0>)

Abstract:

Cross contamination is one of the most important contributing factors in foodborne illnesses originating in household environments. The objective of this research was to determine the transfer coefficients between a contaminated domestic slicing machine and a cooked meat product, during slicing. The microorganisms tested were *Staphylococcus aureus* (Gram positive) and *Escherichia coli* O157:H7 (Gram negative). The results showed that both microorganisms

were able to transfer to all slices examined (20 successively sliced) and at different inoculum levels on the blade (108, 106 and 104 cfu/blade). The results also showed that the number of log cfu transferred per slice, during slicing, decreased logarithmically for both microorganisms at inoculum levels of 8 and 6 log cfu/blade. The type of microorganism significantly influenced transfer coefficients ($p < 0.05$) and there was an interaction between inoculum level and transfer coefficient for *S. aureus* ($p < 0.05$), but not *E. coli* O157:H7. Finally, to describe bacterial transfer during slicing, two models (log-linear and Weibull) were fitted to concentration on slice data for both microorganisms (at 6 and 8 log cfu/blade), obtaining a good fit to data (R^2 [greater-or-equal, slanted] 0.73).

Keywords: Quantitative risk assessment; Cross contamination; Predictive microbiology; Semi-logarithmic model; Weibull model; Transfer coefficient

M.B. Linares, M.I. Berruga, R. Bornez, H. Vergara, Lipid oxidation in lamb meat: Effect of the weight, handling previous slaughter and modified atmospheres, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 715-720, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4N49VSC-2/2/72433e7159352652d4d67a30ecd13cca>)

Abstract:

This study examined the effect of pre-slaughter handling (electrical, gas (CO₂) or non-stunning) on lipid oxidation (as thiobarbituric acid reactive substances, TBARS; in the unit of mg malondialdehyde/kg-1 of meat) of Spanish Manchega breed lamb meat, at 24 h and at 7 days post-mortem. Lambs were slaughtered at two different weights (light (L), 25 kg, vs. suckling (S), 12.8 kg). In general gas-stunned lambs had lower lipid oxidation ($P < 0.001$), and it was higher ($P < 0.001$) in light lambs compared to suckling lambs. In both groups (S and L), malondialdehyde level increased with time ($P < 0.001$), although this increase was lower ($P < 0.05$) in gas-stunned suckling lambs.

In addition, we evaluated the effect of stunning methods (TS: electrical vs. gas) and the weight (L vs. S) on lipid oxidation values in samples packed in different types of modified atmosphere (MA: A: 70%O₂ + 30%CO₂; B: 69.3%N₂ + 30%CO₂ + 0.7%CO; C: 60%N₂ + 40%CO₂) at 7, 14 and 21 days post-packing. Values were higher in samples with MA-type A and lower in B and C types ($P < 0.05$). A significant interaction ($P < 0.001$) weight x TS was observed and the lowest rates of TBARS were found in the samples of light lambs stunned with gas and packed under anaerobic conditions (MA-B and C).

Keywords: Lipid oxidation; Lamb; Stunning; Modified atmosphere; Weight

Irene Martin, Teresa Garcia, Violeta Fajardo, Ines Lopez-Calleja, Maria Rojas, Pablo E. Hernandez, Isabel Gonzalez, Rosario Martin, Mitochondrial markers for the detection of four duck species and the specific identification of Muscovy duck in meat mixtures using the polymerase chain reaction, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 721-729, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4N4J33N-2/2/c27ba9b5ffb2dcad93bc3c5d1491a529>)

Abstract:

A polymerase chain reaction (PCR) assay for the qualitative detection of four duck species in meat mixtures, and a second PCR assay for the specific identification of Muscovy duck, have been developed based on oligonucleotide primers targeting the 12S rRNA mitochondrial gene. The specificity of both assays was tested against a wide range of animal species. The technique was applied to raw and sterilized muscular binary mixtures, with a detection limit that ranged from 0.1% to 1.0% (w/w). The short length (less than 100 bp) of the DNA fragments amplified with these primer pairs was found to be essential for the successful amplification in samples with highly degraded DNA, and consequently, it could be very useful in inspection programmes to enforce

labelling regulation of heat and pressure-processed products, for which other methods cannot be applied.

Keywords: 12S rRNA gene; Polymerase chain reaction; Duck species detection and identification; Muscovy duck

R.G.M. van der Sman, Moisture transport during cooking of meat: An analysis based on Flory-Rehner theory, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 730-738, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4N4J33N-3/2/2a9ba539773ba6855241def07a170cf7>)

Abstract:

It is proposed that the moisture transport during cooking of meat can be described by the Flory-Rehner theory of rubber-elasticity. This theory contains the essential physics to describe the transport of liquid moisture due to denaturation and shrinkage of the heated protein matrix. The validity of the proposition is shown by a numerical model, which comprises a linearisation of the Flory-Rehner theory augmented with Darcy's law for porous media flow. The model is used to simulate cooking experiments performed with a rectangular piece of beef. Reasonable comparison between simulations and experiments is obtained. Further analysis of simulations renders insight of yet unexplained phenomena observed during cooking of meat.

Keywords: Cooking; Moisture transport; Model

L.C. Hoffman, M. Kroucamp, M. Manley, Meat quality characteristics of springbok (*Antidorcas marsupialis*). 1: Physical meat attributes as influenced by age, gender and production region, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 755-761, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4N5CXN7-2/2/5bff7d82c81cb83d6e1a49ce452a9269>)

Abstract:

Springbok is the most extensively cropped game species in South Africa. The effects of age (adult, sub-adult, lamb), gender and production region on the physical attributes (pH₂₄, cooking and drip loss, Warner Bratzler shear force and colour) were determined using samples of the *M. longissimus dorsi* (LD) muscles of 166 springbok. Stressed animals had a higher ($P < 0.05$) pH₂₄ (6.3 ± 0.07), as observed in the meat originating from the Caledon region. This meat had lower ($P < 0.05$) cooking loss ($27.2 \pm 0.62\%$) and drip loss ($1.8 \pm 0.08\%$) values in comparison to meat originating from the other regions. Inverse correlations were noted between pH₂₄ and drip loss ($r = -0.26$, $P < 0.01$) and cooking loss ($r = -0.42$, $P < 0.001$). Shear force values (kg/1.27 cm diameter) correlated positively ($r = 0.25$, $P < 0.01$) with pH₂₄. Age-related effects on tenderness were small in comparison with pH₂₄ effects. CIELab colorimetric values were typical of game meat and venison ($L^* < 40$, high a^* and low b^* values). It was noted that pH₂₄ correlated negatively ($r = -0.51$, $P < 0.001$) and positively ($r = 0.33$, $P < 0.001$) with the hue-angle and the chroma value of colour, respectively. Springbok originating from Caledon had a significantly ($P < 0.05$) higher a^* value, indicating meat to be more red with higher colour saturation.

Keywords: Game meat; Springbok; pH; Water holding capacity; Drip loss; Cooking loss; Colour; Shear force

L.C. Hoffman, M. Kroucamp, M. Manley, Meat quality characteristics of springbok (*Antidorcas marsupialis*). 2: Chemical composition of springbok meat as influenced by age, gender and production region, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 762-767, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4N5CXN7-3/2/873fab7d4d4b5cedddae7317420d8352>)

Abstract:

The effects of age, gender and production region on the chemical, mineral and amino acid composition of the *M. longissimus dorsi* (LD) muscle of springbok were investigated. There was a significant gender*region interaction for protein content - for the four production regions it varied between 18.80 and 21.16 g/100 g. The intramuscular fat (IMF) content of the LD muscle varied between 1.32 and 3.46 g/100 g. Females (3.13 +/- 0.28 g/100 g) had a higher ($P < 0.05$) fat content than males (1.35 +/- 0.08 g/100 g). The IMF content of the adult (2.45 +/- 0.26 g/100 g) and sub-adult (2.50 +/- 0.28 g/100 g) categories was higher ($P < 0.05$) in comparison to that of the lambs (1.32 +/- 0.11 g/100 g). An inverse correlation was noted between the IMF and moisture content ($r = -0.49$, $P < 0.001$) of the meat. The two main amino acids were glutamic and aspartic acid, which contributed 2.47-2.74 and 2.31-2.54 g/100 g of dry matter, respectively. Phosphorous was the predominant mineral in the LD muscle (122.92-159.78 mg/100 g of dry matter), followed by potassium (119.44-131.25 mg/100 g of dry matter) and calcium (6.57-145.18 mg/100 g of dry matter). Production region had a significant effect on the mineral and amino acid composition of the meat, while the effects of age and gender were found to be insignificant.

Keywords: Game meat; Springbok; Chemical composition; Fat; Amino acids; Minerals

L.C. Hoffman, M. Kroucamp, M. Manley, Meat quality characteristics of springbok (*Antidorcas marsupialis*). 3: Fatty acid composition as influenced by age, gender and production region, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 768-773, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4N5CXN7-4/2/ac479154fd2af3c401a55eae36f39004>)

Abstract:

The effects of age, gender and production region on the fatty acid composition of springbok *Musculus longissimus dorsi* (LD) were investigated. The major fatty acid of the LD muscle was stearic acid (C18:0), which contributed 23.92-27.02%. Oleic acid (C18:1) represented the largest component (16.33-20.45%) of the mono-unsaturated fatty acids (MUFA). The major n - 6 polyunsaturated fatty acid (PUFA) was C18:2n - 6, which formed 18.77-21.62%, whereas C18:3n - 3 (3.33-4.00%) was the most abundant n - 3 PUFA. The n - 6:n - 3 ratio of the meat varied from 3.02 to 3.35, with an average ratio of 3.2. Polyunsaturated to saturated (P:S) ratios varied between 0.96 and 1.18 and averaged at 1.06. Total MUFA was found to be higher ($P < 0.05$) in males (20.99%) than females (16.67%). The cholesterol content of the meat varied from 54.45 to 59.34 mg/100 g muscle. Linear correlations between the fatty acid and the intramuscular fat (IMF) content indicated a significant increase in certain saturated and mono-unsaturated fatty acids with increasing IMF content of the meat.

Keywords: Game meat; Springbok; Fat; Fatty acids; Cholesterol

L.C. Hoffman, M. Kroucamp, M. Manley, Meat quality characteristics of springbok (*Antidorcas marsupialis*). 4: Sensory meat evaluation as influenced by age, gender and production region, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 774-778, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4N5CXN7-5/2/655d0bf05ede9a9d95d41d6d17c28d25>)

Abstract:

The effects of age, gender and production region on the sensory characteristics of springbok *M. longissimus dorsi* (LD) were investigated in 19 springbok, which originated from two Nature Reserves in the Free State Province of South Africa and were divided into age (adult, sub-adult) and gender categories. The sensory characteristics evaluated were game meat aroma, juiciness, residual tissue, tenderness and game meat flavour. Age, gender and production region had an effect ($P < 0.05$) on different sensory ratings of the meat. Whereas production region influenced (P

< 0.05) the game meat aroma, initial juiciness, sustained juiciness and residual tissue ratings of the meat, gender and age had a significant effect on only the residual tissue rating of the meat. An interaction ($P < 0.01$) between age, gender and production region was observed for the tenderness attribute where the males from the Gariep Nature Reserve were the only gender that showed a significantly higher tenderness rating in the sub-adult than in the adult category. Sensory ratings were linearly correlated with certain physical and chemical attributes. Warner-Bratzler shear force (kg/1.27 cm diameter) values were inversely correlated with the sensory attributes of tenderness ($r = -0.70$, $P < 0.01$), residual tissue ($r = -0.68$, $P < 0.01$) and sustained juiciness ($r = -0.43$; $P < 0.05$). Age-related effects on perceived tenderness were minor in comparison with pH effects. As the pH₂₄ of the meat increased, tenderness ($r = -0.46$, $P < 0.05$) and sustained juiciness ($r = -0.54$, $P < 0.05$) decreased significantly. No significant linear correlations were observed between the intramuscular fat (IMF) content and the sustained juiciness ratings of the meat. It can be concluded that production region had some influence on sensory characteristics of springbok meat, whilst the influence of age and gender were negligible.

Keywords: Game meat; Springbok; Sensory; Flavour; Tenderness; pH₂₄

G. Arsenos, P. Fortomaris, E. Papadopoulos, D. Kufidis, C. Stamataris, D. Zygoiannis, Meat quality of lambs of indigenous dairy Greek breeds as influenced by dietary protein and gastrointestinal nematode challenge, *Meat Science*, Volume 76, Issue 4, August 2007, Pages 779-786, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.02.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4N7RWD3-1/2/d4e9e0d0990409da6c74d9abcc3f86a2>)

Abstract:

The effect of dietary protein and gastrointestinal (GI) parasitism on growth and meat quality of lambs was assessed using 60 animals. The lambs were randomly allocated to one of three treatment groups ($n = 20$): group A, which served as control, group B that was regularly treated with albendazole and group C, which was given supplementary feeding with dietary protein. The three groups of lambs grazed into a pasture (*Lolium perenne*), which was contaminated with L3 larvae of GI nematodes. Lamb growth and condition score were assessed at 21-day intervals. After 126 days grazing all lambs were slaughtered and their carcasses were assessed for conformation and fatness and their ultimate pH was measured. Four carcasses from each group were randomly selected for meat quality measurements including physical analysis as well as colour, moisture, total fat, protein content and fatty acid composition. Parasitic challenge was assessed by means of faecal egg counts of lambs, pasture larvae and numbers of adult nematodes in the GI tract of lambs at slaughter. Growth rate of group B was higher ($P < 0.01$) than that of group A and resulted in significantly ($P < 0.01$) heavier carcasses. The produced carcasses had similar fatness, but differed significantly ($P < 0.05$), in their conformation; carcasses of group C scored higher than either those of group B or group A, respectively. There was a significant difference in the colour attributes (L^*) with group A being significantly lighter ($P < 0.05$) and in pH ($P < 0.01$); Group B had the highest values. Carcasses of group C had the highest ($P < 0.05$) amounts of intermuscular fat compared to those of group B and A, respectively. The proportion of C16:1n-7 and C18:2n-6 was higher ($P < 0.05$) in subcutaneous fat tissue whereas the proportion of C18:0 was higher ($P < 0.05$) in muscle tissue. In conclusion, the present results showed that the increased protein content in the diet of growing lambs, grazing on a pasture infected with GI nematode larvae, resulted in the production of acceptable carcasses.

Keywords: Growing lambs; Dietary protein; Gastrointestinal nematodes; Meat quality

I. Tovar-Luna, A.L. Goetsch, R. Puchala, T. Sahlu, G.E. Carstens, H.C. Freetly, Z.B. Johnson, Efficiency of energy use for pregnancy by meat goat does with different litter size, *Small Ruminant Research*, Volume 71, Issues 1-3, August 2007, Pages 83-91, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.05.004.

(<http://www.sciencedirect.com/science/article/B6TC5-4K5ST63-3/2/edf45ab6b038b0dc46f9fa5bf328d520>)

Abstract:

Twenty-four Boer x Spanish does (3 years of age, having kidded once previously and with an initial BW of 42.7 +/- 1.2 kg) were used to determine the efficiency of ME utilization for pregnancy (k_{preg}). Six does were nonpregnant and, based on ultrasound determination on day 45 of gestation, six had a litter size (LS) of 1, 2, and 3. However, only 10 of the pregnant does delivered the expected number of kids (3, 4, and 3 with LS of 1, 2, and 3, respectively). Does were fed a diet of approximately 50% concentrate in accordance with assumed maintenance plus pregnancy energy requirements based on estimated nonpregnancy tissue BW and LS. Recovered energy (RE) was determined by subtraction of energy expenditure (EE; respiration calorimetry) near days 80, 100, 120, and 140 of gestation from ME intake (MEI). RE was assumed attributable to pregnancy tissues (fetus, fetal fluids and membranes, uterus, and mammary gland), and ME used for pregnancy (ME_{preg}) was estimated by subtracting ME_m determined with nonpregnant goats from MEI by those pregnant. For does with actual LS equal to that expected, the no-intercept equation for the regression of RE against ME_{preg} was: RE = ME_{preg} x 0.252 (S.E. = 0.030; R² = 0.64), indicating a k_{preg} of 25%. A regression including LS (1 versus 2 or 3) suggested greater k_{preg} for LS of 1 (40.2 +/- 5.6%) versus 2 or 3 (20.5 +/- 3.2%). Regressions for goats with LS different from expected suggested positive effects of use of energy mobilized from nonpregnancy tissues on k_{preg} and of use of dietary ME for energy accretion in nonpregnancy tissues on the efficiency of whole body ME utilization. In conclusion, the average efficiency of ME use for pregnancy regardless of LS in goats was near 25%, which when considering the expected proportion of all pregnancy tissues attributable to fetal or conceptus tissues implies an energy requirement for pregnancy of goats similar to common recommendations for sheep and cattle.

Keywords: Goats; Energy; Pregnancy

A.M. Abdulkhaliq, H.H. Meyer, J.R. Busboom, J.M. Thompson, Growth, carcass and cooked meat characteristics of lambs sired by Dorset rams heterozygous for the Callipyge gene and Suffolk and Texel rams, *Small Ruminant Research*, Volume 71, Issues 1-3, August 2007, Pages 92-97, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.05.005.

(<http://www.sciencedirect.com/science/article/B6TC5-4K66F31-1/2/da5d26ad2158ad9d2232aa1e4f311664>)

Abstract:

Dorset (D) rams heterozygous for the Callipyge gene were single--sire mated to non-carrier ewes to produce Callipyge heterozygous (CLPG, n = 49) and normal (D, n = 33) lambs. Suffolk (S) and Texel (T) rams were mated to similar ewes to produce non-carrier crossbred S (n = 55) and T (n = 52) lambs. Lambs were finished on a high-energy diet to a target live weight of 57 kg. Pre-slaughter weight was recorded for each lamb prior to its transfer and slaughter through a commercial facility. Hot carcass weight and kidney and pelvic fat (KPF) were recorded at slaughter. Chilled carcasses were measured then fabricated into trimmed retail cuts by plant personnel. Each cut was weighed, and two loin chops were collected from each carcass for later cooking. CLPG lambs had the highest dressing % (53.6 versus 49.8-50.6; P < 0.05). At the same cold carcass weight, CLPG lambs had larger longissimus muscle areas (19.5 cm² versus 14.0-15.2 cm² for the rest; P < 0.05), less KPF (0.9 kg versus 1.04-1.13 kg; P < 0.05), less carcass fat (P < 0.05 for all measures), shorter carcasses (60.7 cm versus 61.8-64.7 cm; P < 0.05), and heavier trimmed sirloins, legs, and shoulders than any other group (a₁₁ P < 0.05). They were similar to S lambs in receiving the lowest mean USDA yield grade. CLPG carcasses had the highest proportion of carcass weight represented by trimmed cuts (70% versus 65.7-67.8% for the rest; P < 0.05), the highest proportion of trimmed cuts (62.2% versus 59.7-60.6% for the rest; P < 0.05) represented by the most valuable cuts (leg + loin + rack + sirloin), and the highest composite carcass value (\$135.8 versus \$125-129 for the rest; P < 0.05). CLPG lambs also produced loin

chops with the highest mean Warner-Bratzler shear values (5.4 kg versus 2.8-2.9 kg for the rest; $P < 0.05$) and the highest % cooking loss (31% versus 29-29.6% for the rest; $P < 0.05$).

Keywords: Lamb; Callipyge; Carcass; Meat

T.A. Gipson, A.L. Goetsch, G. Detweiler, T. Sahlu, Effects of feeding method, diet nutritive value and physical form and genotype on feed intake, feeding behavior and growth performance by meat goats, *Small Ruminant Research*, Volume 71, Issues 1-3, August 2007, Pages 170-178, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.06.004.

(<http://www.sciencedirect.com/science/article/B6TC5-4KJDWYH-1/2/c26d915063e15374ab43093bb3695779>)

Abstract:

Thirty-two F1 Boer x Spanish (28.7 +/- 0.49 kg) and 40 3/4 Boer-1/4 Spanish (31.9 +/- 0.47 kg) wethers, approximately 5 months of age, were used to compare feeding systems with different dietary treatments. Feeding systems were Calan gates and automated feeding units allowing one animal to consume feed at a time. Two diets included concentrate (C) and two were dehydrated alfalfa (A), fed pelletized (P) or loose (L). The main effect of feeding method was not significant for any variable. There was an interaction in DM intake (DMI) involving feeding method, diet, and genotype, which indicated that with a concentrate diet, regardless of physical form, DMI was not influenced by feeding method. Main effect dietary treatment means (1.78, 1.67, 2.04, and 1.70 kg for C-P, C-L, A-P, and A-L, respectively; S.E. = 0.030) indicated that pelletizing had a slightly greater effect on DMI with A versus C. ADG was lowest among treatments for A-L (212, 205, 190, and 157 g for C-P, C-L, A-P, and A-L, respectively; S.E. = 8.9), and ADG:DMI was greater for C versus A (127, 120, 94, and 94 g/kg for C-P, C-L, A-P, and A-L, respectively; S.E. = 7.8). Both ADG and ADG:DMI were similar between genotypes. For wethers subjected to automated feeding units, the number of feeder visits was lowest among diets ($P < 0.05$) for C-P (23.1, 31.2, 35.7, and 35.7 per day; S.E. = 2.00); total feeder occupancy time per animal ranked ($P < 0.05$) C-P < A-P < C-L and A-L (74, 130, 105, and 122 min/day; S.E. = 6.8), and rate of DMI was greater for P than for L diets (24.6, 12.9, 22.0, and 13.7 g/min for C-P, C-L, A-P, and A-L, respectively; S.E. = 3.89). In summary, meat goats can markedly vary feeding behaviors in response to different diet types and forms; however, there appear limits to such changes, as exemplified by lowest ADG for A-L. Calan gates and automated feeding systems appear similar in the ability to compare growth performance with treatments such as the concentrate-containing diets and genotypes of this experiment. Pelletizing does not seem to affect growth performance with diets consisting of appreciable concentrate. Effects of pelletizing on growth performance of meat goats consuming forage diets may be attributable to change in level of feed intake, without impact on efficiency of feed utilization.

Keywords: Goats; Feed intake; Growth

Sudhakar G. Bhandare, A.T. Sherikar, A.M. Paturkar, V.S. Waskar, R.J. Zende, A comparison of microbial contamination on sheep/goat carcasses in a modern Indian abattoir and traditional meat shops, *Food Control*, Volume 18, Issue 7, Breakdowns in Food Safety, July 2007, Pages 854-858, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.04.012.

(<http://www.sciencedirect.com/science/article/B6T6S-4JXH3P9-1/2/afa8aad3117de4463b2dd6842fa32445>)

Abstract:

The microbial load on sheep/goat carcasses was investigated in Deonar abattoir and traditional meat shops in Mumbai. A total of 96 swab samples from carcass sites were collected and analysed from the abattoir, while 144 swab samples from carcass sites were analysed from three meat shops. These samples were processed for total viable count (TVC) and differential counts. The average TVC after flaying, evisceration and washing in the abattoir was 5.51 +/- 0.36, 6.06 +/- 0.53 and 5.13 +/- 0.58 CFU/cm², respectively. Pooled average TVC in the shops after flaying,

evisceration and washing was 5.83 +/- 0.42, 6.48 +/- 0.27 and 6.17 +/- 0.41 log CFU/cm², respectively. Statistical analysis revealed a highly significant difference ($P < 0.01$) among TVC counts after washing between abattoir and the shops. The highest prevalence of *Micrococcus* spp. and *S. epidermidis* was noticed during various operations in both the abattoir and the shops. Although *Salmonella* spp. could not be isolated from any of the carcass sites in the abattoir, in the shops it showed 16.4% prevalence at all the sites irrespective of operations. Overall study revealed that level of contamination in the traditional meat shops was significantly higher compared to the abattoir. However, the microbial contamination in the abattoir is also high if we compare these results to the reports from developed countries and do not conform to EU specifications. The findings of this study reflect the hygiene status of meat production in the developing world.

Keywords: Microbial contamination; Sheep/goat carcasses; Organised slaughterhouse; Abattoir; Retail meat shops

F.G. Del Moral, F. O'Valle, M. Masseroli, R.G. Del Moral, Image analysis application for automatic quantification of intramuscular connective tissue in meat, *Journal of Food Engineering*, Volume 81, Issue 1, July 2007, Pages 33-41, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.07.017.

(<http://www.sciencedirect.com/science/article/B6T8J-4MFTVB8-1/2/ce83cf4895601046116749591fea57c7>)

Abstract:

An image analysis application for the quantification of meat intramuscular connective tissue (IMCT) and fibre retraction is presented. This image analysis method was applied to microscopic images of Sirius red-stained tissue sections from various animal species (pig, cow, pigeon, and lamb), including different breeds of pig (Large White crossbreed and Iberian) and cow (Kobe and Rubia Gallega). Results obtained showed statistically significant differences among the species in area and percentage of IMCT, perimysium and fibre retraction in meat ($p < 0.001$, Kruskal-Wallis). Significant differences were also observed between the two breeds of pig in percentages of IMCT (4.00 +/- 2.15 vs. 17.02 +/- 14.99; $p = 0.028$, Mann-Whitney U test) and perimysium (22.59 +/- 0.87 vs. 9.93 +/- 4.95; $p = 0.009$, Mann-Whitney U test) in longissimus thoracis (LT). This original design software permits the accurate, objective, reliable, and fully reproducible quantification of IMCT and fibre retraction in meat.

Keywords: Image analysis; Sirius red; Intramuscular connective tissue; Perimysium; Muscle fibre retraction; Meat; Beef; Kobe beef; Pork; Iberian pork; Pigeon; Lamb

M.P. Tygesen, A.P. Harrison, M. Therkildsen, The effect of maternal nutrient restriction during late gestation on muscle, bone and meat parameters in five month old lambs, *Livestock Science*, Volume 110, Issue 3, July 2007, Pages 230-241, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.11.003.

(<http://www.sciencedirect.com/science/article/B7XNX-4MNHYBF-2/2/de3028bf36ea2246f471b971f58a2e15>)

Abstract:

Twenty twin-bearing Shropshire ewes were either maintained on an adequate (H) or 60% restricted feeding level (L) during the last 6 weeks of gestation. The ewes were sired by a ram selected for either high daily growth (Growth, G) or increased cross-sectional area of m. Longissimus dorsi (LD) combined with minimal fat thickness above LD (Meat, M). The male offspring ($n = 23$) from these ewes were studied with regard to production, fibre type, bone parameters and meat quality traits. Maternal nutrient restriction during late gestation caused a reduced birth weight of the offspring, a low growth rate from birth to weaning, yet compensatory growth after weaning. No relation was found between maternal nutrient restriction during late gestation and meat quality in terms of proteolytic potential, myofibrillar fragmentation index or shear force measured in meat from 5 month old lambs. The data do not support the hypothesis of

a long-term programming effect of maternal nutrient restriction during late gestation on meat tenderness. However, a long-term effect of maternal nutrient restriction was found for bone growth. Femur weight was significantly reduced in L-lambs and cortical bone density and mean relative wall thickness were significantly increased by maternal nutrient restriction during late gestation, suggesting that only some of the bone parameters evaluated express compensatory growth. The effects of maternal nutrition in late gestation on bone parameters have implications for the robustness of breeding stock.

Keywords: Muscle fibre area; Compensatory growth; Meat quality; Bone strength; Metabolic programming

Simthembile E. Pambuka, Abayomi P. Adebisi, Koji Muramoto, Ryno J. Naude, Purification and partial characterisation of a matrix metalloproteinase from ostrich skeletal muscle, and its activity during meat maturation, *Meat Science*, Volume 76, Issue 3, July 2007, Pages 481-488, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.12.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4MVVSTW-1/2/711fab1867eadb142edfb22c69cf7412>)

Abstract:

The matrix metalloproteinases (MMPs) are a homologous family of zinc proteinases that are collectively capable of catabolising the various macromolecular components of the extracellular matrix including collagens. In this study an MMP was successfully isolated and purified from ostrich skeletal muscle using Toyopearl Super Q-650S, hydroxylapatite and zinc-chelate chromatographies. The purified molecule had a molecular weight of 55 K and a total of 467 amino acid residues. Purified ostrich MMP showed a pH optimum of 7 and a temperature optimum of 45 [degree sign]C. The activity of purified ostrich MMP was shown to be inhibited by metal chelators (1,10 phenanthroline and EDTA) and partially inhibited by soy bean trypsin inhibitor. All the functional properties of ostrich MMP were compared to previously reported values for MMPs from other sources. The MMP activities in ostrich meat during a 21-day ageing period were determined and an overall increase in MMP activities was observed.

Keywords: Ostrich; Muscle; Meat maturation; Purification; Matrix metalloproteinases

Qinchun Rao, Y.-H. Peggy Hsieh, Evaluation of a commercial lateral flow feed test for rapid detection of beef and sheep content in raw and cooked meats, *Meat Science*, Volume 76, Issue 3, July 2007, Pages 489-494, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.12.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4MW323G-1/2/0dac215b575c0b99ffed6bdda5385c40>)

Abstract:

Meat species adulteration is a common problem in the retail market. This study investigated the feasibility of a commercial lateral flow immunoassay designed to detect ruminant muscle tissue in feedstuffs, such as 'meat-and-bone meal' (MBM) for detection of beef and/or sheep flesh in meat mixtures, and developed a simple method for meat sample extraction. Laboratory adulterated samples including raw, cooked (100 [degree sign]C, 30 min), and sterilized (121 [degree sign]C, 15 min) beef-in-chicken, beef-in-turkey, and lamb-in-pork at 0 to 1.00% (w/w) adulteration levels were extracted by different solvents (tap water, NaCl, and PB-NaCl with and without EDTA; and a kit-provided 'Extraction Solvent') using three mixing methods. The test rapidly (20 min) detected 0.50% (w/w) bovine or ovine meat; Extraction Solvent was the most efficient extractant tested; EDTA coupled with heating (100 [degree sign]C, 10 min) improved the assay sensitivity; and all the mixing methods achieved the same results. This immunoassay can be conveniently applied to detect low levels of beef/sheep meat in a wide range of meat products.

Keywords: Beef; Meat; Lateral flow immunoassay; Species adulteration

S. Andres, I. Murray, E.A. Navajas, A.V. Fisher, N.R. Lambe, L. Bunger, Prediction of sensory characteristics of lamb meat samples by near infrared reflectance spectroscopy, *Meat Science*, Volume 76, Issue 3, July 2007, Pages 509-516, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4MXBFD1-1/2/55d567f8e94f567c8c9e83b0008cc938>)

Abstract:

This study was implemented to evaluate the potential of visible and near infrared reflectance (NIR) spectroscopy to predict sensory characteristics related to the eating quality of lamb meat samples. A total of 232 muscle samples from Texel and Scottish Blackface lambs was analyzed by chemical procedures and scored by assessors in a taste panel (TP). Then, these parameters were predicted from Vis/NIR spectra. The prediction equations showed that the absorbance data could explain a significant but relatively low proportion of the variability ($R^2 < 0.40$) in the taste panel traits (texture, juiciness, flavour, abnormal flavour and overall liking) of the lamb meat samples. However, a top-tail approach, looking at the spectra of the 25 best and worst samples as judged by TP assessors, provided more meaningful results. This approach suggests that the assessors and the spectrophotometer were able to discriminate between the most extreme samples. This may have practical implications for sorting meat into a high quality class, which could be branded, into a low quality class sold for a lower price for less demanding food use.

Regarding the chemical parameters, both intramuscular fat and water could be more accurately predicted by Vis/NIR spectra ($R^2 = 0.841$ and 0.674 , respectively) than sensory characteristics. In addition, the results obtained in the present study suggest that the more important regions of the spectra to estimate the sensory characteristics are related to the absorbance of these two chemical components in meat samples.

Keywords: NIR spectroscopy; Meat quality; Lamb; Sensory characteristics; Chemical composition; Taste panel

Philippe Gatellier, Suzana Gomez, Verane Gigaud, Cecile Berri, Elisabeth Le Bihan-Duval, Veronique Sante-Lhoutellier, Use of a fluorescence front face technique for measurement of lipid oxidation during refrigerated storage of chicken meat, *Meat Science*, Volume 76, Issue 3, July 2007, Pages 543-547, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4MX56MV-6/2/cbad0f32eb24cedbe3ce64d46efb7b87>)

Abstract:

Lipid oxidation in chicken breast was measured during refrigerated storage in air by front face fluorescence and by thiobarbituric acid techniques. Three chicken genotypes were compared: Standard (fast-growing line), Certified (medium-growing line) and Label (slow-growing line). Lipid oxidation was stable during the first 3 days of storage and then increased in the certified and label animal groups. Standard animals were very stable towards lipid oxidation. This study showed a good correlation between fluorescence intensity and thiobarbituric acid reactive substances measurements. Front face fluorescence technique can be used as a valuable index of lipid oxidation in chicken meat.

Keywords: Chicken; Meat; Lipid oxidation; Schiff bases; TBA-RS; Fluorescence

Utaiwan Chattong, Arunee Apichartsrangkoon, Alan E. Bell, Effects of hydrocolloid addition and high pressure processing on the rheological properties and microstructure of a commercial ostrich meat product 'Yor' (Thai sausage), *Meat Science*, Volume 76, Issue 3, July 2007, Pages 548-554, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4MXBFD1-2/2/7d98c0c88cae5b86079d40ae70fd62ea>)

Abstract:

'Yor' is a traditional sausage like product widely consumed in Thailand. Its textures are usually set by steaming, in this experiment ultra-high pressure was used to modify the product. Three types of hydrocolloid; carboxymethylcellulose (CMC), locust bean gum (LBG) and xanthan gum, were added to minced ostrich meat batter at concentration of 0-1% and subjected to high pressure 600 MPa, 50 [degree sign]C, 40 min. The treated samples were analysed for storage (G') and loss (G'') moduli by dynamic oscillatory testing as well as creep compliance for control stress measurement. Their microstructures using confocal microscopy were also examined. Hydrocolloid addition caused a significant ($P < 0.05$) decrease in both the G' and G'' moduli. However the loss tangent of all samples remained unchanged. Addition of hydrocolloids led to decreases in the gel network formation but appears to function as surfactant materials during the initial mixing stage as shown by the microstructure. Confocal microscopy suggested that the size of the fat droplets decreased with gum addition. The fat droplets were smallest on the addition of xanthan gum and increased in the order CMC, LBG and no added gum, respectively. Creep parameters of ostrich yors with four levels of xanthan gum addition (0.50%, 0.75%, 1.00% and 1.25%) showed an increase in the instantaneous compliance (J_0), the retarded compliance (J_1) and retardation time ($[\lambda]_1$) but a decrease in the viscosity ($[\eta]_0$) with increasing levels of addition. The results also suggested that the larger deformations used during creep testing might be more helpful in assessing the mechanical properties of the product than the small deformations used in oscillatory rheology.

Keywords: Ostrich sausages; Yor; Hydrocolloids; Rheology; Confocal microscopy; High pressure

Thawatchai Supavitpatana, Arunee Apichartsrangkoon, Combination effects of ultra-high pressure and temperature on the physical and thermal properties of ostrich meat sausage (yor), Meat Science, Volume 76, Issue 3, July 2007, Pages 555-560, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4MX56MV-8/2/929129380a82fa9ae9b81666ac697410>)

Abstract:

Ostrich meat sausages (yor) were subjected to ultra-high pressures of 300, 500 and 700 MPa for 40 and 60 min at 40 and 60 [degree sign]C. Subsequently the physical properties of the products, colour, released and expressible water, gel strength and stress relaxation as well as their thermal characteristics (by differential scanning calorimeter, DSC) were determined. The effects of pressure, temperature and holding time significantly influenced the L^* , a^* and b^* values. The amount of released plus expressible water significantly decreased with increasing pressure, temperature and holding time. The gel strength and equilibrium stress increased with increasing severity of treatment. DSC thermograms indicated that pressures of 700 MPa yielded gel networks involving completely denatured protein with the ability to retain water.

Keywords: Ostrich meat yor; Ultra-high pressure; Stress relaxation; DSC

W.R. Shorthose, Lawrie's Meat Science, seventh ed., R.A. Lawrie, D.A. Ledward, Woodhead Publishing, 1966, ISBN: 978-1-84569-159-2., Meat Science, Volume 76, Issue 3, July 2007, Page 588, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.03.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4N7XPFC-3/2/a52d9998d6047bd25c4d6b4a5935e3c4>)

D.A. Ledward, Feiner Gerhard, Meat Products Handbook, Woodhead Publishers, Cambridge (2006) ISBN 978-1-84569-050-2 p. 648., Meat Science, Volume 76, Issue 3, July 2007, Page 589, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2007.01.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4N146D8-2/2/7039c9af2f8ee0e205220dcc7708279b>)

Osman Mahgoub, Isam T. Kadim, Musab H. Al-Busaidi, Kanthi Annamalai, Naseeb M. Al-Saqri, Effects of feeding ensiled date palm fronds and a by-product concentrate on performance and meat quality of Omani sheep, *Animal Feed Science and Technology*, Volume 135, Issues 3-4, 15 June 2007, Pages 210-221, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.07.011.

(<http://www.sciencedirect.com/science/article/B6T42-4KPP48T-1/2/2a7556b86646045d25a3b2eb2264fd26>)

Abstract:

A study was carried out to investigate the potential use of date palm by-products for feeding Omani local sheep. Thirty-two Omani sheep were fed for 120 days one of four ration combinations of two roughages and two concentrates. The roughages were urea treated palm frond (UTPF) and Rhodes grass hay (RGH). The concentrates were a pelleted commercial cubes (CC) and a concentrate made from local by-products (BC). Experimental measurements included daily feed intakes, bi-weekly body weights, hematological values, apparent digestibility, and carcass and meat quality characteristics. The BC was formulated from 250 ground date fronds, 250 wheat bran, 200 ground *Prosopis juliflora* pods, 150 barley grain and 120 g/kg dried sardines plus vitamin and mineral additives. The UTPF silage was prepared by ensiling shredded palm fronds in a 30 g/l urea solution for 5 weeks. On dry matter (DM) basis, the BC and CC concentrates contained 179 and 180 g/kg crude protein (CP); 241 and 56 g/kg acid detergent fiber (ADF); 379 and 182 g/kg neutral detergent fiber (NDF); 118 and 73 g/kg ash; 17.9 and 18.3 kJ/g DM gross energy (GE), respectively. The UTPF and RGH contained 85 and 100 g/kg CP; 580 and 370 g/kg ADF; 740 and 614 g/kg NDF; 120 and 95 g/kg ash; 19.2 and 17.3 kJ/g DM GE, respectively. Experimental animals fed the date palm by-products were in good health throughout the trial. In absolute terms, sheep fed the UTPF had lower feed intakes than those fed the RGH but feed intake/body weight (BW) was similar across diet groups (30 g/kg). By-products fed sheep gained less ($P < 0.05$) weight than those fed RGH and CC. The average daily gain was 80, 56, 32 and 10 g/d for the CC + RGH, BC + RGH, CC + UTPF and BC + UTPF, respectively. Feed conversion (kg feed/kg BW gain) was lower for UTPF and BC feeds. Apparent digestibility coefficients for DM, CP, ADF, NDF, ash and DE were lower for UTPF and BC based diets. Feeding UTPF and BC reduced carcass weight, dressing, fat content and carcass measurements. However, feeding CC with UTPF improved sheep performance compared to BC + UTPF. There were no effects of feeding UTPF or BC on meat quality. This experiment indicated that date palm by-products might be used for feeding Omani sheep for maintenance or during times of nutritional shortage frequently experienced in the arid tropics.

Keywords: Oman; Sheep; Date palm; By-products; Growth; Feed intake; Carcass; Meat quality

Haiqiang Chen, Temperature-assisted pressure inactivation of *Listeria monocytogenes* in Turkey breast meat, *International Journal of Food Microbiology*, Volume 117, Issue 1, 10 June 2007, Pages 55-60, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.02.025.

(<http://www.sciencedirect.com/science/article/B6T7K-4NCJCGX-6/2/e36d15b48f207827a8638582cfaca46f>)

Abstract:

Ready-to-eat turkey breast meat samples were surface-inoculated with a five-strain cocktail of *Listeria monocytogenes* cultures to a final concentration of approximately 10⁷ CFU/g. The inoculated meat samples were vacuum-packaged and pressure treated at 300 MPa for 2 min, 400 MPa for 1 min, and 500 MPa for 1 min at initial sample temperatures of 1, 10, 20, 30, 40, 50, and 55 [degree sign]C. *L. monocytogenes* was most resistant to pressure at temperatures between 10 and 30 [degree sign]C. As temperature decreased below 10 [degree sign]C or increased over 30 [degree sign]C, its pressure sensitivity increased. This enhanced inactivation effect was more pronounced when meat samples were treated at higher temperature than at lower temperature. For example, a 1-min treatment of 500 MPa at 40 [degree sign]C reduced the counts by 3.8 log₁₀, while at 1 and 20 [degree sign]C the same treatment reduced counts by 1.4 and 0.9 log₁₀,

respectively ($P < 0.05$). The survival curves of *L. monocytogenes* were obtained at 300 MPa and 55 [degree sign]C, 400 MPa and 50 [degree sign]C, and 500 MPa and 40 [degree sign]C. With increasing treatment time, the three survival curves showed a rapid initial drop in bacteria counts with a diminishing inactivation rate or tailing effect. The survival data were fitted with a linear and a nonlinear, Weibull, models. The Weibull model consistently produced better fit to the survival data than the linear model.

Keywords: High pressure; Inactivation; *Listeria monocytogenes*; Mild heat; Meat; Modeling

E. Churrua, C. Girbau, I. Martinez, E. Mateo, R. Alonso, A. Fernandez-Astorga, Detection of *Campylobacter jejuni* and *Campylobacter coli* in chicken meat samples by real-time nucleic acid sequence-based amplification with molecular beacons, *International Journal of Food Microbiology*, Volume 117, Issue 1, 10 June 2007, Pages 85-90, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.02.007.

(<http://www.sciencedirect.com/science/article/B6T7K-4N5CX4H-2/2/c0332955cbb487505d51fcc304b532c>)

Abstract:

A nucleic acid sequence-based amplification (NASBA) assay based on molecular beacons was used for real-time detection of *Campylobacter jejuni* and *Campylobacter coli* in samples of chicken meat. A set of specific primers and beacon probe were designed to target the 16S rRNA of both species. The real-time NASBA protocol including the RNA isolation was valid for both of the cell suspensions in buffered saline and the artificially contaminated chicken meat samples. The presence of rRNA could be correlated with cellular viability, following inactivation of the bacteria by heating, in inoculated chicken meat samples but not in RNase-free cell suspensions.

Keywords: *Campylobacter*; Real-time NASBA; Molecular beacon; 16S rRNA; Bacterial viability; Chicken meat

Sun Young Hwang, So Hyun Kim, Eun Joo Jang, Nam Hoon Kwon, Young Kyung Park, Hye Cheong Koo, Woo Kyung Jung, Jun Man Kim, Yong Ho Park, Novel multiplex PCR for the detection of the *Staphylococcus aureus* superantigen and its application to raw meat isolates in Korea, *International Journal of Food Microbiology*, Volume 117, Issue 1, 10 June 2007, Pages 99-105, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.02.013.

(<http://www.sciencedirect.com/science/article/B6T7K-4N6FFGH-7/2/76ea7fcd8ffc01a6cb3bf020aa6d90f2>)

Abstract:

A multiplex PCR assay that allows for the rapid screening of the 19 genes that encode staphylococcal enterotoxins (SEs) (sea to see, and seg to sei), SE-like (SEI) toxins (sej to ser, and seu), and toxic shock syndrome toxin-1 (TSST-1) (tst) was developed in this study. These toxins are included in the pyrogenic toxin superantigen (PTSAg) family and are responsible for many diseases such as staphylococcal food poisoning (SFP) and TSS. The primers were designed based on dual priming oligonucleotide (DPO) technology to detect all of the 19 SAg genes in three sets of PCR. The developed multiplex PCR was applied to 143 *Staphylococcus aureus* strains isolated from pork and chicken meat in Korea. Almost 50% of the strains possessed at least one of the 19 SAg genes. The most frequently found genes were seg, sei, sem, and sen (53 isolates, 37%), which were often found simultaneously in the same isolate. In those isolates, the seo (39 isolates, 27%) or seu (6 isolates, 4%) genes were frequently found together and this combination (seg, sei, sem, sen, and seo or seu) was considered to be a part of the enterotoxin gene cluster (egc). The sea gene (10 isolates, 7%) was the gene most frequently detected out of all the classical SE genes (sea to see). Although these classical SEs are considered to be major etiological factors in SFP, newly described SE or SEI genes (seg to ser, and seu) were more frequently detected than the classical SE genes in this study. There was no isolate detected containing the seb, sec, sek, sel, or seq genes. *S. aureus* possessing mobile genetic elements

known to encode these SAg genes, such as egc, were presumed to be widely distributed among pork and chicken meats in Korea. The multiplex PCR developed in this study could be applied to the investigation of SAg genes in *S. aureus* strains isolated from various sources.

Keywords: Staphylococcal enterotoxin; Superantigen; Multiplex PCR; DPO; egc

Zeng-rong ZHANG, Qing ZHU, Yi-ping LIU, Correlation Analysis on Single Nucleotide Polymorphism of CAPN1 Gene and Meat Quality and Carcass Traits in Chickens, *Agricultural Sciences in China*, Volume 6, Issue 6, June 2007, Pages 749-754, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60108-4.

(<http://www.sciencedirect.com/science/article/B82XG-4P48RF7-H/2/10eaa115a09c6f39c07b5b623ee9b814>)

Abstract: Abstract

The selection of meat quality has received considerable focus in chicken breeding. This study was aimed at investigating the effect of CAPN1 gene on meat quality traits in chicken populations. Primer pairs for 3'UTR in CAPN1 were designed from database of chicken genomic sequence. Polymorphisms were detected using PCR-SSCP and DNA sequencing. A mutation at position 9950 nt (G/A, locus A) was found among individuals in each population. The allele and genotype frequencies significantly differed among eight lines with higher frequencies of allele A2 and genotype A1A2 ($P < 0.01$). The least square analysis showed that there was significant difference ($P < 0.05$) in muscle fiber density and some carcass traits among genotypes and that the breast muscle fiber density (BFD) of birds of A1A1 genotype was significantly higher ($P < 0.05$) than that of birds of A2A2 genotype. It was concluded that the CAPN1 gene was the major gene affecting the muscle fiber traits of chicken or was linked with the major gene. These results were useful for studying the molecular mechanism that influences meat traits and were used as the base of molecular-assisted selection to meat quality traits. So, this site may be a potential marker affecting the muscle traits of chickens.

Keywords: chicken; muscle fiber; carcass traits; CAPN1; SNPs

Cecilia S.M. Lucero Estrada, Lidia del Carmen Velazquez, Silvia Di Genaro, Ana Maria Stefanini de Guzman, Comparison of DNA extraction methods for pathogenic *Yersinia enterocolitica* detection from meat food by nested PCR, *Food Research International*, Volume 40, Issue 5, June 2007, Pages 637-642, ISSN 0963-9969, DOI: 10.1016/j.foodres.2006.11.008.

(<http://www.sciencedirect.com/science/article/B6T6V-4MSY8CC-1/2/1ccc177aae131066598c03931485cf03>)

Abstract:

The objective of this work was to compare three different methods of DNA extraction from meat food, and to determine whether these methods removed inhibitors of nested PCR for pathogenic *Yersinia enterocolitica* detection. The amplification of the *yadA* gene from the DNA obtained from a pure *Y. enterocolitica* culture could be carried out with all the protocols. DNA amplification from the food samples was observed with two of the three tested protocols, which gave highly sensitive amplifications (detection limit 1 CFU/ml). These protocols detected a lower limit of 0.6 fg/[μ l] of DNA extracted from *Y. enterocolitica* pure culture. We concluded that these protocols were able to eliminate satisfactorily the PCR inhibitors present in the foods. The nested PCR tested could be used satisfactorily in the investigation of pathogenic *Y. enterocolitica* in foods in the presence of a high background of microflora.

Keywords: DNA extraction protocols; Comparison; Nested PCR; *yadA* gene; *Yersinia enterocolitica*; Meat food

N. Oulahal, A. Martial-Gros, M. Bonneau, L.J. Blum, Removal of meat biofilms from surfaces by ultrasounds combined with enzymes and/or a chelating agent, *Innovative Food Science &*

Emerging Technologies, Volume 8, Issue 2, June 2007, Pages 192-196, ISSN 1466-8564, DOI: 10.1016/j.ifset.2006.10.001.

(<http://www.sciencedirect.com/science/article/B6W6D-4MMFVSN-1/2/c9c34ebb48c54a0bb8c7e10545494b48>)

Abstract:

A curved ultrasonic transducer was devised to standardise biofilm removal for hygiene testing in internal or curved food contact surfaces. Meat biofilms made with *Escherichia coli* and *Staphylococcus aureus* on stainless steel sheets were studied. Ultrasounds (10 s at 40 kHz) alone failed to completely remove biofilms: 49 +/- 5% and 39 +/- 5% recovery rates were obtained for *E. coli* and *S. aureus* biofilms, respectively. A combined treatment, which involved the application of ultrasounds to EDTA and/or in enzymes solutions, allowed to remove up to 75 +/- 4% and 100 +/- 15% of *E. coli* and *S. aureus* biofilms, respectively. This application was in agreement with an industrial control i.e. a combined treatment: ultrasound generation in enzymes preparation restricted to an active chamber area with a fast and good reproducible recovery. Industrial relevance

The biofilm phenomenon has been under intensive research for several years in food industry. A curved ultrasonic transducer was devised to standardise biofilm removal for hygiene testing in internal or curved food contact surfaces. This apparatus uses the mechanical effects of ultrasonic cavitation produced at 40 KHz (10 s) for the non-destructive detection of biofilms in food processing equipment. We report the utilisation of a combined treatment, which involved the application of ultrasounds to EDTA and/or in enzymes solutions on meat biofilms made with *E. coli* and *S. aureus* on stainless steel sheets. This application was in agreement with an industrial control i.e. a combined treatment: ultrasound generation in EDTA and/or enzymes preparation restricted to an active chamber area with a fast and good reproducible recovery.

Keywords: Biofilms removal; Ultrasounds; Enzymes; Chelating agent; Stainless steel surfaces; Meat

Adisak Nathakaranakule, Worawit Kraivanichkul, Somchart Soponronnarit, Comparative study of different combined superheated-steam drying techniques for chicken meat, *Journal of Food Engineering*, Volume 80, Issue 4, June 2007, Pages 1023-1030, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.04.067.

(<http://www.sciencedirect.com/science/article/B6T8J-4M3RNVT-2/2/4e6785bf41e3652f9c0507b62ad1a3c1>)

Abstract:

The purpose of this study was to compare and evaluate different drying techniques for chicken meat, which was aimed as an ingredient for ready-to-eat noodle. Two multi-stage drying techniques, i.e., superheated steam drying in the first stage followed by heat pump drying in the second stage (SSD/HP), and superheated steam drying in the first stage followed by hot air drying in the second stage (SSD/AD), were proposed. The effects of superheated steam temperature and moisture content of chicken at the end of the first-stage drying on the drying kinetics and quality of the dried product viz. color, shrinkage, rehydration ability were then evaluated. The results were also compared with those of purely superheated steam drying. SSD/HP was found to be the most suitable drying method for drying chicken as an ingredient for ready-to-eat noodle.

Keywords: Color; Heat pump drying; Hot air drying; Microstructure; Rehydration behavior; Shrinkage; Superheated steam drying

Hai-Hua Chen, Shi-Ying Xu, Zhang Wang, Interaction between flaxseed gum and meat protein, *Journal of Food Engineering*, Volume 80, Issue 4, June 2007, Pages 1051-1059, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.08.017.

(<http://www.sciencedirect.com/science/article/B6T8J-4M7K9H8-2/2/23319dcd5caad510818f456bd73a1971>)

Abstract:

Thermal properties, dynamic rheological properties, texture and microstructure of salt-soluble meat protein and flaxseed gum (SSMP-FG) mixtures were investigated. Two transitions, 57.0 [degree sign]C (TSSMP1) and 63.2 [degree sign]C (TSSMP2), were observed for SSMP without FG with differential scanning calorimetry (DSC). Addition of 2% FG to SSMP increased TSSMP1 and TSSMP2 by 1.9 [degree sign]C and 5.9 [degree sign]C, respectively. Two transitions, 53 [degree sign]C (TSSMP1') and 75 [degree sign]C (TSSMP2'), were also observed for SSMP without FG with dynamic rheological measurement. Addition of 2% FG to SSMP increased TSSMP1' and TSSMP2' by 9 [degree sign]C and 14 [degree sign]C. These results indicated that addition of FG increased thermal stability of SSMP. Addition of FG also increased the storage modulus G', gel strength, decreased syneresis, and changed the microstructure of SSMP gels with texture analyser and scanning electron microscope (SEM), respectively, suggesting that an interaction between FG and SSMP may have occurred. The results of addition of destabilizer to SSMP gels indicated that electrostatic forces seemed to be the main force involved in the formation and stability of protein-polysaccharide gel.

Keywords: Flaxseed gum; Meat protein; Thermal transition; Dynamic rheological properties; Microstructure; Texture; Syneresis

Z. Pietrasik, A. Jarmoluk, P.J. Shand, Effect of non-meat proteins on hydration and textural properties of pork meat gels enhanced with microbial transglutaminase, *LWT - Food Science and Technology*, Volume 40, Issue 5, June 2007, Pages 915-920, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.03.003.

(<http://www.sciencedirect.com/science/article/B6WMV-4JRVBHR-1/2/11d54efa96f24373fbda386c30a5686b>)

Abstract:

The combined effect of incorporation of four non-muscle proteins, NMP (blood plasma, BP; sodium caseinate, SC; soy protein isolate, SPI; gelatin, G) at 2 g/100 g levels on hydration and textural characteristics of pork gels processed without or with 0.6 g/100 g microbial transglutaminase preparation (MTG) was investigated. Addition of SC and BP most favourably affected hydration properties and thermal stability, yielding lower cooking loss and expressible moisture for pork gels. Interactions between NMP and MTG were observed. Improvement of gel strength by addition of transglutaminase was observed for treatments containing SC and BP but not G nor soy isolate. Of the four proteins tested SC was found to be a superior substrate for MTG in enhancing textural properties of a gelled meat system. None of the tested ingredients was able to yield gel cohesiveness equivalent to the control containing 8% muscle proteins. Results of this study indicate a potential for using MTG to improve or modify the functional and textural properties of investigated food proteins (SC and BP in particular) in comminuted meat products.

Keywords: Pork gels; Sodium caseinate; Soy isolate; Blood plasma; Gelatin; Microbial transglutaminase; Texture; Water binding

A.L. N'dri, S. Mignon-Grasteau, N. Sellier, C. Beaumont, M. Tixier-Boichard, Interactions between the naked neck gene, sex, and fluctuating ambient temperature on heat tolerance, growth, body composition, meat quality, and sensory analysis of slow growing meat-type broilers, *Livestock Science*, Volume 110, Issues 1-2, June 2007, Pages 33-45, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.025.

(<http://www.sciencedirect.com/science/article/B7XNX-4M9371G-2/2/41da63bf019b3e4aa47289ca51c35ed5>)

Abstract:

Influence of the Naked Neck gene, NA, on heat tolerance was evaluated in slow growing meat-type chickens in interaction with sex. Standard male Ross broilers were used as rapid growth controls. Fluctuating temperature was used to simulate day-night variations, i.e. 17 [degree sign]C

to 23 [degree sign]C in normal and 27 [degree sign]C to 33 [degree sign]C in hot conditions. Male and female chickens were weighed twice and once a week, respectively, and Gompertz function was fitted to our data to calculate theoretical age at 1 kg (A1K) and 2 kg (A2K). Carcass, abdominal fat, breast and leg yields were measured (CY, AFY, BRY, and LY). Meat quality was evaluated 24 h post-mortem with pH and colour (L, a*, b*) of the breast, and 72 h post-mortem with breast meat drip loss (DL). Rectal temperature and its variation were measured at the maximum and minimum ambient temperature at 1 and 2 kg (RT2min, RT2max, and [Delta]BT2 kg). Hematocrit (HCT, [Delta]HCT) were measured at the same stages. Organoleptic characteristics of breast and leg muscles were studied for females from both ambient temperatures.

Significant genotype x sex x temperature interaction was observed for A2K, AFY, RT2max, [Delta]BT2 kg, and [Delta]HCT2 kg. Hot condition did not affect [Delta]BT2 kg and A2K in homozygous NA birds; [Delta]BT2 kg was markedly increased in all other genotypes for males but not for females. Significant genotype x environment interactions were found only for A2K and CY. Sex x temperature interactions were found for all traits except for A1K, b*, pH, and [Delta]HCT2 kg. In both conditions, males reached 2 kg at the same age (69 d) while females reached this weight 11 d later in hot than in normal condition. Heat decreased CY in males (- 1.0%) and increased it in females (+ 1.4%). Meat was paler in males and darker in females in the hot condition leading to a difference in meat brightness between males and females only in the hot condition. Concerning sensory analysis, genotype x temperature interaction was significant for meat consistence, both in leg and breast muscles.

Effects of the NA gene on susceptibility to heat stress were smaller in slow growing animals than in broilers. However, heat tolerance was still improved in homozygous NA slow growing birds, as shown by the limited change in diurnal variation of body temperature. Furthermore, the NA gene improved breast meat percentage.

In contrast to broilers, where females should be recommended for production in hot climates, the present study would rather suggest that naked neck males from slow-growing meat-type 'label' chicken lines should be preferred.

Keywords: Heat; Label chicken; Growth; Meat quality; Naked neck gene

Tetsuya Endo, Ma Yong-Un, C. Scott Baker, Naoko Funahashi, Shane Lavery, Merel L. Dalebout, Vimoksalehi Lukoschek, Koichi Haraguchi, Contamination level of mercury in red meat products from cetaceans available from South Korea markets, *Marine Pollution Bulletin*, Volume 54, Issue 6, June 2007, Pages 669-677, ISSN 0025-326X, DOI: 10.1016/j.marpolbul.2007.01.028.

(<http://www.sciencedirect.com/science/article/B6V6N-4NC50YV-2/2/92f0723b28861c0e39dc30242252b619>)

Abstract:

Levels of total mercury (T-Hg) were surveyed in red meat (n = 73) and liver (n = 3) from toothed whales, dolphins and porpoises (odontocetes) sold for human consumption in the coastal cities of South Korea. High concentrations of T-Hg were found in the liver products of finless porpoises (18.7 and 156 [mu]g/wet g) and common dolphins (13.2 [mu]g/wet g). The T-Hg concentrations in red meat products were highest in the false killer whale (9.66 +/- 12.3 [mu]g/wet g, n = 9), bottlenose dolphin (10.6 +/- 12.6 [mu]g/wet g, n = 3) and killer whale (13.3 [mu]g/wet g, n = 1), and lowest in Cuvier's beaked whale and the harbour porpoise (0.4-0.5 [mu]g/wet g). Thus, most of the products that originated from odontocetes exceeded the safety limit of 0.5 [mu]g/wet g for T-Hg set by the South Korean health authorities for the fishery industry. Pregnant women and other vulnerable sectors of the population living in South Korea should therefore limit their consumption of odontocete products.

Keywords: Total mercury; Red meat; Dolphin; Porpoise; Whale; South Korea; Provisional tolerable weekly intake (PTWI); Human health

V. Fajardo, I. Gonzalez, I. Lopez-Calleja, I. Martin, M. Rojas, P.E. Hernandez, T. Garcia, Rosario Martin, Identification of meats from red deer (*Cervus elaphus*), fallow deer (*Dama dama*), and roe deer (*Capreolus capreolus*) using polymerase chain reaction targeting specific sequences from the mitochondrial 12S rRNA gene, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 234-240, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.11.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4MR7DFP-1/2/3e42d8860f76e0c8a05680799b8df276>)

Abstract:

Polymerase chain reaction (PCR) based on oligonucleotide primers targeting the mitochondrial 12S rRNA gene was applied to the specific identification of meats from red deer (*Cervus elaphus*), fallow deer (*Dama dama*), and roe deer (*Capreolus capreolus*). The use of a common reverse primer, together with forward specific primers for red deer, fallow deer, and roe deer, allowed the selective amplification of the desired cervid sequences. The specificity of each primer pair was verified by PCR analysis of DNA from various game and domestic meats. The assay can be useful for the accurate identification of meats from cervid species, avoiding mislabeling or fraudulent species substitution in meat products.

Keywords: Game meat; 12S rRNA gene; Polymerase chain reaction (PCR); Species-specific primers

J.A. Partida, J.L. Olleta, M.M. Campo, C. Sanudo, G.A. Maria, Effect of social dominance on the meat quality of young Friesian bulls, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 266-273, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.11.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4MY6NDM-1/2/ba741b7b4fbf3687eb9feaeec52764d2>)

Abstract:

This study examined whether social status of the animals influenced the productive, morphological, physiological, and meat quality parameters in young Friesian bulls. The social dominance index (SDI) was estimated by direct observation of the dominance relationships among animals living in a feedlot. Thirty young bulls were divided into three groups based on their social status as assessed by SDI. The social status of the animals had a small effect on daily growth rate, but did not affect carcass or meat quality parameters. Physiological measures of stress were also unaffected by the animals' social status.

Keywords: Social behaviour; Hierarchy; Dominance index; Meat quality; Stress response

C. Vasanthi, V. Venkataramanujam, K. Dushyanthan, Effect of cooking temperature and time on the physico-chemical, histological and sensory properties of female carabeef (buffalo) meat, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 274-280, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.11.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4MX54TR-2/2/8a0d8932121671c191de588261045157>)

Abstract:

The effect of cooking temperature (80-100 [degree sign]C) and time (30-60 min) on collagen solubility of Semimembranosus muscle in carabeef were investigated. The pH, cooking loss, shear force value, collagen content, collagen solubility, sensory evaluation and histological observations of water bath cooked and pressure cooked Semimembranosus meat samples were measured. Increase in pH, cooking loss, collagen solubility and tenderness scores with decrease in shear force value and collagen content was observed with increases in cooking temperature and time. However, no statistical difference was observed for shear force values, collagen solubility values and tenderness scores in pressure cooked meat and meat cooked in a water bath at 100 [degree sign]C for 45 min, inferring that cooking of buffalo meat at 100 [degree sign]C for 45 min improved collagen solubility and tenderness to the same extent as that due to pressure cooking.

Keywords: Carabeef; Semimembranosus muscle; Collagen content; Collagen solubility; Tenderness; Shear force value

A. Tateo, P. De Palo, N.C. Quaglia, P. Centoducati, Some qualitative and chromatic aspects of thawed buffalo (*Bubalus bubalis*) meat, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 352-358, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.12.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4MX54TR-4/2/666815f3bc6d7dd497f199d4905edfe0>)

Abstract:

After thawing, the meat of beef calves (Italian Frisian breed) and buffalo calves (Mediterranean breed) slaughtered at 4, 8 and 12 months of age was examined. Both the pH and the thawing loss confirmed that the meat of buffalo calves is more suitable for preservation by freezing. With increased age and time of exposure to air the lightness of the non-renewed surface was reduced. The lightness of the fresh cut surface remained stable in the various thawing phases though it was less in the older animals. The a^* index increased with animal age but decreased during the 4 days post-thawing. The fresh cut surface of buffalo meat from calves slaughtered at 4 and 8 months was not darker than beef slaughtered at the same age. On the contrary at 12 months of age, the buffalo meat had a lower redness index than beef and a higher haematin concentration.

Keywords: Buffalo meat; Beef; Thawing out; Colour

M.C. Cabrera, M. del Puerto, R. Olivero, E. Otero, A. Saadoun, Growth, yield of carcass and biochemical composition of meat and fat in nutria (*Myocastor coypus*) reared in an intensive production system, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 366-376, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.12.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4N08X6T-1/2/7ed4aeb4e071ec7c648391b15b9b4ec>)

Abstract:

Growth, carcass yield and proximate composition were determined in intensively reared nutria (*Myocastor coypus*) fed different levels of protein. Growth, food intake and food utilization efficiency were not significantly affected, within the same sex, in animals receiving 16%, 19% or 22% of protein in the diet. Males consumed the same amount of food as females but had greater live and carcass weights at slaughter age than females. Males had the highest meat yield and females had the highest fat content. Independent of dietary protein level, the pectoral muscles of all animals ranged from 19.2% to 23.6% protein, 1.97% to 2.47% total lipids, and 70.1 to 72.0 mg of cholesterol in 100 g of tissue. In the thigh muscles, the observed ranges were between 21.4% and 22.9% in proteins, 1.83% and 2.07 in total lipids and 69.9 and 71.0 mg of cholesterol in 100 g of tissue. The determination of classes of lipids shows more phospholipids contents in animals receiving 16% of protein in diet.

Keywords: Nutria meat; *Myocastor coypus*; Carcass yield; Growth; Proximate composition

C. Sarraga, M.D. Guardia, I. Diaz, L. Guerrero, J.A. Garcia Regueiro, J. Arnau, Nutritional and sensory quality of porcine raw meat, cooked ham and dry-cured shoulder as affected by dietary enrichment with docosahexaenoic acid (DHA) and [α]-tocopheryl acetate, *Meat Science*, Volume 76, Issue 2, June 2007, Pages 377-384, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.12.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4MY117V-1/2/1f274a54fdda1e66df2288936d09c153>)

Abstract:

The effects of dietary enrichment of pig diets with DHA from a marine source (Algatrium(R)) and [α]-tocopheryl acetate on the nutritional and sensory characteristics of pork and pork products were evaluated. Raw and cooked hams, and dry-cured shoulders from pigs fed with three diets

(control, control supplemented with 0.3% DHA plus 50 ppm [alpha]-tocopheryl acetate and control with 200 ppm [alpha]-tocopheryl acetate) were used. The treatments did not cause any significant differences in proteolytic and antioxidant enzyme activities, except on catalase (CAT) which increased significantly in raw hams from pigs fed DHA supplemented diets. Vitamin E accumulated in samples with [alpha]-tocopheryl acetate supplementation. DHA added to the diet increased the DHA level by 87% compared with the control treatment in both raw and dry-cured shoulders, and exceeded 82% in cooked hams. In consequence, the incorporation of the n - 3 source in the diet significantly reduced the n - 6/n - 3 ratio in all products. The ratio reduction ranged from 51% in dry-cured shoulders to 65% in cooked and raw hams.

No significant differences were found among treatments in the sensory parameters evaluated in the cooked hams. Fishy odour and flavour were not detected in any sample by the trained panel. However, reduced cured and aged flavours and a stronger fishy flavour were found in dry-cured shoulders from pigs on the DHA enriched treatment; while, [alpha]-tocopheryl acetate supplementation had negligible influence on flavour.

Keywords: DHA; Vitamin E; Raw meat; Cooked ham; Dry-cured shoulder; Dietary supplementation; Nutritional quality; Sensory quality

Ying-jie ZHANG, Yue-qin LIU, Hong-xin SUN, Shao-hua SUN, Yu LI, Forecast of the Heterosis of Imported Meat Sheep by Genetic Polymorphism of Microsatellite DNA, *Agricultural Sciences in China*, Volume 6, Issue 5, May 2007, Pages 634-640, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60093-5.

(<http://www.sciencedirect.com/science/article/B82XG-4NX345H-K/2/fdbe503d8a2f8fd683dbf5cf751a72b8>)

Abstract:

Forecast of the heterosis of Small Tail Han sheep crossed with imported meat sheep by genetic polymorphism of microsatellite DNA was done in different sheep breeds. The gene frequency, the polymorphism information contents, the number of effective alleles, the heterozygosity, and the genetic distances were studied in four imported meat sheep and Small Tail Han sheep using five microsatellite loci. The crossing effects on the Small Tail Han sheep with four imported meat sheep were tested. The results indicate that there are genetic polymorphisms at five microsatellite loci in five sheep breeds. Five microsatellite loci can be used for genetic diversity evaluation in sheep breeds. The genetic variability of Dorset is the highest, and that of the Small Tail Han sheep is the lowest in the five sheep breeds. The order of heterosis from large to small in four imported meat sheep by the analysis of genetic relationship is White-Suffolk, Black-Suffolk, Dorset, and Texel. This accords with the testing results of actual heterosis. It is feasible to forecast the heterosis of Small Tail Han sheep crossed with imported meat sheep by genetic polymorphism of microsatellite DNA, which will have an important value for sheep breeding in the future.

Keywords: sheep; microsatellite DNA; genetic polymorphism; heterosis

Kunihiro Kishida, Quantitation and confirmation of six sulphonamides in meat by liquid chromatography-mass spectrometry with photodiode array detection, *Food Control*, Volume 18, Issue 4, May 2007, Pages 301-305, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.10.014.

(<http://www.sciencedirect.com/science/article/B6T6S-4J14P1V-1/2/11cee434050fa17de19f760a80115830>)

Abstract:

Multiresidue analysis of six sulphonamides (SAs) (sulphadiazine, sulphadimidine, sulphamonomethoxine, sulphamethoxazole, sulphadimethoxine, and sulphaquinoxaline) in meat (beef, pork, and chicken) using liquid chromatography (LC)-mass spectrometry (MS) with photodiode array (PDA) detection is presented. The sample preparation is carried out by normal-phase matrix solid-phase dispersion (MSPD) with an ethanol solution. The LC-MS determination is performed using a Mightysil RP-4 GP column and an isocratic mobile phase of 0.3% (v/v) acetic

acid solution (pH 3.4, in water)-ethanol (83:17, v/v) with an atmospheric pressure chemical ionization (APCI) MS on positive-ion mode. Average recoveries spiked at 0.05-0.5 ppm for each drug were higher than 90% with relative standard deviations between 1% and 6%. In all the processes, no toxic solvents were used at all.

Keywords: Liquid chromatography; Mass spectrometry; Sulphonamides

Hung-Sheng Hsieh, Tuu-ji Chai, Deng-Fwu Hwang, Using the PCR-RFLP method to identify the species of different processed products of billfish meats, *Food Control*, Volume 18, Issue 4, May 2007, Pages 369-374, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.11.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4HYN52R-1/2/16e2ddef268989384d507fb340eb92a4>)

Abstract:

A polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method had been developed for the detection of five billfish species *Xiphias gladius*, *Makaira nigricans*, *M. indica*, *Istiophorus platypterus* and *Tetrapturus audax* in raw, frozen and heat-treated meats. The primers L-CYTBF and H-CYTBF were designed in the mitochondrial cytochrome b (cytb) gene and the molecular weight of amplified fragment was 348 bp and amplified the fragment from processed billfish meats. The results obtained from the *Bsa*JI, *Cac*8I and *Hpa*II enzymes digestion could be used to distinguish the five billfish species in frozen and heat-treated meats. Using the PCR-RFLP method, species of 10 commercial samples including raw fish fillets, frozen fish meats and fried fish meats could be identified. It was determined that two commercial samples of billfish products were not made from billfish. The method is sensitive, rapid and valid to detect fraudulent billfish products substituted from cheaper fish.

Keywords: PCR-RFLP; Billfish; mtDNA; Cytochrome b gene; Identification

Iftikhar Hussain, Muhammad Shahid Mahmood, Masood Akhtar, Ahrar Khan, Prevalence of *Campylobacter* species in meat, milk and other food commodities in Pakistan, *Food Microbiology*, Volume 24, Issue 3, May 2007, Pages 219-222, ISSN 0740-0020, DOI: 10.1016/j.fm.2006.06.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4KJ5T5G-1/2/4e171d26d3dd85a27ee777b7ffe28b0f>)

Abstract:

A surveillance study was carried out to determine the prevalence of *Campylobacter* in meat, milk and other food commodities in Pakistan. Over a period of 3 years (January 2002-December 2004), a total of 1636 food samples of meat, milk and other food commodities were procured from three big cities of Pakistan (Faisalabad, Lahore and Islamabad) and were analysed. Among meat samples, the highest prevalence (48%) of *Campylobacter* was recorded in raw chicken meat followed by raw beef (10.9%) and raw mutton (5.1%). Among other food commodities, the highest prevalence was observed in vegetable/fruit salad (40.9%), sandwiches (32%), cheese (11%) and raw bulk milk samples (10.2%). The overall prevalence of *Campylobacter* was found to be 21.5%, out of which 70.6% were identified as *Campylobacter* (*C.*) *jejuni* and 29.4% as *C. coli*. The study reported that the prevalence of *Campylobacter* spp. was significantly higher in the food commodities, which included raw/undercooked ingredients.

Keywords: *Campylobacter*; Prevalence; Meat; Milk; Salad; Cheese; Pakistan

Y. Ghafir, B. China, K. Dierick, L. De Zutter, G. Daube, A seven-year survey of *Campylobacter* contamination in meat at different production stages in Belgium, *International Journal of Food Microbiology*, Volume 116, Issue 1, 1 May 2007, Pages 111-120, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.12.012.

(<http://www.sciencedirect.com/science/article/B6T7K-4MTC6CS-2/2/b3399aaf84ffa14742207ea5d0de4ba1>)

Abstract:

The presence of *Campylobacter* was assessed in different samples of poultry, pork and beef meat and carcasses from slaughterhouses, production plants and retail level. An introductory study from 1997 to 1999, had the purpose of establishing the optimum dilution to detect changes in prevalence and allowed a semi-quantitative estimation of poultry and pork contamination. Following this, between 2000 and 2003, 4254 samples were taken in order to study the trends. The poultry matrixes represented the greatest number and the most highly contaminated samples, with 30.9% (in 0.01 g) positive samples, 18.7% (in 1 g), 46.9% (in 25 g) and 19.6% (in 0.01 g) for broiler carcasses, broiler fillets, prepared chicken and layer carcasses, respectively. Broiler carcasses and fillets sampled at retail level were significantly less contaminated than samples from production plants. Pork, beef and veal samples were rarely contaminated and, where contamination existed, it was at a low prevalence (maximum 5.0%). The high and unvarying prevalence of *Campylobacter* in poultry necessitates the implementation of intervention measures at the primary production level, in addition to methods of minimizing cross-contamination at the processing level. A survey plan in line with the present study could be used in the future to monitor the effects of the planned measures and performance objectives and to follow the evolution of *Campylobacter* contamination at all stages of the food chain, in accordance with European legislation.

Keywords: Foodborne pathogens; *Campylobacter*; Meat; Poultry; Pork; Beef

Lu Zhang, James G. Lyng, Nigel P. Brunton, The effect of fat, water and salt on the thermal and dielectric properties of meat batter and its temperature following microwave or radio frequency heating, *Journal of Food Engineering*, Volume 80, Issue 1, May 2007, Pages 142-151, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.05.016.

(<http://www.sciencedirect.com/science/article/B6T8J-4KBDW8C-1/2/79744a064279f9a6a6d3c2da0931fb46>)

Abstract:

The objective of the present study was to examine the influence of the level of added water (21-29%), fat (12.4-29.7%) and salt (0.4-2.4%) on radio frequency (RF) and microwave (MW) dielectric properties. Selected thermal properties and temperature rises ($[\Delta]T$) following standardised MW or RF heating protocols were also measured. Results revealed that added salt had a major impact on dielectric properties and $[\Delta]T$ though no impact on thermal properties was noted. Fat had an influence on thermal properties and a lesser influence than salt on dielectric properties, though no significant effect (P [greater-or-equal, slanted] 0.05) on $[\Delta]T$ was found across the range examined. The high inherent moisture content of the lean used made it difficult to isolate the impact of added water as increasing its addition level decreased the amount of added lean resulting in no net change in the moisture content across the range examined.

Keywords: Dielectric properties; Thermal properties; Microwave frequency; Radio frequency

M. Flores, E. Giner, S.M. Fiszman, A. Salvador, J. Flores, Effect of a new emulsifier containing sodium stearoyl-2-lactylate and carrageenan on the functionality of meat emulsion systems, *Meat Science*, Volume 76, Issue 1, May 2007, Pages 9-18, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4MD9KH6-2/2/43b76ce5d0b3ed5a25b9c885368279b2>)

Abstract:

The emulsion capacity and stability of a new emulsifier containing sodium stearoyl lactylate plus iota carrageenan (SSL/iC) in comparison to caseinate and soy isolate was analysed. The emulsion capacity and stability of SSL/iC in oil/water (O/W) model system emulsions was higher than shown by caseinate and soy isolate. However, the O/W emulsion stability was negatively affected by sodium chloride addition, but positively affected by an increase in temperature. Meat batters were made with caseinate, soy isolate, and SSL/iC at the minimum concentration that showed a good

performance (>75% stability) in the O/W emulsions. The emulsifier SSL/iC produced high cook yields and good stability when used in meat batters. However, the cooked meat batters containing SSL/iC showed texture characteristics highly detrimental to the sensory analysis. On the other hand, the addition of 2% potato starch reduced the differences in texture parameters among the samples made with the different emulsifiers.

Keywords: Pork; Meat batters; Functionality; Emulsion; Carrageenan; Sodium stearoyl lactylate; Casein; Soy protein

C. Corino, D.P. Lo Fiego, P. Macchioni, G. Pastorelli, A. Di Giancamillo, C. Domeneghini, R. Rossi, Influence of dietary conjugated linoleic acids and vitamin E on meat quality, and adipose tissue in rabbits, *Meat Science*, Volume 76, Issue 1, May 2007, Pages 19-28, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4MH2C7N-1/2/b5bb463228ec977d02bb08a6e0083f26>)

Abstract:

Eighty New Zealand White rabbits, age 55 days, half male and half female, were randomly assigned to one of four diets in a 2 x 2 x 2 factorial arrangement. The diets contained 0% or 0.5% CLA, and 60 or 240 mg/kg [alpha]-Tocopheryl acetate. Forty-eight rabbits were slaughtered at age 92 days. Growth performances and carcass weight were higher ($P < 0.05$) in 240 mg/kg of [alpha]-tocopheryl acetate-fed rabbits. Fat and CLA isomers content of Longissimus Lumborum (LL) muscle was higher ($P < 0.05$) in CLA-fed rabbits than control. Fatty acid composition of LL muscle was modified ($P < 0.05$) and oxidative stability was increased ($P < 0.001$) by both dietary treatments. CLA increased ($P < 0.05$) triglyceride, total cholesterol and glucose levels in plasma. Adipocytes in interscapular and perirenal fat in the 240 mg/kg [alpha]-tocopheryl acetate and 0.5% CLA groups were larger in size but lesser in number than in 60 mg/kg [alpha]-tocopheryl acetate and no CLA rabbit ($P < 0.01$).

Keywords: Rabbit; Nutrition; Conjugated linoleic acids; Vitamin E; Meat quality; Adipocyte histometry

A.D. Sorensen, H. Sorensen, I. Sondergaard, K. Bukhave, Non-haem iron availability from pork meat: Impact of heat treatments and meat protein dose, *Meat Science*, Volume 76, Issue 1, May 2007, Pages 29-37, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4MFTVWK-1/2/6d517d79e761e65cfb82113cef1219e4>)

Abstract:

Pork meat heated at 60, 80, 100, and 120 [degree sign]C (1 h), raw pork meat, BSA, casein and haemoglobin were examined for their effects on in vitro iron availability measured as Fe²⁺-dialysability, and on iron-reducing capacity following in vitro protein digestion (IVPD-dialysis). The pepsin-digested samples of meat heated at 80, 100, and 120 [degree sign]C resulted in increased in vitro iron availability. Generally, the capacity to reduce Fe³⁺ to Fe²⁺ was higher in the pepsin digests, whereas Fe²⁺ decreased significantly after pepsin + pancreatin digestion and only part of the Fe²⁺ was dialysable. Regardless of protein concentration, casein had no effect on in vitro iron availability, while pork meat protein treated at 120 [degree sign]C showed dose dependency reaching a plateau at 50 mg protein/ml. In conclusion, the major effects on iron availability in vitro was shown in pepsin digests under conditions mimicking those in the duodenal lumen and heat-treatment of meat at 120 [degree sign]C showed the most pronounced effects.

Keywords: In vitro iron availability; In vitro digestion; Pork meat; Heat treatment; Dialysis

David Morcuende, Mario Estevez, Rosario Ramirez, Ramon Cava, Effect of the Iberian x Duroc reciprocal cross on productive parameters, meat quality and lipogenic enzyme activities, *Meat*

Science, Volume 76, Issue 1, May 2007, Pages 86-94, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4MH2C7N-3/2/41e5d132e575ff0a08f84bcf8fd57071>)

Abstract:

The aim of this study was to investigate the effect of the Iberian x Duroc reciprocal cross on: (i) productive parameters, (ii) physico-chemical traits of three muscles with different oxidative patterns (Longissimus dorsi, Biceps femoris and Psoas maior) and (iii) lipogenic enzyme activities (glucose-6-phosphate dehydrogenase and malic enzyme) in subcutaneous adipose and muscle tissues. Fourteen Duroc-sired (Duroc[male symbol] x Iberian[female symbol]) and 14 Iberian-sired castrate male pigs (Iberian[male symbol] x Duroc[female symbol]) were selected at weaning and were reared until 235 days of age. Iberian-sired pigs had significantly higher weight at slaughter (147.7 kg vs. 138.8 kg, $p < 0.05$) as well as a greater ham and foreleg weight than Duroc-sired pigs. The fatty acid composition of subcutaneous adipose tissue of Duroc-sired pigs showed a higher percentage of C18:0 (13.21% vs. 14.34%, $p < 0.05$) and a lower percentage of monounsaturated fatty acids (47.79% vs. 46.73%, $p < 0.05$) compared to that from Iberian-sired pigs. Contrary to productive parameters, there were no noticeable differences between reciprocal cross in parameters defining meat quality, although there was a clear muscle effect on such parameters with this effect being significant for most of the traits. No differences were found between reciprocal crosses for glucose-6-phosphate dehydrogenase and malic enzymes activities in both muscular and subcutaneous adipose tissues. Lipogenic enzyme activities were considerably higher in subcutaneous adipose tissue compared to muscles. Glucose-6-phosphate dehydrogenase activity did not differ ($p > 0.05$) between muscles, whereas malic enzyme activity was higher ($p < 0.05$) in Psoas maior compared to Biceps femoris and those were higher than in Longissimus dorsi, which was consistent with the positive correlations ($p < 0.05$) found between malic enzyme activity and traits defining oxidative metabolic type. On the contrary, negative correlations ($p < 0.05$) were found between malic enzyme activity and intramuscular fat content, which could suggest that there are differences among muscles in the ability of depositing fatty acids from other tissues.

Keywords: Lipogenic enzymes; Glucose-6-phosphate dehydrogenase; Malic enzyme; Reciprocal cross; Duroc breed; Iberian breed

J. Mitchaothai, C. Yuangklang, S. Wittayakun, K. Vasupen, S. Wongsutthavas, P. Srenanul, R. Hovenier, H. Everts, A.C. Beynen, Effect of dietary fat type on meat quality and fatty acid composition of various tissues in growing-finishing swine, Meat Science, Volume 76, Issue 1, May 2007, Pages 95-101, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4MG1P8H-3/2/4446057c359c21d584a87ebd72b8160d>)

Abstract:

Thirty-six castrated male growing pigs were used to study the effect of dietary beef tallow (BT) versus sunflower oil (SO) on meat quality and fatty acid composition of various tissues. The diets used contained either 5% (w/w) of the variable fat source. The fat type had no significant effect on carcass traits (carcass weight, back-fat thickness, fat-lean ratio) and meat quality (colour, pH1, pHU, drip losses, cooking losses, shear force, sarcomere length, loin moisture, loin marbling). The diet with SO instead of BT significantly increased the incorporation of polyunsaturated fatty acids in adipose tissues, loin and liver at the expense of the sum of saturated and monounsaturated fatty acids. In erythrocytes, the diet containing SO raised the contents of saturated and polyunsaturated fatty acids and lowered that of monounsaturated fatty acids. In particular, the SO diet produced an increase in the content of linoleic acid (C18:2n - 6) in the various tissues. It is concluded that feeding a diet with SO instead of BT altered the fatty acid composition of tissues without simultaneously affecting various characteristics of meat quality.

Keywords: Swine; Sunflower oil; Beef tallow; Meat quality; Fatty acid composition

J. Lepetit, A theoretical approach of the relationships between collagen content, collagen cross-links and meat tenderness, *Meat Science*, Volume 76, Issue 1, May 2007, Pages 147-159, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4MMP62T-1/2/f31eeef8232c0cb87fef6a22ed46f78a>)

Abstract:

This work concerns the relationship between meat tenderness and the rubber-like properties, i.e. pressure and elastic modulus, that endomysium and perimysium connective tissues develop when meat has been heated to a temperature above which collagen contracts. For rest length meats with similar intramuscular connective tissue morphology, and which are at the same ageing state and pH, the elastic modulus of the collagenous fraction of connective tissues is approximately proportional to the total number of collagen cross-links present per volume of meat. Calculations from various published experiments concerned with the effect on tenderness of muscle type, animal age, type, and sex from different species show that this modulus follows most of the variations of meat toughness. Moreover, the proportionality between the increase in this elastic modulus and the increase in meat toughness approaches unity in situations where toughness mainly depends on connective tissues. This work demonstrates the decisive role of rubber-like properties of connective tissues in meat tenderness variations.

Keywords: Meat tenderness; Rubber like elasticity; Elastic modulus; Pressure; Collagen cross-links

D. Renaudeau, J. Mouro, A comparison of carcass and meat quality characteristics of Creole and Large White pigs slaughtered at 90 kg BW, *Meat Science*, Volume 76, Issue 1, May 2007, Pages 165-171, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.024.

(<http://www.sciencedirect.com/science/article/B6T9G-4MJBTWD-1/2/88454d77074a568bee63e3eb8f7fdad9>)

Abstract:

The effect of breed in combination with sex (gilts or barrows) on carcass composition and meat quality characteristics were studied in two replicates involving a total of 40 Creole (CR) and 40 Large White (LW). This trial was conducted in the experimental facilities of INRA in Guadeloupe (French West Indies, 16[degree sign] Lat. N. and 61[degree sign] Long. W). All the pigs were slaughtered at about 90 kg BW. No interaction between breeds and sex was found for all criteria studied. Carcass dressing weight was higher in CR than in LW (832 vs. 810 g/kg, $P < 0.001$) in connection with their lower internal organs weight (34.0 vs. 41 g/kg; $P < 0.001$). Fat cuts weight (i.e., back and leaf fat) was higher in CR than in LW (192 vs. 90 g/kg; $P < 0.001$). Creole pigs showed higher intramuscular fat percentage (IMF), higher percentage of monounsaturated fatty acids (MUFA) and lower percentage of polyunsaturated fatty acids (PUFA) in Longissimus dorsi (LD) muscle than LW pigs (4.72% vs. 2.29%, 50.2% vs. 45.0% and 7.9% vs. 13.8%, respectively). Whatever the muscle considered the ultimate pH was higher ($P < 0.05$) in CR than in LW pigs. The drip and cooking losses of LD muscle were lower in CR than in LW (8.2% vs. 9.7% and 28.9% vs. 30.1%, respectively; $P < 0.05$). Whatever the breed, the females were leaner than barrows ($P < 0.01$) but the effect of sex was significant only on a few parameters.

Keywords: Creole pig; Large White pig; Growth; Meat quality; Carcass

Nadine Gerber, Paolo Colombani, Martin Scheeder, Trace elements in fish and meat, *Meat Science*, Volume 76, Issue 1, May 2007, Page 194, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4MFKK9P-2/2/e263a816ec4abe165f5f3bcac600a562>)

M.G. Gicheha, I.S. Kosgey, B.O. Bebe, A.K. Kahi, Efficiency of alternative schemes breeding for resistance to gastrointestinal helminths in meat sheep, *Small Ruminant Research*, Volume 69, Issues 1-3, May 2007, Pages 167-179, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.01.009.

(<http://www.sciencedirect.com/science/article/B6TC5-4JD117W-1/2/27a726325b3bfc848bde0af5f22f0a72>)

Abstract:

Genetic and economic efficiency of alternative schemes breeding for resistance to gastrointestinal (GI) helminths in meat sheep was evaluated using deterministic simulation. Four breeding objectives and schemes were assessed. The first breeding objective simulated a situation where the flock size cannot be increased due to non-feed related constraints (FLOCK). The second specifically assumed that the flock size is restricted due to limited amount of feed resources (FEED). The third and fourth objectives assumed that sheep performed only tangible roles (TR) and both tangible and intangible roles (IR) in the production system, respectively. Within these breeding objectives, four breeding schemes that differed in the measures available for use as selection criteria were compared. The schemes ranged from one that utilised birth weight, weaning weight, yearling weight, litter size and lambing interval (scheme 1) to one that included two measurements of faecal egg count (FEC, eggs/g) in young rams immediately after weaning (scheme 4). For scheme 1, resistance to GI helminths was not included in the breeding objectives. A two-stage selection process was assumed in the selection of rams to be used in the nucleus. The annual monetary genetic gain and profit per ewe for all schemes varied within breeding objectives but were highest in TR. Within each breeding objective, the annual monetary genetic gain and profit per ewe was highest for the breeding scheme with the highest level of recording (scheme 4). In all objectives, the difference in the profit per ewe between a scheme that included records on FEC measured once in rams immediately after weaning (scheme 3) and scheme 4 was small (1.3-3.7%) indicating that there is little benefit taking a second measurement of FEC. The optimal size of the nucleus was determined by the breeding objective. In schemes 3 and 4, profit per ewe was optimal when the top 5%, 5%, 10% and 10% of rams were selected in the first selection stage for FEC measurement in FLOCK, FEED, TR and IR, respectively. The practical implications of these results are discussed.

Keywords: Breeding programme design; Faecal egg count; Meat sheep; Resistance to helminths; Tropics

J.P. Perez, J.M. Gil, I. Sierra, Technical efficiency of meat sheep production systems in Spain, *Small Ruminant Research*, Volume 69, Issues 1-3, May 2007, Pages 237-241, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2006.02.003.

(<http://www.sciencedirect.com/science/article/B6TC5-4JKJT5S-1/2/3d26f2dbba7aa894bfa61f3cd215d2f6>)

Abstract:

The technical efficiency of sheep results in one of the most important sheep producing regions in Spain has been assessed. The methodology is based on a survey from representative farms (in terms of the existing alternative production systems) within the region. Results indicate that the best farms, in terms of technical efficiency, are obtained by extreme situations: either by extensive and well-managed farms, without pens and one lambing per year (lower production but well adapted to the seasonality of prices and more reduced costs), or by well-managed farms with prolific ewes. Thus, maximum efficiency is determined not so much by the production system as by the technical and economic management to accommodate the specific circumstances of each farm.

Keywords: Sheep production; Spain; Technical efficiency; Frontier production functions

Oriol Barrera, Jose M. Rodriguez-Calleja, Jesus A. Santos, Andres Otero, Maria-Luisa Garcia-Lopez, Effect of different storage conditions on *E. coli* O157:H7 and the indigenous bacterial microflora on lamb meat, *International Journal of Food Microbiology*, Volume 115, Issue 2, 30 April 2007, Pages 244-251, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.10.053.

(<http://www.sciencedirect.com/science/article/B6T7K-4MVVSJW-2/2/9bb0879933478cafd37dd764d96d1c4>)

Abstract:

Lamb chops inoculated with 2.23-2.83 log cfu/g of *E. coli* O157:H7 strain NCTC 12900 were packed in air (AP), vacuum (VP), and two modified atmospheres (MAP) consisting of 100% CO₂ and a commercial mixture of 35% CO₂/35% O₂/30% N₂. All samples (initial total counts < 3.5 log cfu/g) were stored in a commercial cold storage facility set at 4 [degree sign]C and one AP trial also at 12 +/- 1 [degree sign]C in a temperature controlled incubator. Pathogen and indigenous flora evolution, physicochemical and sensory changes, surface packages temperature and MAP gas composition were monitored throughout the lamb meat shelf life. Temperature monitoring revealed that during chilled storage packed chops exceeded 7 [degree sign]C about 3% of the time for periods of 10-20 min at 6 h intervals corresponding to defrosting cycles. In AP samples under these conditions, the *E. coli* O157:H7 strain had an overall increase of 0.48 log cfu/g by day 12. This increase, which may be regarded as an artefact of the sampling procedure, might also be a response to fluctuating temperatures. Regardless of rapid proliferation of the background microflora on AP lamb meat kept at 12 +/- 1 [degree sign]C, the pathogen significantly increased by 2.35 log cfu/g after nine days. There was a slight decrease (0.20 log cfu/g) of the pathogen numbers after four weeks cold storage in VP despite a significant increase in lactic acid bacteria (LAB). With a relatively small outgrowth of LAB, chilled storage in 100% and 35% CO₂ resulted in significant differences compared to similar conditions in air (decrease from initial numbers of 0.80 and 0.45 log cfu/g, respectively). Our data confirm the importance of effective temperature control to prevent pathogen growth on raw meat and also that contaminated meat remains hazardous regardless of refrigeration and protective packaging. Further studies are needed to determine the behaviour of *E. coli* O157:H7 at temperatures that fluctuate around the minimum for growth.

Keywords: *E. coli* O157:H7; Lamb meat; Modified atmosphere packaging

G. Normanno, G. La Salandra, A. Dambrosio, N.C. Quaglia, M. Corrente, A. Parisi, G. Santagada, A. Firinu, E. Crisetti, G.V. Celano, Occurrence, characterization and antimicrobial resistance of enterotoxigenic *Staphylococcus aureus* isolated from meat and dairy products, *International Journal of Food Microbiology*, Volume 115, Issue 3, 20 April 2007, Pages 290-296, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.10.049.

(<http://www.sciencedirect.com/science/article/B6T7K-4MV0M6H-8/2/f5246170187bda7c3fe2a6403407d76b>)

Abstract:

Staphylococcus aureus is considered to be one of the leading causes of food-borne illnesses. Milk, dairy products and meats are often contaminated with enterotoxigenic strains of this bacterium. Foodstuff contamination may occur directly from infected food-producing animals or may result from poor hygiene during production processes, or the retail and storage of foods, since humans may carry the microorganism. The number of *S. aureus* strains that exhibits antimicrobial-resistance properties has increased, together with the potential risk of transmitting the same properties to the human microflora via foods or inducing infections hard to be treated. This paper reports the results of a 3-year survey (2003-2005) on the occurrence of *S. aureus* in meat and dairy products. Of 1634 samples examined, 209 (12.8%) were contaminated with *S. aureus*. A total of 125 enterotoxigenic *S. aureus* strains were biotyped and their antimicrobial resistance pattern tested. Most of the isolated strains produced SED (33.6%), followed by SEA (18.4%), SEC (15.2%), SEB (6.4%) and belonged mainly to the Human ecovar (50.4%), followed by Ovine (23.2%), Non-Host-Specific (17.6%), Bovine (7.2%) and Poultry-like (1.6%) ecovars. Finally, the

68.8% analysed strains showed antimicrobial resistance properties at least at one of antibiotics tested. Human biotype showed antimicrobial resistance at more than one antibiotic than the other biotypes ($p < 0.05$). The results provided evidence that the presence of enterotoxigenic and antimicrobial resistant strains of *S. aureus* has become remarkably widespread in foods. This calls for better control of sources of food contamination and of the spread of antimicrobial-resistance organisms.

Keywords: Enterotoxigenic *Staphylococcus aureus*; Foods; Biotyping; Antimicrobial resistance

M.R. Al-Masri, M. Al-Bachir, Microbial load, acidity, lipid oxidation and volatile basic nitrogen of irradiated fish and meat-bone meals, *Bioresource Technology*, Volume 98, Issue 6, April 2007, Pages 1163-1166, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.05.026.

(<http://www.sciencedirect.com/science/article/B6V24-4KGG5TG-1/2/5432676f573ea81d830a75b23d9c8ba6>)

Abstract:

Experiments were carried out to study the effect of different doses of gamma irradiation (0, 5, 10, 15 and 20 kilo gray; kGy) on some nutritive components and chemical aspects pertaining to quality of fish meal and meat-bone meal. The radiation doses required to reduce the total microbial load and *Salmonella* sp. one log cycle (D10) in fish meal and meat-bone meal were determined. Results indicated that gamma irradiation of fish meal and meat-bone meal with 5-20 kGy doses had no effects on the total acidity values but increased the values of lipid oxidation and total volatile basic nitrogen. D10 of total microbial load and *Salmonella* sp. were 833 and 313 Gy for fish meal and 526 Gy and 278 Gy for meat-bone meal, respectively. It can be concluded that radiation processing could be employed in the recycling of fish and meat-bone meals by using them as feedstuffs in poultry diets with no fear of losing their nutritive components.

Keywords: Decontamination; Irradiation; Nutrients; Animal by-product

Irene Hoffmann, Judith Bernhard, Meat marketing in Burkina Faso after the devaluation of the FCFA: Insights into the functioning of informal market systems, *Food Policy*, Volume 32, Issue 2, April 2007, Pages 229-245, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2006.05.006.

(<http://www.sciencedirect.com/science/article/B6VCB-4KJ0SX3-1/2/e4140d6e4ee5a8af527b69ec90d34846>)

Abstract:

The strategies that participants in informal African markets adopt in response to shocks have rarely been analysed, yet these can provide important insights into how such markets function. Policy advice often seeks to modernise trading practices within such markets so as to improve efficiency. However, efforts to improve efficiency could have undesirable consequences if the current functioning of the markets is inadequately understood. In Burkina Faso, the FCFA devaluation in 1994 led to increasing livestock exports and a subsequent meat shortage on the domestic market. Based on market statistics from Burkina Faso and household interviews, the study investigates the status of meat consumption before and up to four years after the devaluation. Results indicate that the price increase for cattle was only transmitted to consumers after a time lag. Meat is more frequently sold in little heaps than on a weight basis. Lower per-kg prices of smaller size heaps imply an income gain for poorer consumers. Butchers use all edible body parts in addition to the carcass (i.e. head, hoofs, intestines) to buffer price fluctuations and to cope with the consumers' notion of a fixed nominal price. This suggests that butchers and their clients are embedded in networks of what [S. Plattner, 1989. *Economic behavior in markets*. In: Plattner S. (Ed.), *Economic anthropology*, Stanford, pp. 209-222.] called equilibrating economic relations, which are favoured by the perishable nature of meat. Selling live animals or meat by weight is often considered as a measure to increase transparency within informal markets. However, the introduction of formalized or standardized marketing measures alone, without lowering the transaction costs of other components of the value chain, risks undermining the

equilibrating social relationships that play an important role particularly for the poorer market actors, and thereby disadvantaging vulnerable population groups.

Keywords: Informal markets; Meat marketing; Fifth quarter; FCFA devaluation; Burkina Faso

Promluck Somboonpanyakul, Shai Barbut, Pantipa Jantawat, Ninnart Chinprahast, Textural and sensory quality of poultry meat batter containing malva nut gum, salt and phosphate, *LWT - Food Science and Technology*, Volume 40, Issue 3, April 2007, Pages 498-505, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.12.008.

(<http://www.sciencedirect.com/science/article/B6WMMV-4J625XR-1/2/3a37a0f6dcf37f4b7e7fd7cbcd250aab>)

Abstract:

The effect of crude malva nut gum (CMG) addition to poultry breast meat batters formulated with different salt levels (0-3 g/100 g NaCl) and phosphate (0 and 0.5 g/100 g) was studied. Increasing the salt level resulted in an overall increase of cook yield, and the addition of CMG (0.2 g/100 g) further improved yield at all salt levels. The cooked batter with 2 g/100 g NaCl and phosphate showed the highest values for all of textural parameters. However, the cohesiveness and chewiness were reduced by the addition of 0.2 g/100 g CMG. In addition, the effect of incorporating CMG (0.0, 0.2 and 0.6 g/100 g) into commercial type frankfurters, made from mechanically deboned chicken meat (MDCM), was evaluated. Frankfurters with 0.2 g/100 g CMG showed low cooking loss and had better textural properties than the frankfurters without CMG. Frankfurters lightness and redness were reduced due to CMG. Sensory analysis results indicated that the frankfurters with 0.2 g/100 g CMG were more firm and elastic. Overall, the study indicates the potential use of CMG to improve yield and textural parameters of meat products.

Keywords: Frankfurters; Malva nut; Poultry meat batter; *Scaphium scaphigerum* (G. Don) Guib & Planch

M. Ruusunen, K. Partanen, R. Poso, E. Puolanne, The effect of dietary protein supply on carcass composition, size of organs, muscle properties and meat quality of pigs, *Livestock Science*, Volume 107, Issues 2-3, April 2007, Pages 170-181, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.021.

(<http://www.sciencedirect.com/science/article/B7XNX-4M7KFGB-6/2/62880a50e317df75cb4388ccbb17e951>)

Abstract:

This study investigated the effect of dietary protein supply on growth performance, carcass composition and size of organs in pigs slaughtered at the age of 165 +/- 2 d. In addition, we analysed muscle fibre properties and glycolytic potential of light muscles longissimus lumborum (LD), semimembranosus (SM), and gluteus superficialis (GS), and dark muscles infraspinatus (IS) and masseter (M) of 20 gilts and 20 barrows. Of these pigs, 16 were Finnish Landrace, 16 were Finnish Yorkshire, and 8 were crosses of these breeds. The pigs were fed low-or high-protein diets formulated to contain 6.0 and 9.5 g of apparent ileal digestible lysine/feed unit (1 fu = 9.3 MJ NE), respectively. The pigs were fed according to a restricted weight-based feeding scale (13-30 MJ NE/d). Lean meat, fat, bones, and skin of the carcasses as well as organs were dissected and weighed. The pH value was measured 45 min post mortem from LD, and 24 h post mortem from LD, SM and GS. Drip loss, lightness (L^*) and redness (a^*) were measured from LD, SM and GS. Pigs with a low-protein supply showed a lower growth rate ($P < 0.01$), carcass weight ($P < 0.01$), and carcass lean meat content ($P < 0.01$), but higher carcass fat content ($P < 0.01$) and smaller kidneys ($P < 0.01$) than did pigs with a high-protein supply. In LD, the differences in cross-sectional areas in all muscle fibre types ($P < 0.05$) between the feeding groups were significant; in GS we found significant differences in cross-sectional areas of type IIA and type IIB ($P < 0.05$), while in SM we found no differences in muscle fibre cross-sectional areas between the feeding groups ($P > 0.05$). We found no such differences in the dark muscles studied. We also took into

account the effect of both the breed and sex on the studied properties. The low-protein diet increased glycolytic potential in porcine LD and SM, and decreased the pH value measured 45 min post mortem from LD. The dietary protein supply affected no other meat quality traits studied. A more rapid drop in pH in LD resulted in a lighter and less red meat with higher drip loss.

Keywords: Pig; Protein; Carcass characteristics; Muscle fibres; Glycolytic potential; Meat quality

S. Ahmad, P.K. Srivastava, Quality and shelf life evaluation of fermented sausages of buffalo meat with different levels of heart and fat, *Meat Science*, Volume 75, Issue 4, April 2007, Pages 603-609, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.09.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4MBC59F-1/2/6901be33a0e34331e6bf38a9f9b917c0>)

Abstract:

Investigations were carried to study the effect of heart incorporation (0%, 15% and 20%) and increasing levels of fat (20% and 25%) on physicochemical (pH, moisture content and thiobarbituric acid, TBA number) and microbiological (total plate count and yeast and mold count) quality and shelf life of semi dry sausages of buffalo meat during refrigerated storage (4 [degree sign]C). Different levels of fat significantly ($p < 0.05$) increased the pH of the sausage samples. However different levels of heart incorporation did not significantly ($p < 0.05$) affect pH, moisture content and TBA number of sausage samples. Fresh samples had pH, moisture content and TBA number in the range of 5.15-5.28, 42.4-47.4% and 0.073-0.134 respectively. Refrigerated storage significantly ($p < 0.05$) increased TBA number of control samples while storage did not significantly ($p < 0.05$) increase the TBA number of sodium ascorbate (SA) treated samples. Total plate counts of twelve sausage samples were f under the TFC (too few to count) limit at the initial stage. Incorporation of different levels of heart and also increasing levels of fat did not significantly ($p < 0.05$) increase the log TPC/g values. Yeast and molds were not detected in twelve samples of semi dry fermented sausages in their fresh condition. Storage revealed that there was a consistent decrease in pH, and moisture content. Refrigerated storage significantly ($p < 0.05$) reduced both pH and moisture contents. TBA number and total plate counts and yeast and mold counts of controls were found to increase significantly ($p < 0.05$) during refrigerated storage. However, in SA treated sausage, only TPC and yeast and mold count significantly ($p < 0.05$) increased during refrigerated storage. Shelf life of the sausages was found to be 60 days under refrigerated storage (4 [degree sign]C).

Keywords: Fermented sausage; pH; TBA number; Total plate count; Yeast and mold count; Shelf life

C. Sanudo, M. Alfonso, R. San Julian, G. Thorkelsson, T. Valdimarsdottir, D. Zygoiannis, C. Stamataris, E. Piasentier, C. Mills, P. Berge, E. Dransfield, G.R. Nute, M. Enser, A.V. Fisher, Regional variation in the hedonic evaluation of lamb meat from diverse production systems by consumers in six European countries, *Meat Science*, Volume 75, Issue 4, April 2007, Pages 610-621, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.09.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4MBC59F-2/2/f2236843f2cc5d742da3c2b6a04824fe>)

Abstract:

This paper describes the responses of consumers in six European countries (Greece, Italy, Spain, France, Iceland and United Kingdom) tasting meat from twelve different local types of lambs produced in those same six countries. Animals represented 10 breeds and crossbreeds, three sexes, several diets composed of either milk, concentrates and various forages as main ingredients and different slaughter ages, from 1 and 12 months, and carcass weights, from 5.5 to 30.4 kg. Tests were conducted by 36 volunteer families in each of the six countries involved in the study. Families were asked to roast the joints using their own cooking criteria, evaluating (from 'dislike extremely' to 'like extremely') flavour, tenderness, juiciness and overall liking. Also the cook

was asked to rate the odour during cooking. Country and lamb type and their interaction were statistically significant for all the variables analysed. Results suggest a link between the assessments of a given lamb type and the consumers' culinary background, showing clear associations between country and lamb type preferences. It was possible to separate, independently of the country, different groups of families with similar preferences. Five family groups, which included 88 families (40.74%), had a clear Mediterranean origin and preferred types of lamb fed either milk or mainly concentrate diets. Seven family groups, which included 93 families (43.06%) with a clear northern origin, preferred types reared on grass or with grass included in the diet. The rest of the groups (four) that included 35 families (16.20%) had no clear composition (northern or Mediterranean), and they had a wider taste preference. It can clearly be seen that there are two categories of consumers of lamb in the analysed European market: those who prefer 'milk or concentrate taste' and those who prefer 'grass taste'.

Keywords: Consumer preference; Tenderness; Flavour; Odour; Sheep breed; Production system

S.St.C. Botha, L.C. Hoffman, T.J. Britz, Physical meat quality characteristics of hot-deboned ostrich (*Struthio camelus* var. *domesticus*) *Muscularis gastrocnemius*, pars interna during post-mortem aging, *Meat Science*, Volume 75, Issue 4, April 2007, Pages 709-718, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4MG1P8H-2/2/ed74dad94d76d0d7066364d5b162edbf>)

Abstract:

There is a risk of shortening and toughening with hot-deboning of muscles. However, with refrigerated aging this phenomenon may be negated. Vacuum-packed hot and cold-deboned ostrich *Muscularis gastrocnemius*, pars interna were stored for 21 d at 4 [degree sign]C to investigate the effects of hot-deboning on quality characteristics of ostrich meat during refrigerated storage. Muscle pH did not differ ($P > 0.05$) between hot and cold-deboned muscles during storage. Hot-deboning caused ($P < 0.0001$) more purge in the vacuum packages of the hot-deboned muscles (1.83 +/- 1.31%) than in the cold-deboned muscles (0.67 +/- 0.75%) during the 21-d aging period. Hot-deboned muscles were tougher ($P < 0.05$) than cold-deboned muscles from 24 h up to 5 d. Although hot-deboning caused muscles to be tougher than cold-deboned muscles, with aging at 4 [degree sign]C beyond 5 d this toughness was found to be insignificant.

Keywords: Hot-deboning; pH; Tenderness; Sarcomere length; Water holding capacity (WHC); Purge; Cooking loss; Aging; Colour

V.A.C. Santos, A.O. Silva, J.V.F. Cardoso, A.J.D. Silvestre, S.R. Silva, C. Martins, J.M.T. Azevedo, Genotype and sex effects on carcass and meat quality of suckling kids protected by the PGI 'Cabrito de Barroso', *Meat Science*, Volume 75, Issue 4, April 2007, Pages 725-736, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4MD95BX-3/2/841a1cf74b836c6b85df2ff4e1fcac07>)

Abstract:

Carcass composition and meat quality traits were evaluated in 55 suckling kids (27 males and 28 females) from Serrana (S), Bravia (B) and Serrana x Bravia (SxB) crossbred genotypes. Kids were slaughtered at 8-11 kg of live weight according to 'Cabrito de Barroso-PGI' specifications and carcasses' left sides were totally dissected. Dressing percentage (based on ELW) did not vary between genotypes and sexes. Genotype B carcasses have better conformation, expressed in higher compactness index and muscle/bone ratio. Sex had no effect on the composition of dissected carcass but females deposited more internal fat than males. S genotype had significantly less muscle content and higher dissectible fat compared to B and SxB genotypes, suggesting differences in maturity stages. The carcass' bone content (20.4-21.4%) did not differ significantly between genotypes. The longissimus thoracis et lumborum (LTL) and gluteobiceps

(GB) muscles were used for meat quality determinations. Genotype had a significant effect on meat traits and fatty acid composition of the analysed muscles: B genotype and LTL muscle showed lower final pH, SxB genotype had darker and more red muscles, GB muscle had a higher shear force value and lower collagen solubility. Few sex effects were observed on meat quality traits as well as on fatty acid composition. Average percentage of desirable fatty acids in kids was superior to 60% with male S genotype displaying a lower value. Genotypes B and BxS, males and GB muscle had more favorable PUFA:SFA ratios.

Keywords: Goat kids; European quality labels; Carcass; Meat quality; Fatty acids

M.J. Petron, K. Raes, E. Claeys, M. Lourenco, D. Fremaut, S. De Smet, Effect of grazing pastures of different botanical composition on antioxidant enzyme activities and oxidative stability of lamb meat, *Meat Science*, Volume 75, Issue 4, April 2007, Pages 737-745, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.10.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4MFKK9P-1/2/db6fb20762d3e7280c2c3d43a19f74e3>)

Abstract:

The aim of this work was to study the influence of different pastures (Intensive ryegrass, Botanically diverse and Leguminosa rich pastures) on the antioxidant status and oxidative stability of meat from lambs that had been exclusively grazing for three months. Lipid, colour and protein oxidation, [alpha]-tocopherol content and activity of antioxidant enzymes (superoxide dismutase (SOD), catalase (Cat) and glutathione peroxidase (GSH-Px)) were measured in Longissimus thoracis et lumborum muscle samples taken 1 day after slaughter. Pasture type significantly affected protein oxidation and the activity of GSH-Px, but no significant differences were found for the [alpha]-tocopherol content, colour and lipid oxidation, and the activities of SOD and Cat. Grazing a Botanically diverse pasture induced significantly higher protein oxidation in meat, as measured by the free thiol and carbonyl contents, compared to a Leguminosa rich or Intensive ryegrass pasture ($P < 0.05$). The GSH-Px activity was significantly higher in meat from lambs on the Leguminosa rich pasture compared to the other pasture groups ($P < 0.01$).

Keywords: Pasture; Lamb meat; Superoxide dismutase; Glutathione peroxidase; Catalase; Protein oxidation; Lipid oxidation; Colour oxidation

Maria Teresa Osorio, Jose Maria Zumalacarregui, Belen Bermejo, Anastasio Lozano, Ana Cristina Figueira, Javier Mateo, Effect of ewe's milk versus milk-replacer rearing on mineral composition of suckling lamb meat and liver, *Small Ruminant Research*, Volume 68, Issue 3, April 2007, Pages 296-302, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.11.010.

(<http://www.sciencedirect.com/science/article/B6TC5-4J2KXX0-2/2/1a45fd7c511b8b0a1b85ad8982e5b094>)

Abstract:

The effect of ewe's milk versus artificial rearing on the mineral content of suckling lambs muscle and liver was investigated, using a practically non-destructive sampling of carcasses. Mineral content was determined by inductively coupled plasma atomic emission spectroscopy (ICP-AES). Significant differences in mineral composition of muscle and liver were observed between the two groups belonging to each type of weaning. In muscle, these differences were mostly detected for Na, Zn and particularly Mn contents. As for the liver's mineral content, significant higher concentrations of K, P and Cu and lower amounts of Zn and Mn were observed in samples from ewe's milk reared lambs, when compared to those from hand reared ones.

Results obtained lead to the conclusion that mineral composition of suckling lamb's muscle and liver differed significantly according to the mineral intake of the ingested milk or formula. However, determination of the mineral content of either lambs' muscle or liver does not seem to provide an accurate and sensible method for discriminating between carcasses from either type of rearing.

Keywords: Suckling lamb; Meat composition; Liver composition; Mineral elements; Milk-replacers

P. Caparra, F. Foti, M. Scerra, M.C. Sinatra, V. Scerra, Solar-dried citrus pulp as an alternative energy source in lamb diets: Effects on growth and carcass and meat quality, *Small Ruminant Research*, Volume 68, Issue 3, April 2007, Pages 303-311, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.11.015.

(<http://www.sciencedirect.com/science/article/B6TC5-4J44076-1/2/627b61280cdf37a3620bb9696051e317>)

Abstract:

Twenty-seven Italian Merino male lambs, equally divided into three groups, were used to evaluate the effects of the dietary incorporation of citrus pulp dried by exploiting solar energy (solar-dried citrus pulp, SDCP) on growth and carcass and meat quality. The diet consisted of oat hay and concentrate, with a hay/concentrate ratio of 30/70. The concentrates of the SDCP-0, SDCP-30 and SDCP-45 groups were formulated to incorporate 0, 30 and 45% of SDCP, respectively, as partial replacement of cereal grain. The lambs were slaughtered after 80 days of feeding (at 150 days of age) and carcass and some meat quality parameters were measured. No significant differences were found in final live-weights and average daily gains among the groups. Lambs in the SCP-45 group showed impaired ($P < 0.001$) feed conversion efficiency, lower ($P < 0.05$) carcass weight and lower ($P < 0.05$) dressing percentage compared with the other two groups. The majority of SDCP-45 carcasses (88.9%) fell within the bis-grid EU system (light carcasses weighing ≤ 13 kg), while most SDCP-0 (66.7%) and SDCP-30 (77.8%) carcasses fell within the SEUROP system (heavy carcasses weighing > 13 kg). The bis-grid EU carcass classification highlighted how all carcasses produced an ideal meat colour and fatness, while the SEUROP grid carcass classification showed good carcass conformation and optimal fatness in the SDCP-0 and SDCP-30 groups. Carcass compactness was found to be significantly higher ($P < 0.05$) in groups SDCP-0 and SDCP-30 compared to group SDCP-45. The histological dissection of the pelvic limb evidenced a higher ($P < 0.01$) adiposity in the SDCP-0 and SDCP-30 groups. Chemical analysis of meat did not differ significantly among the groups. Physical analysis of the meat showed higher ($P < 0.05$) redness value and higher ($P < 0.05$) chroma value in the SDCP-0 and SDCP-30 groups. Based on the results of the present study it may be concluded that SDCP can be incorporated in concentrate mixtures for fattening lambs at levels equal to 30% without adverse effects both in growth and slaughter performances as well as in carcass and meat quality and, at this replacement level, it appears also to be economically convenient.

Keywords: Citrus pulp; Lamb; Growth; Carcass quality; Meat quality

E. Carrasco, A. Valero, F. Perez-Rodriguez, R.M. Garcia-Gimeno, G. Zurera, Management of microbiological safety of ready-to-eat meat products by mathematical modelling: *Listeria monocytogenes* as an example, *International Journal of Food Microbiology*, Volume 114, Issue 2, 10 March 2007, Pages 221-226, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.09.013.

(<http://www.sciencedirect.com/science/article/B6T7K-4MG1NPR-5/2/ddf575c3f3f4d59bdb85d351d4cdb309>)

Abstract:

The recent Commission Regulation (EC) No 2073/2005 establishes microbiological criteria in foods. For the pathogen *Listeria monocytogenes* in the category ready-to-eat foods able to support its growth, other than those intended for infants and for special medical purposes, two different microbiological criteria are proposed: (i) *L. monocytogenes* levels should be < 100 cfu/g throughout the shelf-life of the product, (ii) absence in 25 g of the product at the stage before the food has left the immediate control of the food business operator, who has produced it. The application of either the first or the second of these criteria depends on whether or not the manufacturer is able to demonstrate that the level of *L. monocytogenes* in the food product will not exceed 100 cfu/g throughout its shelf-life. This demonstration should be based on physico-chemical characteristics of the target product and consultation of scientific literature, and, when

necessary, on quantitative models and/or challenge tests. Once the characteristics of the product as well as scientific literature show that the pathogen has potential to grow on a specific food commodity, it seems adequate to use quantitative models and/or perform challenge tests to study the extent to which *L. monocytogenes* could grow. In this study, we aim to illustrate with an example in cooked ham the application of quantitative models as a tool to manage the compliance with these criteria. Two approaches were considered: deterministic and probabilistic, in three different commercial brands (A, B, and C). The deterministic approach showed that the limit 100 cfu/g was exceeded largely at the end of the shelf-life of all three; however, when reducing the storage time, the level of *L. monocytogenes* remained below 100 cfu/g in B. The probabilistic approach demonstrated very low percentiles corresponding to 100 cfu/g; when reducing the storage time, percentiles for three products increased, especially in products B and C (from 4.92% to 75.90%, and from 0.90% to 73.90%, respectively). This study shows how different storage times influence the level of *L. monocytogenes* at the end of the shelf-life of cooked ham, and, depending on the level reached, the microbiological criterion applied should be different, as stated above. Beside this, the choice of either point-estimate or probabilistic approach should be determined by the competent sanitary authority, and, in case of selecting the second approach, a certain percentile for the level 100 cfu/g should be established.

Keywords: *Listeria monocytogenes*; Microbiological criteria; Ready-to-eat foods; Cooked ham; Shelf-life

Rebecca S. Morrison, Lee J. Johnston, Adrienne M. Hilbrands, The behaviour, welfare, growth performance and meat quality of pigs housed in a deep-litter, large group housing system compared to a conventional confinement system, *Applied Animal Behaviour Science*, Volume 103, Issues 1-2, March 2007, Pages 12-24, ISSN 0168-1591, DOI: 10.1016/j.applanim.2006.04.002.

(<http://www.sciencedirect.com/science/article/B6T48-4K0FFMY-1/2/2baf34cec83ba2bff0699ce94b8de9a1>)

Abstract:

The behaviour, welfare, growth performance, and meat quality of deep-litter, large group-housed pigs were compared to pigs raised in a conventional housing system. Castrated males were housed from 9 weeks of age in a conventional housing (15 pigs/pen; 1.0 m²/pig) or deep-litter, large group housing system (90 pigs/pen; 1.7 m²/pig). Behavioural observations and stress physiology measurements were conducted at 9, 17 and 22 weeks of age. The willingness of the pigs to approach a novel object was assessed using a standard novel object test at 22 weeks of age. Pigs in the deep-litter, group housing system spent more time ($P < 0.05$) standing, locomoting, and interacting with their environment compared with contemporaries housed in the conventional system. At 17 weeks but not at 9 or 22 weeks, pigs in the conventional housing engaged in more ($P < 0.05$) social interactions than deep-litter housed pigs. Salivary cortisol was higher ($P < 0.05$) in deep-litter pigs compared to conventional pigs at 9 weeks of age but were similar at 17 and 22 weeks of age. Pigs in the deep-litter, large group system exhibited more exploratory behaviour ($P < 0.05$) compared to conventionally raised pigs in the novel test. Loins from pigs housed in the deep-litter, large group treatment had lower ($P < 0.01$) loin pH, more ($P < 0.05$) purge loss, more glucose in purge ($P < 0.05$) and were lighter in subjective colour ($P < 0.05$) than loins from conventionally housed pigs. However, there were no significant differences observed in the objective colour measurements of L*, a* and b*. A trained sensory panel detected no differences in tenderness, juiciness or overall desirability of loins from deep-litter or conventionally housed pigs. In this experiment, housing system modified pig behaviour, fearfulness and stress physiology (at 9 weeks of age) but these differences did not negatively impact meat quality.

Keywords: Pig-social behaviour; Fearfulness; Deep-litter; Large groups; Meat quality

G. Pesavento, B. Ducci, N. Comodo, A. Lo Nostro, Antimicrobial resistance profile of *Staphylococcus aureus* isolated from raw meat: A research for methicillin resistant *Staphylococcus aureus* (MRSA), *Food Control*, Volume 18, Issue 3, March 2007, Pages 196-200, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.09.013.

(<http://www.sciencedirect.com/science/article/B6T6S-4HHWW3P-1/2/2b9b9dd4ffe05c9d31a036a98aa67196>)

Abstract:

Methicillin-resistant *Staphylococcus aureus* (MRSA) has emerged as a risk factor for patients in general population and particularly in immunocompromised patients. As a matter of fact, it can produce serious infections that may then evolve in septicemia. However, transmission of MRSA from food to people can represent a serious problem only for immunocompromised people. Vancomycin is the elective antimicrobial commonly used in case of MRSA infection, but *S. aureus* strains with reduced sensibility to vancomycin are emerging worldwide. We isolated 42 strains of *S. aureus* from 176 samples of raw meat (poultry, pork and beef) during a one-year survey. Each strain was tested against twelve antimicrobials to verify antibiotic resistance. We found no evidence of methicillin-, teicoplanin- or vancomycin-resistance, but a lot of multiresistant microorganisms, i.e. resistant to three or more antibiotics. These results confirm the hypothesis that antibiotics resistance is present not only in nosocomial bacteria, but also in community environments microorganisms.

Keywords: *Staphylococcus aureus*; Antimicrobial resistance; Food; Meat

F. Napolitano, G. Caporale, A. Carlucci, E. Monteleone, Effect of information about animal welfare and product nutritional properties on acceptability of meat from Podolian cattle, *Food Quality and Preference*, Volume 18, Issue 2, March 2007, Pages 305-312, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2006.02.002.

(<http://www.sciencedirect.com/science/article/B6T6T-4JMKMSP-1/2/ac8c76580208897c9fa1f4bf4cd662b1>)

Abstract:

The present study was aimed to study the effect of information about the welfare of Podolian cattle and their meat nutritional properties on beef acceptability for regular users and non-users of this particular beef meat. For both user groups, information induced a high expected liking. However, the information had a positive impact on the actual liking score when the product was tasted (an assimilation effect occurred) only for regular users. For these regular users the same level of expected liking and an assimilation effect were also observed in a second occasion. For the non-users, an information session where Podolian meat was tested after detailed information about production system and nutritional and sensory characteristics of this product was organised. After this training, the expected liking did not increase but the information had a positive effect on the actual liking score when the product was tasted (an assimilation effect occurred). Thus, information concerning animal welfare and nutrition may be used to differentiate meat in a mixed production system with competing industrialised and traditional farms.

Keywords: Podolian cattle; Beef; Information; Expectancy; Acceptance; Sensory; Animal welfare

O.A. dalla Costa, L. Faucitano, A. Coldebella, J.V. Ludke, J.V. Peloso, D. dalla Roza, M.J.R. Paranhos da Costa, Effects of the season of the year, truck type and location on truck on skin bruises and meat quality in pigs, *Livestock Science*, Volume 107, Issue 1, March 2007, Pages 29-36, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.08.015.

(<http://www.sciencedirect.com/science/article/B7XNX-4M1TYKB-1/2/ca88d3d0bfa448d6ad34c991b3ce1192>)

Abstract:

The purpose of this study was to evaluate the effect of the season of the year (summer vs winter), type of truck (A: single decker vs B: double-decker) and pig location on the truck (front, middle,

rear) on the incidence of skin bruising and pork quality variation. For this purpose, 2660 gilts of an average weight of 126.7 (+/- 6.6) kg originating from 19 different farms were used. No interaction between season of the year, type of truck and location on truck was observed. A higher number of bruises on the body at unloading and slaughter ($P < 0.0001$) and a higher number of bruises on the carcass ($P < 0.01$) were observed in winter. At unloading a higher number of bruises on the body and on the carcass after slaughter was observed in pigs transported on Truck A ($P = 0.004$ and $P = 0.05$). A higher, although not significant, number of bruises was found on the body of pigs transported in the rear compartment of both trucks. Higher paleness value was found in the longissimus and semimembranosus muscles in summer ($P = 0.0001$) than in winter. Cold and heat stress have a negative influence on skin bruises and meat quality, respectively. Poor vehicle design increases the incidence of bruised carcasses without detracting from pork quality regardless of the climate conditions tested and location of the animal in the truck.

Keywords: Pigs; Transport; Season; Truck type; Skin bruises; Meat quality

C. Vieira, A. Cerdeno, E. Serrano, P. Lavin, A.R. Mantecon, Breed and ageing extent on carcass and meat quality of beef from adult steers (oxen), *Livestock Science*, Volume 107, Issue 1, March 2007, Pages 62-69, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.004.

(<http://www.sciencedirect.com/science/article/B7XNX-4M3BGYV-3/2/b0895b240ebca1ec75c0f9f44363b435>)

Abstract:

In Spain, there is increasing demand, mainly by restaurants and specialty markets, for beef from adult steers (oxen). Therefore, this study assessed the quality of meat from three breeds which show large differences in meat production, but were reared under the same production system and slaughtered at 42 months of age. The breeds evaluated include a specialized meat breed, Limousine (LIM), a dual-purpose breed, Brown Swiss (BS), and a local breed, Asturiana de los Valles (AV). Effect of ageing extent (14 vs. 28 days) was also evaluated. LIM showed the highest dressing percentage and best conformation score while AV oxen provided the lowest carcass weights. BS and LIM adult steers produced fatter carcasses and BS animals had the highest intramuscular fat content. With the exception of juiciness, which had slightly higher values in BS, breed had little effect on sensory parameters. Shear force values were slightly lower in meat aged for 28 days than in meat aged for 14 days. Regarding sensory parameters, ageing extent beyond 14 days just influenced odour intensity which had higher values in meat aged for 28 days.

Keywords: Adult steers beef; Meat quality; Carcass quality; Breed; Ageing extent

Abdullah Y. Abdullah, Hussein S. Musallam, Effect of different levels of energy on carcass composition and meat quality of male black goats kids, *Livestock Science*, Volume 107, Issue 1, March 2007, Pages 70-80, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.09.028.

(<http://www.sciencedirect.com/science/article/B7XNX-4M7KFGB-2/2/b8c35178134a2b7c938e0d83151117e0>)

Abstract:

In this study thirty Black goat male kids were used in a 3 x 2 factorial arrangement to evaluate the effects of feeding diets containing low (LEL; 10.44 MJ ME/kg DM), medium (MEL; 11.60 MJ ME/kg DM) and high energy (HEL; 12.90 MJ ME/kg DM) levels and early castration (TRT) on carcass composition and meat quality. Half of these kids were castrated at 1 week of age and left to be reared with their dams until weaning at the age of 90 days prior to entering the feedlot. Average initial body weight of kids was 14.83 +/- 0.5 kg. Intact and castrated kids were randomly assigned to one of three experimental diets (10 kids/treatment) containing 15% CP and different levels of energy. Kids were fed individually and slaughtered at the end of the fattening period (119 days). Results showed that most of the dissected tissues in the carcass cuts were not affected ($P > 0.05$) by TRT or dietary energy levels. Castration treatment and increasing energy levels in the diets resulted in significantly higher total and subcutaneous fat% and intermuscular fat%, and lower total

muscle%. As a result, intact and MEL kids showed higher muscle% and lower fat% with a higher ratio of muscle/fat in all carcass cuts than castrated and LEL or HEL kids. Muscle pH and temperature values of the loin area measured at 2, 5, 8, 24 h postmortem and after thawing were not affected by the different energy levels, but were lower pH and higher temperature values were recorded in castrated than intact kids. Water holding capacity, cooking loss%, shear force values and muscle color components (CIE; L*, a* and b* values) were not affected by dietary energy or TRT except that muscle of castrated kids had significantly higher L*, WHC and cooking loss% compared to intact kids. Meat from castrated and HEL animals had more (P < 0.05) fat and slightly higher protein but similar moisture and ash than intact and LEL or MEL animals. These results indicated that feeding different energy levels had no influence on meat quality attributes but castration improved fat deposition which increased under higher energy levels. On the other hand, muscularity was higher in intact kids in comparison to castrated kids.

Keywords: Black goat; Castration; Energy level; Carcass composition; Meat quality

R. Ramirez, R. Cava, Carcass composition and meat quality of three different Iberian x Duroc genotype pigs, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 388-396, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.08.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4M340H5-1/2/7c2348a21e791116ad2eb15a70051445>)

Abstract:

Carcass composition and meat quality of Longissimus dorsi (LD) and Biceps femoris (BF) muscles from three different Iberian x Duroc genotype pigs were studied: GEN1: [male symbol] Iberian x [female symbol] Duroc1; GEN2: [male symbol] Duroc1 x [female symbol] Iberian; GEN3: [male symbol] Duroc2 x [female symbol] Iberian. Duroc1 (DU1) were selected for the manufacture of dry-cured meat products while Duroc2 (DU2) were pigs selected for meat production, with high percentages of meat cuts and low carcass fat. Genotype had a significant effect on the differences found while sex had not. GEN2 showed the highest weights at days 180 and 238 of weaning and the highest slaughter weights (day 316) followed by GEN3, while the lowest weights were found in GEN1. GEN3 had well conformed carcasses in comparison with GEN1 and GEN2, since GEN3 showed the highest percentages of ham and loin and the highest weight of loin as well as the lowest back and ham fat thickness. However, the use of DU2 pigs in the cross with Iberian had negative effects on meat quality, as GEN3 gave the worst meat quality in both muscles, postmortem pH, cook and drip loss, and colour and the lowest percentages of intramuscular fat (IMF). In subcutaneous fat (SCF), GEN3 had higher percentages of polyunsaturated fatty acids (PUFA) than GEN2, while GEN2 had higher saturated fatty acids (SFA) levels. In LD, IMF from GEN3 showed the highest percentage of MUFA and PUFA; while the fatty acid profile of GEN2 was more saturated. BF muscle showed similar trends, but not significantly so. On the other hand, few differences were found between reciprocal crosses (GEN1 vs. GEN2). GEN2 showed higher IMF in LD than GEN1, agreeing with their carcass weight. As a result, GEN1 had a fatty acid profile of IMF in the LD that was more unsaturated.

Keywords: Meat quality; Carcass; Iberian; Duroc; Crossbreeding; pH

J.J. Bond, R.D. Warner, Ion distribution and protein proteolysis affect water holding capacity of Longissimus thoracis et lumborum in meat of lamb subjected to antemortem exercise, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 406-414, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.08.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4M340H5-2/2/f3e51df3c9e16f49b1eae6d9115e1f53>)

Abstract:

Exercise has been shown previously to reduce the water holding capacity (WHC) of meat in lamb. The consequence of changes in the distribution of ions pre- and post-rigor and proteolysis on

WHC is relatively unknown. Twelve crossbred lambs were used to investigate the effect of exercise on the meat quality traits of the Longissimus thoracis et lumborum (LTL) muscle. There were no treatment effects on Warner-Bratzler shear force (WBSF), myofibril and sarcoplasmic protein solubility, denaturation or sarcomere length. With exercise the initial pH of the muscle was lower and the rate of pH fall to rigor was faster compared to controls. Exercise caused increased purge and meat fluid had a lower osmolarity, magnesium, potassium and sodium concentration. Proteolysis of desmin occurred after day 3 and vinculin on day 7 of ageing with exercise. It was concluded that exercise caused changes in the distribution of ions and the proteolysis of muscle proteins that reduced the ability of the muscle to bind or hold water.

Keywords: Water holding capacity; Exercise; Ions; Proteolysis

M. Eyas Ahamed, A.S.R. Anjaneyulu, T. Sathu, R. Thomas, N. Kondaiah, Effect of different binders on the quality of enrobed buffalo meat cutlets and their shelf life at refrigeration storage (4 +/- 1 [degree sign]C), Meat Science, Volume 75, Issue 3, March 2007, Pages 451-459, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.08.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4M340H5-3/2/a5bc217f258060555218a54eb06c894b>)

Abstract:

To enhance the binding and quality of enrobed buffalo meat cutlets (EBMC), a meat emulsion at 0%, 15%, 20% and 25% replaced the cooked meat in the formulation. Emulsion containing products had significantly higher moisture contents and texture scores compared to the control. Emulsion at 20% level could be incorporated in enrobed buffalo meat cutlets to enhance their quality. Addition of 1% egg white powder improved the quality of EBMC compared to control, while a 3% level had adverse effect on the sensory attributes despite giving higher product yield and lower shrinkage. Cutlets with refined wheat flour had significantly higher protein and fat contents. It had also higher acceptability followed by corn flour, potato starch and tapioca flour. TBARS of enrobed samples remained lower than controls throughout the storage period. Mesophilic count remained below log 3 cfu/g for both samples during storage. Uncoated products and enrobed products were acceptable up to 10th and 15th day, respectively. Enrobing of buffalo meat cutlets improved their acceptability and shelf life under refrigeration storage.

Keywords: Buffalo meat product; Enrobed cutlets; Meat emulsion; Egg white powder; Binders; Shelf life

M.L. Latorre-Moratalla, S. Bover-Cid, T. Aymerich, B. Marcos, M.C. Vidal-Carou, M. Garriga, Aminogenesis control in fermented sausages manufactured with pressurized meat batter and starter culture, Meat Science, Volume 75, Issue 3, March 2007, Pages 460-469, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4M3RPDJ-2/2/501089d68e1e4930b96c6cf94dd1dc5c>)

Abstract:

The application of high hydrostatic pressure (200 MPa) to meat batter just before sausage fermentation and the inoculation of starter culture were studied to improve the safety and quality of traditional Spanish fermented sausages (fuet and chorizo). Higher amounts of biogenic amines were formed in chorizo than in fuet. Without interfering with the ripening performance in terms of acidification, drying and proteolysis, hydrostatic pressure prevented enterobacteria growth but did not affect Gram-positive bacteria significantly. Subsequently, a strong inhibition of diamine (putrescine and cadaverine) accumulation was observed, but that of tyramine was not affected. The inoculated decarboxylase-negative strains, selected from indigenous bacteria of traditional sausages, were resistant to the HHP treatment, being able to lead the fermentation process, prevent enterococci development and significantly reduce enterobacteria counts. In sausages

manufactured with either non-pressurized or pressurized meat batter, starter culture was the most protective measure against the accumulation of tyramine and both diamines.

Keywords: Fermented sausages; High hydrostatic pressure; Starter culture; Biogenic amines; Enterococci; Enterobacteria

James G. Lyng, Denis A. Cronin, Nigel P. Brunton, Wenqu Li, Xiaohong Gu, An examination of factors affecting radio frequency heating of an encased meat emulsion, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 470-479, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4MBC03V-1/2/f4fa2384c8e044ec283bb9b62acb7b8c>)

Abstract:

The potential of radiofrequency (RF) heating for rapid cooking of a cased comminuted meat emulsion (white pudding) to a pasteurisation temperature of 73 [degree sign]C was examined. Immersion of the product in water was essential in order to prevent thermal damage to the casings by electrical arcing effects during heating. Using a polyethylene heating cell with non-circulating water the applied RF power, primary electrode distance as well as the mineral content, temperature and volume of the surrounding water all influenced the efficiency of the RF heating. Under optimised conditions maximum/minimum temperature gradients ($[\Delta]T$) across the products in excess of 15 [degree sign]C were observed. These could be reduced to around 6 [degree sign]C by heating the white puddings in a cell operating with recirculating hot water (80 [degree sign]C). Using an oven power output of 450 W a 4.3-fold reduction in cooking time compared to conventional steam oven cooking could be achieved.

Keywords: Radio frequency; Cooking protocol development; Meat emulsion

B. Arino, P. Hernandez, M. Pla, A. Blasco, Comparison between rabbit lines for sensory meat quality, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 494-498, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.08.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4M3BGV7-3/2/4b72ca680d4c4b489066dd52337da88f>)

Abstract:

Rabbits from three synthetic lines were used in the experiment. Line R was selected for growth for 24 generations. Lines V and A were selected for litter size at weaning for 30 and 33 generations, respectively. Sensory analysis was carried out on the Longissimus muscle. The parameters evaluated were: juiciness (J), hardness (H), fibrousness (F), flouriness (FI), intensity of rabbit flavour (IRF), aniseed odour (AO), aniseed flavour (AF), liver odour (LO) and liver flavour (LF). A Bayesian analysis was performed. Line V was only 82% as juicy as line R. Line V was 18% harder and 17% more fibrous than line R. Lines A and R had the same H and F. No differences in FI were found. Small effects were found for flavour traits. We conclude that line origin has an influence on some sensory traits determining rabbit meat tenderness.

Keywords: Rabbits; Breeds; Sensory traits; Bayesian analysis

K.E. Neath, A.N. Del Barrio, R.M. Lapitan, J.R.V. Herrera, L.C. Cruz, T. Fujihara, S. Muroya, K. Chikuni, M. Hirabayashi, Y. Kanai, Difference in tenderness and pH decline between water buffalo meat and beef during postmortem aging, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 499-505, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.08.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4M51FNS-3/2/2b6dd0c6dbd1e9be0afd2cab8a70d4e5>)

Abstract:

The objective of this research was to determine the difference in tenderness and some characteristics of water buffalo meat and beef during postmortem aging. Five female crossbred water-buffalo (Philippine Carabao x Bulgarian Murrah) and five female crossbred cattle (Brahman

x Philippine Native), were finished on the same diet for 6 months and slaughtered at 30 months of age. The muscle pH was measured at 40 min, 3 h, 7 h, 24 h, and 48 h postmortem. Longissimus thoracis (LT) and semimembranosus (SM) muscles were excised at 2 d postmortem, and shear force was measured at 2, 4, 7, and 14 d postmortem. Glycogen and lactate concentrations were determined from 0, 2, and 4 d LT samples, and myosin heavy chain type of buffalo and cattle LT was determined by ELISA methods. Myofibrillar protein degradation was also observed by SDS-PAGE and Western blotting of fast-type troponin T. Results showed that the buffalo meat had significantly lower shear force values compared to beef for LT and SM muscles, which was supported by a difference in troponin T degradation. Postmortem pH decline of buffalo meat was significantly slower than that of beef, which was confirmed by lactic acid concentrations, but was not explained by glycogen content. In addition, there was no significant difference in the ratio of slow to fast type muscle fibers in buffalo and cattle, indicating that myosin heavy chain type was not responsible for the difference in pH decline and tenderness between the buffalo meat and beef. This study demonstrated that the tenderness of water buffalo meat was superior to that of Brahman beef, which may have been due to the difference in pH decline and the subsequent effect on muscle protease activity.

Keywords: Buffalo; Tenderness; Troponin T; pH decline; Glycogen; Lactic acid; Myosin heavy chain

A. Small, C. James, S. James, R. Davies, M. Howell, M. Hutchison, S. Buncic, Construction, management and cleanliness of red meat abattoir lairages in the UK, *Meat Science*, Volume 75, Issue 3, March 2007, Pages 523-532, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.09.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4M51FNS-4/2/8dc8b20b8437bdd46683abd410f69faf>)

Abstract:

A survey of a large number of UK abattoirs was conducted via a questionnaire designed to obtain information on (i) throughput and species slaughtered; (ii) construction materials used; (iii) use and type of bedding and (iv) details of cleaning/sanitation regimes. A representative group of abattoirs were selected on the basis of the responses to the questionnaire, and the lairage at these plants investigated through enumeration of *Escherichia coli* remaining after routine cleansing operations. The aim of this study was to enable identification of 'common lairage practices' and to assess the general status of the lairage hygiene and effectiveness of lairage cleaning in commercial UK abattoirs.

The study shows that microbial contamination often remains in UK lairage holding pens after routine cleaning operations. It would appear that there are significant differences in the effectiveness of lairage cleaning programmes at commercial abattoirs, and that the stun-box-roll-out areas are often cleaned to a better standard than the holding areas. As a result of persistence of microbial contamination in the lairage, there is a possible risk of foodborne pathogens persisting in the environment and potentially contaminating animals and carcasses processed on subsequent days.

Keywords: Lairage; Cleaning; Construction

Kristi Praakle-Amin, Mati Roasto, Hannu Korkeala, Marja-Liisa Hanninen, PFGE genotyping and antimicrobial susceptibility of *Campylobacter* in retail poultry meat in Estonia, *International Journal of Food Microbiology*, Volume 114, Issue 1, 28 February 2007, Pages 105-112, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.10.034.

(<http://www.sciencedirect.com/science/article/B6T7K-4MM25PS-3/2/63db9c5ce4f91a4adf445e605eefcbdb>)

Abstract:

In the present study, the *Campylobacter* isolates from retail poultry meat in Estonia were sero- and genotyped, and the antimicrobial susceptibility was determined. Forty-eight chicken (36 Estonian,

12 imported) and 22 turkey (imported) *Campylobacter* isolates from 580 raw broiler chicken (396 Estonian, 184 imported) and 30 turkey (imported) meat samples were studied. Of the isolates, 64 were *C. jejuni*, 4 *C. coli*, and 2 *Campylobacter* spp. Penner serotyping of 54 *C. jejuni* isolates revealed 11 different serotypes, and 22% of the isolates were nontypeable by the commercial antisera. The most common serotypes O:1,44; O:21, and O:55 accounted for 28%, 13%, and 13% of the isolates, respectively. Differences in serotype distribution were seen for chicken and turkey isolates. Genotypic characterization of all *Campylobacter* isolates (n = 70) was performed by pulsed-field gel electrophoresis (PFGE). *Smal* and *KpnI* yielded 29 and 34 PFGE types, respectively, revealing high diversity among isolates. The serotype distribution did not show an association with the origin of the sample, but the majority of the isolates sharing a similar PFGE genotype originated from one country. High levels of resistance to ciprofloxacin (66%), nalidixic acid (66%), tetracycline (44%), ampicillin (34%), and erythromycin (14%) were detected among the 70 *Campylobacter* isolates. The simultaneous resistance to two or three antimicrobial agents occurred in 60% of the isolates. The *Campylobacter* isolates from turkey meat had higher resistance to ampicillin, ciprofloxacin, nalidixic acid, and tetracycline than those from chicken meat. None of the chicken isolates were resistant to gentamicin, and no turkey isolates to erythromycin or gentamicin.

Keywords: *Campylobacter*; Poultry meat; PFGE; Serotyping; Antimicrobial susceptibility

S.J. Santchurn, A. Collignan, G. Trystram, Impact of solute molecular mass and molality, and solution viscosity on mass transfer during immersion of meat in a complex solution, *Journal of Food Engineering*, Volume 78, Issue 4, February 2007, Pages 1188-1201, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.12.031.

(<http://www.sciencedirect.com/science/article/B6T8J-4J9N0HF-1/2/8d7fdc8e10c8c2fe78d9f1bdefa281da>)

Abstract:

Dehydration of meat by soaking in a concentrated solution of water, salt and corn syrup (DE21) generally results in a high water loss and moderate salt and sugar gains. This study was undertaken to better understand the role of corn syrup in the transfer of water and solutes, and particularly its limiting effect on salt impregnation. Corn syrup is composed of saccharides of molecular mass varying from 180 Da (glucose) to more than 1500 Da (oligo- and polysaccharides), in variable proportion. In an attempt to clarify the role of these different saccharides on mass transfer, immersion trials in concentrated solutions of salt (constant molality = 3.0) and polyethylene glycol (PEG, used a model solute) of varying molecular mass and molality were carried out. The influence of solution viscosity was also studied through the addition of agar agar as a viscosity agent. Results showed that water loss increased while salt and PEG gains decreased with increasing molecular mass of PEG in the range of 200-600 Da. In addition, an increasing molality of PEG from 0.6 to 1.6 mol/kg water led to increases in water loss and PEG gain but a decrease in salt gain. Under the prevailing experimental conditions, no significant influence of solution viscosity on mass transfer was found. Moreover, immersion trials were carried out to compare corn syrup with three different combinations of PEG with molecular mass distributions similar to that of corn syrup. The mixtures closely reproduced corn syrup behaviour with respect to salt gain. However, their impact on water loss and PEG gain (as compared to sugar gain) was significantly different from that of corn syrup. Information gathered in this study was used to propose a schematic representation of the mechanisms involved in the transfer of water and solutes during the immersion of meat in a ternary solution. The model is based on the development of a barrier layer of solutes at the periphery of the product, this barrier playing a key role in the control of subsequent mass transfer.

Keywords: Dehydration; Salting; Meat; Ternary solution; Mass transfer

Jasim Ahmed, Hosahalli S. Ramaswamy, Dynamic rheology and thermal transitions in meat-based strained baby foods, *Journal of Food Engineering*, Volume 78, Issue 4, February 2007, Pages 1274-1284, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.12.035.

(<http://www.sciencedirect.com/science/article/B6T8J-4J9VMNM-2/2/5e7ff78c09f3a0f4eed15914375a9030>)

Abstract:

Dynamic (viscoelastic) and conventional rheology (steady flow) of three commercial meat puree based strained baby foods (chicken, lamb and beef) were evaluated in the temperature range of 5-80 [degree sign]C using a controlled rate rheometer and their thermal transitions were evaluated using a standard differential scanning calorimeter (0-100 [degree sign]C). All samples showed a strong viscoelastic behavior with consistently higher value of storage modulus (G') as compared to loss modulus (G'') in the entire frequency ($[\omega]$) range studied (0.1-10 Hz). Both G' and G'' values decreased with an increase in temperature at studied $[\omega]$ ranges between 5 and 50 [degree sign]C. A change in the pattern was noticed for G' and G'' for chicken and lamb meat was found at and above 65 [degree sign]C while beef exhibited similar changes at 80 [degree sign]C indicating protein denaturation related events. A power-type relationship was found satisfactory ($R^2 > 0.90$) to represent dynamic rheological data (storage and loss modulus-frequency). Under steady state flow, shear-thinning behavior of baby foods was generally noticed within shear rate range between 0.1 and 100 s⁻¹. Herschel Bulkley model represented flow data (shear stress-shear rate) adequately in the temperature range of 5-50 [degree sign]C. The rheological relationships were not stable or satisfactory at and above 65 [degree sign]C for both dynamic and flow rheology. Thermal transition behavior evaluated using DSC confirmed the denaturation of meat proteins in the range 65 and 80 [degree sign]C, which was believed to be the primary reason for the unexpected rheological behavior in this temperature zone, expected contributed by individual or group of proteins.

Keywords: Meat puree; Dynamic rheology; Flow rheology; Gelation; Thermal denaturation

T. Kvame, O. Vangen, Selection for lean weight based on ultrasound and CT in a meat line of sheep, *Livestock Science*, Volume 106, Issues 2-3, February 2007, Pages 232-242, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.08.007.

(<http://www.sciencedirect.com/science/article/B7XNX-4KWTF5N-2/2/48638f5ff90dbbd7690eaa8d4e8768e8>)

Abstract:

Genetic parameters for carcass traits in lambs at weaning (average age of 128 days) measured by ultrasound ($n = 1821$) and computer tomography (CT) ($n = 234$), and response to selection for ultrasound eye muscle depth (UMD) and carcass LEAN weight, were estimated. The research flock comprised a meat line (ML) and a control line (CL) of Norwegian White Sheep. The ML was crossed with Texel from 1998, and selected for UMD from 1993 to 2001, and for LEAN weight from 2001 to 2004. For CT scanning, a mean of 23 images was taken per animal. Genetic parameters were estimated with univariate and bivariate mixed-animal models using AIREML, including all animals with records and their relatives. The statistical models included fixed effects, live weight or age of lamb at weaning (covariate), and a random genetic effect.

Heritability estimates for weight of LEAN, FAT and BONE were 0.57, 0.29 and 0.51 using model corrected for live weight. The heritability estimates were lower when these traits were adjusted for age. High genetic correlation was found between LEAN and UMD (0.70), and between carcass FAT and ultrasound fat depth (UFD) (0.82). The genetic trend for UMD regressed on year of birth was significantly greater for ML than CL in 2004.

Keywords: Lamb; Meat line; Selection; LEAN weight; CT and ultrasound

G. Otto, R. Roehe, H. Looft, L. Thoelking, P.W. Knap, M.F. Rothschild, G.S. Plastow, E. Kalm, Associations of DNA markers with meat quality traits in pigs with emphasis on drip loss, *Meat*

Science, Volume 75, Issue 2, February 2007, Pages 185-195, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4M3RPDJ-1/2/42667731becfb30d40e280ea3522fac4>)

Abstract:

Phenotypic information on 1155 market pigs for several pig meat quality traits, was collected. Genotypes on 12 DNA markers, including RYR1 and PRKAG3 I199V, were also obtained on all pigs to investigate the relationship between genetic markers and meat quality.

The RYR1 gene had the highest impact on meat quality, however, several other markers showed significant effects on one or more traits. Animals heterozygous at the RYR1 locus were significantly inferior in almost all meat quality traits, except ultimate pH value, initial conductivity and redness of the meat. Drip loss from case-ready meat (measured from 1 to 7 days post-mortem) was 43% higher for heterozygotes than animals of the stress resistant genotype. The homozygous genotype II at position I199V of the PRKAG3 locus also resulted in less drip loss than genotypes IV and VV, regardless of the method and time of measurement. Furthermore, the favourable genotype related to higher ultimate pH and darker meat. Both loci significantly affected the intercept, linear and quadratic terms of fitted drip loss development curves. The favourable genotypes showed a lower drip loss after one day of measurement and a slower increase and a more linear development over time. Whilst the RYR1 and PRKAG3 markers influenced numerous meat quality traits, some of the other markers were also found to have significant effects on one or two meat quality traits. Markers at MC4R and HMGA1 loci significantly affected drip loss, whereas LDHA, CAST (Hpy188I) and ATP2A1 influenced pH value. In addition, the marker ATP2A1 was associated with variation in intramuscular fat content in *M. longissimus dorsi*. GLUT4 affected temperature 45 min post-mortem and several markers (MC4R, LDHA, GLUT4, HMGA1, CAST (Hpy188I and Pvull)) influenced one or two of the different colour measurements. The markers at MC4R, CKM, AGRP, PRKAG3, and HMGA1 loci were tested for their interactions with RYR1 regarding drip loss. Only AGRP showed a significant interaction, but this was based on only a few animals with the homozygous genotype for one allele. Our results suggest that genetic markers provide a useful tool to improve meat quality in pigs independently from RYR1, especially the mutation I199V in the PRKAG3 gene.

Keywords: Drip loss; Meat quality; Genomic markers; Marker-assisted selection; Pigs

A. Small, C. James, G. Purnell, P. Losito, S. James, S. Buncic, An evaluation of simple cleaning methods that may be used in red meat abattoir lairages, *Meat Science*, Volume 75, Issue 2, February 2007, Pages 220-228, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4KV8TMD-2/2/a2b1e3c4b61df082087ad142a5dee632>)

Abstract:

Concrete tiles artificially contaminated with field strains of *Escherichia coli* and *Salmonella kedougou*, with and without the presence of bovine faecal matter, to simulate visually clean and visually dirty surfaces respectively, were cleaned using a specially designed mechanical rig. Cleaning was carried out using (1) water under mains pressure, (2) water under pressure, (3) water under pressure with a proprietary sanitising agent, (4) steam under pressure and combinations of (5) mains water followed by steam under pressure or (6) water under pressure followed by steam under pressure. Thirty replicates of each of visually clean and visually dirty concrete surfaces were cleaned using each method.

Where there was no faecal matter, the use of a proprietary sanitiser at maximum recommended concentration, or the application of steam under pressure gave greater reductions in microbial contamination than the use of mains or a pressure wash. Where the surface was visually contaminated with the faecal material, the use of a pressure wash followed by immediate steam application gave reductions in microbial contamination comparable with the use of a proprietary

sanitiser at maximum recommended concentration. The use of steam alone on a visually dirty surface was not an effective means of reducing microbial contamination. A small pilot trial under commercial conditions ranked the efficacy of cleaning treatments as follows: pressure washing followed immediately by steam application was the best method of cleaning a holding pen floor, followed by use of a sanitising agent at the greatest concentration recommended by the manufacturer, and then by pressure washing alone. Pressure washing followed by a delayed steam application appeared to give a poor final result on the surface.

Keywords: Lairage; Cleaning; Abattoir; Washing

Lene Meinert, Lene T. Andersen, Wender L.P. Bredie, Charlotte Bjerregaard, Margit D. Aaslyng, Chemical and sensory characterisation of pan-fried pork flavour: Interactions between raw meat quality, ageing and frying temperature, *Meat Science*, Volume 75, Issue 2, February 2007, Pages 229-242, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4KRY936-2/2/1a891ff73eabd34416a03080a602e3d0>)

Abstract:

The effect of raw meat quality and cooking temperature on flavour generation in pork was investigated. The semimembranosus muscle was varied through genetics (carrier (HLY) and non-carrier (DLY) of the RN- allele) and ageing at 2 [degree sign]C (2, 15, and 22 days), whereas the pan-frying temperatures were 150 [degree sign]C and 250 [degree sign]C. HLY gave more pronounced 'fried' and 'burnt' notes than DLY after frying. This could partly be explained by a significantly higher concentration of glucose and glucose 6-phosphate in HLY after 22 days of ageing. HLY was generally perceived as more sour, which correlated well with the measured pH of HLY, but not to the l-lactate concentration. HLY was furthermore perceived as more tender and juicier than DLY, both attributes increased during ageing. Lipid-derived aroma volatiles dominated the samples fried at 150 [degree sign]C, while those from Maillard reactions mostly prevailed in the aroma profile at 250 [degree sign]C.

Keywords: Pork; Carbohydrates; Phosphorylated carbohydrates; Ageing; GC-MS; Aroma volatiles; Lipid composition; Descriptive sensory analysis; RN- allele; Flavour

B. Nowak, T.V. Mueffling, J. Hartung, Effect of different carbon dioxide concentrations and exposure times in stunning of slaughter pigs: Impact on animal welfare and meat quality, *Meat Science*, Volume 75, Issue 2, February 2007, Pages 290-298, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4M1D0FH-1/2/e2a83fab499b9d3063ad4c06824597d0>)

Abstract:

The objective of this study was to determine the impact of different slaughter procedures on animal welfare and meat quality. Before slaughter in a dip-lift, one-gondola system, 460 pigs were exposed to an atmosphere containing either 80% or 90% CO₂ for 70 or 100 s, and at the longer exposure time with stun-to-stick intervals of either 25-35 or 40-50 s. Clinical parameters (reflexes, catecholamines and lactate) showed deficiencies in animal welfare after stunning with 80% CO₂ for 70 and 100 s, with an interval of 40-50 s, and with 90% CO₂ for 70 s. Stunning with 80% CO₂ for 70 or 100 s always induced stress, as indicated by higher lactate levels, and reduced meat quality as indicated by low pH₂₄ values (5.4 in *Musculus longissimus* and 5.5 in *Musculus semimembranosus*) and low impedance (Py₂₄) values, especially in combination with the longer stun-to-stick interval (40-50 s). Stunning with 80% or 90% CO₂ in a dip-lift system was found to be acceptable for animal welfare (percentage of clinical reflexes) only in combination with the longer exposure time of 100 s and the shorter stun-to-stick times of 25-35 s. When 90% CO₂ was used, the longer stun-to-stick interval of 40-50 s also gave results acceptable with regard to animal

welfare. Generally, in comparison to 80% CO₂ stunning meat quality was superior (higher pH₂₄ and Py₂₄ values) after stunning with 90% CO₂.

Keywords: Carbon dioxide (CO₂); Animal welfare; Stunning; Catecholamines; Epinephrine; Norepinephrine; Lactate; Meat quality; PH; Py

T. Goli, P. Abi Nakhoul, N. Zakhia-Rozis, G. Trystram, P. Bohuon, Chemical equilibrium of minced turkey meat in organic acid solutions, *Meat Science*, Volume 75, Issue 2, February 2007, Pages 308-314, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4M0J4WD-4/2/515c083fab5e9007d498e8880a60eae>)

Abstract:

The distribution of acid (HA), anions (A⁻), free protons (H₃O⁺) and bound protons (Hb), in homogenized turkey meat was evaluated at various meat/water mass ratios of (1/4-1/10) during titration with acetic acid (0.25 N) or lactic acid (0.2 N). Hb concentration was determined by titration with hydrochloric acid (0.075 N) and a correlation for [Hb] = f(pH) was proposed. A procedure was used to calculate the fractions of the various species in equilibrium, starting from an initial acid concentration in a meat/water system and assuming the accuracy of the pK_a value of the pure weak acids despite the chemical complexity of meat. Calculated results were in very good agreement (+/-0.15) with experimental pH values, whatever the acid, meat batch or meat/water mass ratios used. Less than 1% of the total protons were free (H₃O⁺) and determined the meat pH.

Keywords: Acid-base equilibrium; Acetic acid; Lactic acid; Turkey; Marination; Buffering capacity

P. Polidori, C. Renieri, M. Antonini, P. Passamonti, F. Pucciarelli, Meat fatty acid composition of llama (*Lama glama*) reared in the Andean highlands, *Meat Science*, Volume 75, Issue 2, February 2007, Pages 356-358, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.07.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4KYY43G-2/2/47f54febf9d863ac80be30f0537be0da>)

Abstract:

This study reports the results of the chemical analysis of the Longissimus thoracis and lumborum taken from 20 llama males, reared in the Andean highlands. The animals were slaughtered at 25 months and had a mean final body weight of 63 kg. Llama meat shows a low fat (3.51%) and cholesterol content (56.29 mg/100 g). The fatty acid composition in llama meat contains 50.34% saturated fatty acids, 42.48% monounsaturated fatty acids and 7.18% polyunsaturated fatty acids. Llama meat appears to be a healthy alternative red meat choice.

Keywords: Llama; Meat quality; Fatty acids

J.N.B. Shrestha, M.H. Fahmy, Breeding goats for meat production: 2. Crossbreeding and formation of composite population, *Small Ruminant Research*, Volume 67, Issues 2-3, February 2007, Pages 93-112, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.10.018.

(<http://www.sciencedirect.com/science/article/B6TC5-4HS3BWY-1/2/e709b7a77ca5fea4ddafd236f41d8ef5>)

Abstract:

This review, the second in the series on breeding goats for meat production, examines the role of crossbreeding and composite population in improving economically important traits necessary for commercial production of meat goats. In general, the crossbreeding of indigenous goats or established breeds with one or more breeds (Alpine, Beetal, Boer, Jamunapari, Nubian and Saanen) that have demonstrated genetic merit in the performance traits of economical importance rely on specific cross and back cross to achieve increased productivity. Concurrently, the combining of desirable morphological characteristics and production performance of two or more breeds in composite populations has had considerable success in other livestock and poultry

species, invigorating interest in the breeding of meat goats for commercial production. There have been a number of studies, world-wide, on evaluation of indigenous goats or established breeds and their crosses, including crossbreds derived from exotic breeds that are summarized. Furthermore, the Boer breed developed in South Africa has considerable potential for rapid and permanent improvement of meat production from goats, and studies on the Boer-sired crossbred offspring are highlighted.

Keywords: Meat goat; Crossbreeding; Composite breeds; Review

J.N.B. Shrestha, M.H. Fahmy, Breeding goats for meat production: 3. Selection and breeding strategies, *Small Ruminant Research*, Volume 67, Issues 2-3, February 2007, Pages 113-125, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.05.040.

(<http://www.sciencedirect.com/science/article/B6TC5-4HYN55T-1/2/992f4c03951d5502cd31d07f29136a58>)

Abstract:

This review, the third and final in the series on breeding goats for meat production describes the role of selection to achieve genetic improvement of economically important performance traits and breeding strategies for commercial production of meat from goats. The primary source of scientific knowledge on commercial production of meat from goats has been negligible compared to other livestock and poultry species, and even in the goat species more attention has been directed towards Dairy and Pashmina goats. At the same time, genetic parameter estimates for reproduction and growth assembled from numerous studies offer theoretical promise in direct selection for improvement of the efficiency of meat goat production. In practice, breeders of crossbred animals must rely on the performance of their parents to exploit both the additive and non-additive genetic variances associated with direct and maternal performance. While purebred selection can benefit from the presence of a greater proportion of additive genetic variance in production traits of economic importance to meat goats, crossbred selection based on additive and non-additive genetic variances becomes important as the proportion of additive genetic variance in those traits is exhausted. The availability of sufficient genetic variation in morphological characteristics and production performance necessary to establish a population with as broad a genetic base as possible can be critical in sustaining accelerated genetic response to selection for many generations. Besides, heterosis not only improves vigour among animals but also produces uniform population of animals, thus increasing consumer acceptability in the marketing of meat and meat products. There is also the opportunity for the application of breeding technology based on multi-trait animal model that utilize mixed model methodology to estimate breeding values and genetic parameters, and to establish optimum breeding objectives to achieve maximum efficiency in meat goat. The genetic improvement of performance may be based on a simple means of identification, measurement and recording of morphological characteristics and production performance necessary for estimating breeding values followed by prompt dissemination of goats with potential genetic merit to many commercial herds.

Keywords: Meat goat; Selection; Heritability; Correlations; Breeding strategies

Athanassios Krystallis, George Chryssochoidis, Joachim Scholderer, Consumer-perceived quality in 'traditional' food chains: The case of the Greek meat supply chain, *Appetite*, Volume 48, Issue 1, January 2007, Pages 54-68, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.06.003.

(<http://www.sciencedirect.com/science/article/B6WB2-4KVXPGN-1/2/40cc2621fe7638f78ab883f07ff69f3a>)

Abstract:

Recent food scares have increased consumer concern about meat safety. However, the Greek 'traditional' meat supply chain from producers to local butchers does not seem to realise the pressing consumer demand for certified meat quality. Or is it that, in such food chains, this demand is not so pressing yet? The present paper seeks to answer this question based on a

survey conducted in the Athens area, involving a sample of 268 participants responsible for food purchasing decisions. The survey mainly aims to develop an integrated model of factors that affect consumer-perceived meat quality and to develop the profile of different consumer segments in relation to these perceptions. The substantial findings of the survey include the fact that, despite their enormous per capita consumption, the majority of consumers are not particularly involved in the meat-purchasing process. Rather they attach importance to visual intrinsic quality cues evaluated in a pre-purchasing context. In this respect, intrinsic quality cues are assigned a role similar to that of quality certification; coupled with the choice of traditional channels and the resulting personal relation with the butcher, they can be understood as efforts to decrease risk of the purchasing decision. Moreover, consumers with such behaviour seem to relate domestic country of origin of meat mostly with perceptions of general safety. Finally, a small, but promising trend with substantial marketing implications of frequent purchases of chicken and pork at supermarkets should not be ignored.

Keywords: Traditional channels; Visible meat quality; Perceived quality model; Segmentation

N. Bhaskar, V.K. Modi, K. Govindaraju, C. Radha, R.G. Lalitha, Utilization of meat industry by products: Protein hydrolysate from sheep visceral mass, *Bioresource Technology*, Volume 98, Issue 2, January 2007, Pages 388-394, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.12.017.

(<http://www.sciencedirect.com/science/article/B6V24-4J5T5SW-4/2/916b31467bd14a75b898cf29fc752098>)

Abstract:

Protein hydrolysate was prepared from pre-treated sheep visceral mass (including stomach, large and small intestines) by enzymatic treatment at 43 +/- 1 [degree sign]C (at the in situ pH 7.1 +/- 0.2 of the visceral mass) using fungal protease. The enzyme readily solubilized the proteins of the visceral mass as indicated by the degree of hydrolysis (34%) and nitrogen recovery (>64%). Hydrolysis with an enzyme level of 1% (w/w of total solids) at 43 +/- 1 [degree sign]C with a pH around 7.0 for 45 min was found to be the optimum condition. The yield of protein hydrolysate was about 6% (w/w). The amino acid composition of the protein hydrolysate that was very hygroscopic, was comparable to that of casein.

Keywords: Protein hydrolysate; Sheep viscera; Fungal protease; Amino acid

K. Jayathilakan, G.K. Sharma, K. Radhakrishna, A.S. Bawa, Antioxidant potential of synthetic and natural antioxidants and its effect on warmed-over-flavour in different species of meat, *Food Chemistry*, Volume 105, Issue 3, 2007, Pages 908-916, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.04.068.

(<http://www.sciencedirect.com/science/article/B6T6R-4NR18KT-2/2/b1d5ab06bbcc996af1e4ae72bfecbbe5>)

Abstract:

The role of natural antioxidants, e.g. Maillard reaction products (MRPs 60 mM/2 h), ascorbic acid (500 ppm), cloves (*Eugenia caryophyllata*) (250 mg/100 g), cinnamon (*Cinnamomum zeylanicum*) (250 mg/100 g) and synthetic antioxidants, e.g. tertiary butyl hydroxy quinone (TBHQ), butylated hydroxy anisole (BHA) and propyl gallate (PG), at 0.02% level each, in controlling the warmed-over-flavour (WOF), and non-haem iron release, as well as their potential in cooked and refrigerated stored meats from three common domestic species (sheep, beef and pork) has been investigated. MRPs and TBHQ showed good antioxidant activity (82-91%) and were significantly different ($P < 0.05$) from the other treatments in all three species. Significantly ($P < 0.05$) lower values of hexanal and non-haem iron were obtained for MRPs and TBHQ treated samples, which showed ability to control WOF during refrigerated storage. Non-linear correlation regression analysis was performed between non-haem iron, WOF values and antioxidant activity in all three species. Exponential fit equations were established for beef and pork, while for sheep, the relationship was found to be polynomial with correlation coefficients ranging from 0.90 to 0.97 for

non-haem iron and WOF, respectively. The susceptibility of these species to lipid oxidation was in the order, pork > beef > sheep, and the order of antioxidant activity for the natural antioxidants was MRPs > cloves > ascorbic acid > cinnamon; for synthetics it was TBHQ > BHA > PG.

Keywords: Warmed-over-flavour; Antioxidant activity; Non-haem iron; Lipid oxidation; Maillard reaction products; Species; Synthetic; Natural

Sweetie R. Kanatt, Ramesh Chander, Arun Sharma, Antioxidant potential of mint (*Mentha spicata* L.) in radiation-processed lamb meat, *Food Chemistry*, Volume 100, Issue 2, 2007, Pages 451-458, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.066.

(<http://www.sciencedirect.com/science/article/B6T6R-4HNSBCW-3/2/f8de64067999d8784b51911559273ee1>)

Abstract:

The effectiveness of mint leaves, a common herb used in Indian cuisine, as a natural antioxidant for radiation-processed lamb meat was investigated. Mint extract (ME) had good total phenolic and flavonoid contents. It exhibited excellent antioxidant activity, as measured by [β]-carotene bleaching and 1,1-diphenyl-2-picrylhydrazyl (DPPH) assays. It also showed a high superoxide- and hydroxyl-scavenging activity but low iron-chelating ability. A positive correlation was found between the reducing power and the antioxidant activity. The antioxidant activity of ME was found to be comparable to the synthetic antioxidant, butylated hydroxytoluene (BHT). The suitability of ME as an antioxidant was determined during radiation processing of lamb meat. ME retarded lipid oxidation, monitored as thiobarbituric acid-reactive substances (TBARS), in radiation-processed lamb meat. TBARS values of ME containing irradiated meat stored at chilled temperatures were significantly lower ($p < 0.05$) than samples without ME. After 4 weeks of chilled storage, TBARS in irradiated meat containing ME (0.1%) was half of that in untreated irradiated meat.

Keywords: Irradiation; Lipid oxidation; Antioxidants; Mint extract

F. Castro, M.C. Garcia, R. Rodriguez, J. Rodriguez, M.L. Marina, Determination of soybean proteins in commercial heat-processed meat products prepared with chicken, beef or complex mixtures of meats from different species, *Food Chemistry*, Volume 100, Issue 2, 2007, Pages 468-476, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.067.

(<http://www.sciencedirect.com/science/article/B6T6R-4HR72NX-2/2/020e151d73614dc06cf149922704128e>)

Abstract:

The addition of foreign proteins (mainly soybean proteins and milk proteins) to heat-processed meat products is a common practice. This work approaches the determination of additions of soybean proteins in heat-processed meat products prepared with chicken meat, beef meat, and complex mixtures of meats from different species (chicken, pork, beef, and turkey) by perfusion reversed-phase high-performance liquid chromatography. The applied method was previously developed for the determination of soybean proteins in pork and turkey meat products but it has never been tested for the determination of soybean proteins in other heat-processed meat products containing other kinds of meats. This paper demonstrates the validity of this method for the detection of soybean proteins in heat-processed meat products containing different varieties of meats and even in the presence of other foreign proteins such as milk proteins. The specificity and existence of matrix interferences have been checked for these samples and accuracy has been evaluated by the comparison of the soybean protein contents determined by the proposed method and the official ELISA method.

Keywords: Heat-processed meat products; Soybean proteins; Quantitation; Perfusion reversed-phase high-performance liquid chromatography; Chicken; Beef; Pork; Turkey

Yung-Hsiang Tsai, Hung-Sheng Hsieh, Hwi-Chang Chen, Shou-Hsun Cheng, Tuu-jiy Chai, Deng-Fwu Hwang, Histamine level and species identification of billfish meats implicated in two food-

borne poisonings, Food Chemistry, Volume 104, Issue 4, 2007, Pages 1366-1371, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.052.

(<http://www.sciencedirect.com/science/article/B6T6R-4N146D7-C/2/90c6917ba2e661f1f04180ccec100b0b>)

Abstract:

Two incidents of food-borne poisonings, causing illness in 59 and 43 victims due to ingestion of billfish meats, occurred in May 2004, in Pingtung, southern Taiwan and in December 2004, Taichung, central Taiwan, respectively. One fried billfish fillet and five frozen billfish fillet samples collected, respectively, from the suspected restaurants in Pingtung and Taichung, respectively, were tested to determine the histamine levels and identify fish species. Analyses of histamine showed that the suspected billfish samples in two food poisonings contained more than 150 mg/100 g of histamine, which is higher than the hazard action level of 50 mg/100 g. Judging from the allergy-like symptoms of the victims and the high histamine levels in the suspected billfish samples, both food-borne poisonings were strongly suspected to be caused by histamine intoxication. A polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method was used to identify the species of the suspected billfish samples in both food poisonings. The 348 bp amplified fragment of the mitochondrial cytochrome b gene by PCR was digested with BsaJI, Cac8I and HpaII enzymes to distinguish the species of the suspected billfish samples. Consequently, the species of Pingtung and Taichung billfish samples implicated in food poisonings were identified as *Makaira nigricans* and *Xiphias gladius*, respectively.

Keywords: Histamine; Food poisoning; Billfish; Polymerase chain reaction; Cytochrome b gene

R.M.L. de Campos, E. Hierro, J.A. Ordonez, T.M. Bertol, N.N. Terra, L. de la Hoz, Fatty acid and volatile compounds from salami manufactured with yerba mate (*Ilex paraguariensis*) extract and pork back fat and meat from pigs fed on diets with partial replacement of maize with rice bran, Food Chemistry, Volume 103, Issue 4, 2007, Pages 1159-1167, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.10.018.

(<http://www.sciencedirect.com/science/article/B6T6R-4MD95BV-8/2/07bf3e45a820bf445f487cc1e5c0aa96>)

Abstract:

Four batches of salami were manufactured. Back fat and meat from pigs fed on diets with maize or maize partially substituted with rice bran (maize/rice bran, 62/38, w/w) were used to prepare two different batches, M and M/RB, respectively. The other two batches (M-YM or M/RB-YM) were prepared as batch M or M/RB, added a yerba mate (*Ilex paraguariensis*) extract. Salamis did not show differences in percentual general composition, texture analysis or sensory features. The TBAR values were affected by the storage time. The use of yerba mate extract controlled the lipid oxidation.

In general, salamis M/RB and M/RB-YM showed higher concentrations of C18:2 n - 6, C18:3 n - 3 and polyunsaturated n - 6 and n - 3 fatty acids. Salamis M and M-YM showed high C18:1 n - 9, and saturated and monounsaturated fatty acid contents. Volatile compounds from lipid oxidation were the most abundant in salamis M/RB and M, while volatiles from fermentation were dominant in salamis M-YM and M/RB-YM.

Keywords: Salami; Pork; Fatty acids; Maize; Rice bran; Yerba mate

Ryszard Rywotycki, The effect of baking of various kinds of raw meat from different animal species and meat with functional additives on nitrosamine contamination level, Food Chemistry, Volume 101, Issue 2, 2007, Pages 540-548, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.02.012.

(<http://www.sciencedirect.com/science/article/B6T6R-4K2SKF7-1/2/b930e8ea7a65dac2e75195a06d3fd1b4>)

Abstract:

The studies aimed to determine the occurrence and formation of nitrosamine contamination levels with dimethylnitrosamine (DMNA) and diethylnitrosamine (DENA) in meat of various kinds, species and genders of farm animals slaughtered at meat processing plants all over Poland. The meat after cooling, cutting and jointing was classified, then comminuted and divided into several experimental variants. Moreover, the effect of the most frequent functional additives used in food industry, such as sodium chloride and sodium ascorbate, and baking process upon the level of the meat pollution was researched. Nitrosamine (DMNA and DENA) concentrations were assessed by Varian 3400 gas chromatograph coupled with Finnigan MAT ITD 800 spectrometer. The quantitative and qualitative states of respective nitrosamines were determined by comparing the chromatogram values.

The experiments conducted by the author revealed that sodium chloride or sodium ascorbate added to the meat caused a decrease in nitrosamine contamination level in comparison with meat without the additives. It was also found that under the experimental conditions and for the experimental variants, baking process leads to an increase in the levels of nitrosamine (DMNA and DENA) contamination in comparison with meat free of functional additives as compared to meat containing the functional additives.

Keywords: Dimethylnitrosamine (DMNA); Diethylnitrosamine (DENA); Meat; Functional additives; Baking

R. Mostert, L.C. Hoffman, Effect of gender on the meat quality characteristics and chemical composition of kudu (*Tragelaphus strepsiceros*), an African antelope species, *Food Chemistry*, Volume 104, Issue 2, 2007, Pages 565-570, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.12.006.

(<http://www.sciencedirect.com/science/article/B6T6R-4MMWHN4-4/2/e4d89765426510c41691872893a21e4f>)

Abstract:

The kudu (*Tragelaphus strepsiceros*), one of Africa's most majestic antelope species, shows a strong sexual dimorphism. The male reaches a larger size ([approximate]250 kg live weight) than the female ([approximate]180 kg live weight). Kudu occur throughout the savannah regions in central Africa, south of the equatorial forests, through East Africa to Ethiopia, Sudan and Chad down to the Eastern Cape (South Africa). Kudu are predominantly browsers, but will occasionally graze. Within South Africa, this species is hunted regularly for local consumption, and Kudu meat is also a regular item in most restaurants that serve game meat and is also frequently exported. However, very little data has been published pertaining to the muscle chemical composition and other quality attributes of its meat. In the present investigation, the proximate, amino acid, fatty acid and mineral chemical compositions of the *Longissimus dorsi et lumborum* muscle of 18 animals are presented, and the effect of gender thereupon tested by means of standard student's t-tests. Kudu meat has a high protein and a low fat content. Only two of the longer chained polyunsaturated fatty acids (C20:3n-6 and C20:5n-3) differed between the females and males, the latter having a higher concentration each time. Of the kudu muscle's fatty acids, 37% were saturated, 22% monounsaturated and 41% polyunsaturated. The mean PUFA to SFA ratio (1.12) was well above the recommended 0.45 prescribed by the British Department of Health. The n-6:n-3 PUFA ratio (2.34) was also well below the British Department of Health's recommended figure of four. Histidine and valine had significantly higher levels in female kudu meat than in male kudu meat. Phosphorus was present at the highest concentrations in both female and male animals. Overall, the chemical composition of kudu meat is not significantly effected by gender.

Keywords: Game meat; Chemical composition; Meat quality; Fatty acid; Amino acids; Mineral content

R. Thomas, A.S.R. Anjaneyulu, Y.P. Gadekar, H. Pragati, N. Kondaiah, Effect of comminution temperature on the quality and shelf life of buffalo meat nuggets, Food Chemistry, Volume 103, Issue 3, 2007, Pages 787-794, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.09.016.

(<http://www.sciencedirect.com/science/article/B6T6R-4M69JWF-4/2/aa82eb294e10fe73a4f4c2f4458baba5>)

Abstract:

Buffalo meat nuggets were prepared after equilibrating the ingredients to temperatures of 4, 10, 25 and 37 [degree sign]C. Following comminution for 6 min, the temperatures of the batters were 16.3, 19.3, 27.4 and 34.8 [degree sign]C and their pH and emulsion stability ranged from 6.18 to 6.29 and 88.76 to 95.33%, respectively. Increasing temperature of comminution led to increased cooking losses and TBARS values. However, even at 37 [degree sign]C, complete emulsion breakdown did not occur as the cooking losses were still only about 12%. Texture profile analysis revealed an inverse relationship between chopping temperature and shear force. Sensory evaluation indicated that, at least up to comminution temperatures of 27.4 [degree sign]C, the nuggets were acceptable. The aerobic mesophilic bacterial counts were higher for the nuggets made from batters with higher temperatures but, even at the 21st day of storage, the counts were well below the levels likely to cause spoilage in meat products. Results suggested that comminuted buffalo meat products can be manufactured in conditions where refrigeration is not available, by a preservation system (mostly chemical) to decrease microbial and chemical spoilage and also by devising an efficient marketing system for their early distribution (preferably 14 days).

Keywords: Buffalo meat; Nuggets; Comminution temperature; Quality; Shelf life

Pisal Sriket, Soottawat Benjakul, Wonnop Visessanguan, Kongkarn Kijroongrojana, Comparative studies on chemical composition and thermal properties of black tiger shrimp (*Penaeus monodon*) and white shrimp (*Penaeus vannamei*) meats, Food Chemistry, Volume 103, Issue 4, 2007, Pages 1199-1207, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.10.039.

(<http://www.sciencedirect.com/science/article/B6T6R-4MNHY7M-3/2/80e0c01c12d9ca59f43a92fc3b986156>)

Abstract:

Chemical composition and thermal properties of meat from two species of shrimps, black tiger shrimp (*Penaeus monodon*) and white shrimp (*Penaeus vannamei*), were comparatively studied. White shrimp meat had higher protein and ash contents than had black tiger shrimp meat ($p < 0.05$). Fractionation of nitrogenous constituents revealed that myofibrillar protein was the major component in the muscles; myosin heavy chain (MHC) and actin were the predominant proteins. White shrimp meat comprised higher stromal protein with greater pepsin-soluble collagen and insoluble collagen contents than did black tiger shrimp meat. Muscle proteins from black tiger shrimp, especially MHC, had higher thermal stability than those from white shrimp as indicated by the higher transition temperature (T_{max}) as well as the lower inactivation rate constant (KD). Phospholipid was the predominant lipid (72-74%) in both shrimps, followed by triglyceride. Polyunsaturated fatty acids were found as the major fatty acids with the range of 42.2-44.4%. DHA (22:6)/EPA (20:5) ratio in black tiger shrimp (2.15) was higher than that in white shrimp (1.05). Mg was the dominant mineral in both shrimps. Ca and Fe were also found at high concentrations. Arginine was the most abundant amino acid, while leucine, isoleucine and proline were predominant in both shrimps. Glutamic acid and glycine contents were greater in black tiger shrimp meat; however, white shrimp meat had higher hydroxyproline content. Different compositions might govern the different characteristics as well as thermal properties of both species.

Keywords: Black tiger shrimp; White shrimp; Muscle; Protein; Lipid; Composition; Mineral

Romuald Cheret, Christine Delbarre-Ladrat, Marie de Lamballerie-Anton, Veronique Verrez-Bagnis, Calpain and cathepsin activities in post mortem fish and meat muscles, Food Chemistry,

Volume 101, Issue 4, 2007, Pages 1474-1479, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.04.023.

(<http://www.sciencedirect.com/science/article/B6T6R-4K606TW-1/2/7d76ffbe7dc3d8cbe2a54cd63e2ccd4b>)

Abstract:

Post mortem tenderization is one of the most unfavourable quality changes in fish muscle and this contrasts with muscle of mammalian meats. The tenderization can be partly attributed to the acid lysosomal cathepsins and cytosolic neutral calcium-activated calpains. In this study, these proteases from fish and bovine muscles were quantified and compared. The cathepsin B and L activities were in more important amounts in sea bass white muscle than in bovine muscle. On the other hand, cathepsin D activity was 1.4 times higher in meat than in fish muscle, while cathepsin H was negligible in both muscles. Calpain activities were similar in both types of muscle. Moreover, calpastatin (calpain endogenous inhibitor) level is 3.9 times higher in sea bass white muscle. These differential activities are considered in relation to their probable involvement in post mortem degradation of muscle.

Keywords: Calpain; Cathepsin; Protease; Fish; Meat

M. Pla, P. Hernandez, B. Arino, J.A. Ramirez, Isabel Diaz, Prediction of fatty acid content in rabbit meat and discrimination between conventional and organic production systems by NIRS methodology, Food Chemistry, Volume 100, Issue 1, 2007, Pages 165-170, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.029.

(<http://www.sciencedirect.com/science/article/B6T6R-4HH81ST-4/2/5915afbfe78a6bcf3b22f42f6ce3dc7a>)

Abstract:

To investigate the feasibility of using the NIRS methodology to analyse the fatty acid content of rabbit meat and to discriminate between conventional and organic production, the meat of a hind leg of 119 rabbits was scanned between 1100 and 2498 nm and 104 samples were sent to the laboratory for reference analysis of fatty acids by gas chromatography. A commercial spectral analysis program (WINISI-2, v. 1.04) was used to process the data and to develop chemometric models. The better calibration equation for each fatty acid, leading to a higher determination coefficient of cross-validation (r^2) and low standard error of cross-validation (SECV) was retained. Prediction of linoleic, palmitic, palmitoleic and oleic acid content was excellent or good (r^2 between 0.90 and 0.70); prediction of arachidonic, stearic, $[\alpha]$ -linolenic and eicosatrienoic FA has r^2 between 0.69 and 0.50. However, miristic, vaccenic, icosanoic and eicosadienoic FA are problematic to predict. When fatty acids were grouped, the r^2 of the calibration equations were: 0.85 for saturated FA, 0.83 for MUFA, 0.92 for PUFA and 0.91 for n - 6 FA, indicating excellent or good prediction. Prediction of $[\alpha]$ -linolenic FA ($r^2 = 0.59$) needs more precision. The obtained equations have been applied for predicting meat fatty acid composition of both groups of production systems, conventional and organic, for an other 52 rabbit meat samples (2 x 26). Meat of the organic source had lower ($p = 0.000$) monounsaturated FA (30.54% vs. 34.64%) and higher ($p = 0.019$) polyunsaturated FA (27.28% vs. 23.66%) than rabbit meat from the conventional system, while the saturated FA content was similar (42%) in both groups. The discriminant model correctly classified (98%) between conventional or organic produced rabbit meat.

Keywords: Near-infrared spectroscopy; Prediction; Fatty acids; Organic rabbit meat

Bozena Stodolak, Anna Starzynska, Marcin Czyszczonek, Krzysztof Zyla, The effect of phytic acid on oxidative stability of raw and cooked meat, Food Chemistry, Volume 101, Issue 3, 2007, Pages 1041-1045, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.02.061.

(<http://www.sciencedirect.com/science/article/B6T6R-4JTRTJC-2/2/d19d1261952befdc5d6a0b73bd45c995>)

Abstract:

The effects of phytic acid addition (0.1, 1 and 5 mM) to pork and beef homogenates on TBARS and metmyoglobin levels in raw meat, and TBARS and heme iron contents in cooked meat during 3 days of storage at 4 [degree sign]C were investigated. Also, the role of inositol as a potential synergist of IP6 (phytic acid) was examined. IP6 effectively decreased the TBARS accumulation in raw and cooked meat homogenates. The metmyoglobin formation was inhibited in raw beef by phytic acid in a dose-dependent manner. The effect of IP6 was more pronounced in cooked meat than in raw and in cooked beef homogenates more than pork. Inositol did not enhance antioxidant action of phytic acid in minced meat.

Keywords: Phytic acid; Antioxidant; Lipid peroxidation; Metmyoglobin; Ground meat

Antonios Drakos, Georgios Doxastakis, Vassilis Kiosseoglou, Functional effects of lupin proteins in comminuted meat and emulsion gels, *Food Chemistry*, Volume 100, Issue 2, 2007, Pages 650-655, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.088.

(<http://www.sciencedirect.com/science/article/B6T6R-4HSY556-2/2/f7e56c6f61917d62c5e44088e4f1d78f>)

Abstract:

The mechanical and textural properties of gel network resulting by heating at 90 [degree sign]C of comminuted meat systems, containing lupin seed protein isolate at a relatively low concentration (2%), were studied in an attempt to establish the role of the lupin proteins in the gel structure network development. These results are supported with data from SDS-PAGE analysis of the adsorbed protein at the fat particle surface of the system. The findings are considered in terms of lupin protein involvement in interactions, either at the fat particle surface, or within isolated pockets of high lupin protein content.

Keywords: Lupin protein; Comminuted meat gels; Protein interactions; Meat emulsion; Protein adsorption

Pilar Trespalacios, Reyes Pla, Simultaneous application of transglutaminase and high pressure to improve functional properties of chicken meat gels, *Food Chemistry*, Volume 100, Issue 1, 2007, Pages 264-272, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.058.

(<http://www.sciencedirect.com/science/article/B6T6R-4HR72NX-1/2/812c9efb7e2ffa632b36492d0283cf32>)

Abstract:

Low-fat protein gels obtained by pressure are softer than those processed by conventional heat treatment. In this study, microbial transglutaminase (MTGase) (0.3%) was added to chicken batters in order to investigate the combined effect of pressure and enzyme on the functional properties of gels. Batters of meat with egg proteins were treated at 500 MPa for 30 min at 40 [degree sign]C and then heated at 75 [degree sign]C for 5 min to inactivate the enzyme. Treated samples showed, under confocal microscopy, a more compact and homogeneous microstructure and exhibited a notable increase in hardness and chewiness as compared to controls that were pressurized but contained no MTGase. They were also harder, more chewy and springy but had a similar cohesiveness and cutting force to those obtained by heat alone.

Keywords: Microbial transglutaminase; High pressure; Chicken meat gels; Texture; Microstructure

B. de la Roza-Delgado, A. Soldado, A. Martinez-Fernandez, F. Vicente, A. Garrido-Varo, D. Perez-Marin, M.J. de la Haba, J.E. Guerrero-Ginel, Application of near-infrared microscopy (NIRM) for the detection of meat and bone meals in animal feeds: A tool for food and feed safety, *Food Chemistry*, Volume 105, Issue 3, 2007, Pages 1164-1170, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.02.041.

(<http://www.sciencedirect.com/science/article/B6T6R-4N7RWD1-1/2/7fc120f0ea437f717485aee07477baa3>)

Abstract:

This paper reports on the development and validation of a method for detecting meat and bone meal (MBM) in compound feeds by near-infrared reflectance microscopy (NIRM) as an alternative in food and feed safety. A FT-NIR (Fourier transformer-near-infrared reflectance) instrument attached to a microscope was used to build up a spectral library containing reference feed particles identified as plant or animal origin, from various sources. Spectra were collected directly from particles in the NIR spectrum region (1112-2500 nm). The spectral library sample set was used to develop various discriminant models to classify spectra as MBM or plant material. The best discriminant model was obtained using partial least squares (PLS) discriminant analysis and standard normal variate and detrending (SNVD) and first derivative for spectrum pretreatment; this model had a coefficient of determination of 0.95 and a standard error of cross-validation of 0.133. The model was externally validated. The results confirmed NIRM as a valuable technique for detection of banned MBM.

Keywords: Near-infrared microscopy (NIRM); Bovine spongiform encephalopathy; Meat and bone meals; Food and feed safety; Spectral discriminant analysis

K.S.C. Koep, L.C. Hoffman, L.M.T. Dicks, E. Slinde, Chemical composition of meat and blubber of the Cape fur seal (*Arctocephalus pusillus pusillus*), Food Chemistry, Volume 100, Issue 4, 2007, Pages 1560-1565, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.12.035.

(<http://www.sciencedirect.com/science/article/B6T6R-4J8D988-1/2/fa366746615b17fa931d405a146e3093>)

Abstract:

Although the Cape fur seal is harvested commercially in southern Africa, no data exist to indicate whether its meat composition is such that it can be consumed by humans. Presently, these animals are harvested mainly for their hides. Little is known about the chemical composition of the meat and blubber and whether it could be processed into food or animal feed. This is the first report on the chemical composition of the Pectoralis muscle and fat of seal pups and bulls. The fat content in the muscle of pups was higher (4.2 g/100 g) than recorded in bulls (2.4 g/100 g). The protein content in muscle, on the other hand, was similar (23.2 g/100 g) for animals of both age groups. The blubber of bulls had a higher protein level (26.6 g/100 g) compared to that of pups (14.6 g/100 g), but a lower fat content (67.1 g/100 g vs 77.2 g/100 g). Muscle of bulls contained 33% saturated fatty acids (SFA), 29% monounsaturated fatty acids (MUFA) and 38% polyunsaturated fatty acids (PUFA). Muscle of pups contained 39% SFA, 30% MUFA and 31% PUFA. The toxin content in Cape fur seal blubber was lower than that reported for the blubber of Canadian seals. The organochlorine content in the blubber of Cape fur seals was lower than 13.7 ng/g oil, whereas levels as high as 87.2 ng/g have been reported in Canadian seal oil. The chemical composition of the Cape fur seal is such that it could be classified as a healthy meat source.

Keywords: Cape fur seal; Sustainable harvesting; Protein; Fat; Organochlorine

De-Wei Chen, Min Zhang, Non-volatile taste active compounds in the meat of Chinese mitten crab (*Eriocheir sinensis*), Food Chemistry, Volume 104, Issue 3, 2007, Pages 1200-1205, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.042.

(<http://www.sciencedirect.com/science/article/B6T6R-4N02J7S-4/2/db153ca8437d63418d30d5ea191284ae>)

Abstract:

The non-volatile taste active compounds, including soluble sugars, succinic acid, free amino acids and flavour 5'-nucleotides in the meat of Chinese mitten crab (*Eriocheir sinensis*) were analyzed, and their taste impacts were evaluated by taste active values (TAVs) and equivalent umami concentration (EUC) methods. The total free amino acid content of crab meat was 20.9 mg/g. Arginine, glycine and alanine were the major free amino acids, accounting for more than 70% of the total free amino acids. 5'-Adenosine monophosphate (AMP) was the main flavour 5'-nucleotide

(75.3 mg/100 g), followed by 5'-inosine monophosphate (IMP) (34.4 mg/100 g) and 5'-guanosine monophosphate (GMP) (2.3 mg/100 g). Arginine, glycine, alanine, glutamic acid, IMP and AMP were of high TAV (greater than one), and they had strong taste impacts on the crab meat flavour. Glycine and alanine contributed to the major sweet taste, while glutamic acid, IMP and AMP contributed to the strong umami taste. As the TAVs of soluble sugar, succinic acid and bitter free amino acids were lower than one, thus those compounds are likely to have insignificant impact on the taste of the crab meat. The EUC was 4.2 g MSG/100 g crab meat, which meant that the umami taste of the crab meat was very intense.

Keywords: Chinese mitten crab; Taste active compounds; Free amino acids; Flavour 5'-nucleotides; Umami; Sweet

Pauline R. Kriese, Adriana L. Soares, Paulo D. Guarnieri, Sandra H. Prudencio, Elza I. Ida, Massami Shimokomaki, Biochemical and sensorial evaluation of intact and boned broiler breast meat tenderness during ageing, *Food Chemistry*, Volume 104, Issue 4, 2007, Pages 1618-1621, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.03.003.

(<http://www.sciencedirect.com/science/article/B6T6R-4N7XPF9-9/2/1ee425a0657c3d492e840b6e8d79c38a>)

Abstract:

Meat tenderness is the main characteristic demanded by consumers and is affected by rigor mortis development and proteolysis activities, both of which occur during carcass refrigeration. In this work, we demonstrate that broiler breast fillet tenderness can be further increased and its extension depends on whether or not meat is excised from the carcass. Post-harvest samples taken from 0 to 72 h after slaughtering and kept refrigerated at 2 +/- 2 [degree sign]C were evaluated for tenderness by myofibrillar fragmentation index determination, shear force analysis and sensorial testing. The 24 h post-harvested intact samples were 30.6% more tender than excised samples and 41.7% more tender than control samples (p [less-than-or-equals, slant] 0.05). The myofibrillar fragments index was 13.2% higher in intact samples than in deboned fillet (p [less-than-or-equals, slant] 0.05) and a sensory test showed that the 24 h intact samples were of major acceptability. Our results demonstrated that tenderness was best achieved with intact breast fillet samples stored at 2 +/- 2 [degree sign]C for 24 h.

Keywords: Myofibrillar fragmentation index; Shear force values; Acceptance test; Calpain system; Meat aging

Gabriella Favaro, Paolo Pastore, Giovanna Sacconi, Silvano Cavalli, Determination of biogenic amines in fresh and processed meat by ion chromatography and integrated pulsed amperometric detection on Au electrode, *Food Chemistry*, Volume 105, Issue 4, 2007, Pages 1652-1658, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.04.071.

(<http://www.sciencedirect.com/science/article/B6T6R-4NR18KT-4/2/32011d15a2a1451e746fc2f031ece452>)

Abstract:

A selective cation exchange chromatographic method, coupled to integrated pulsed amperometric detection, has been developed to quantify biogenic amines in fresh and processed meat. The method is based on gradient elution of aqueous methanesulfonic acid with post column addition of a strong base to obtain suitable conditions for amperometric detection. A potential wave-form able to keep long time performance of the Au electrode was set up. The analysis time is about 68 min. Amounts of tyramine, putrescine, cadaverine, histamine, agmatine, spermidine and spermine were measured, after extraction with perchloric acid. The method was used to determine analytes in fresh and processed meat. Analyte quantification was made with external calibration method after demonstration that matrix effects were not present. All analytes were identified in real samples except phenethylamine which is eluted in a zone of the chromatogram rich of interfering peaks. Repeatabilities, computed on their amounts in real samples, were better than 9% for all of them.

Detection limits were computed according to the Hubaux-Vos method. The obtained values ranged between 0.70 and 2.12 mg/l corresponding to 7-21 mg/kg, low enough to determine all analytes in real matrices.

Keywords: Biogenic amines; Integrated pulsed amperometric detection; Au electrode; Meat products; Ion chromatography

Bing Shao, Hao Han, Dongmei Li, Yalu Ma, Xiaoming Tu, Yonging Wu, Analysis of alkylphenol and bisphenol A in meat by accelerated solvent extraction and liquid chromatography with tandem mass spectrometry, *Food Chemistry*, Volume 105, Issue 3, 2007, Pages 1236-1241, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.02.040.

(<http://www.sciencedirect.com/science/article/B6T6R-4N7RWD1-2/2/d6baae40fb623282d731ac1391496c68>)

Abstract:

The ubiquity of alkylphenols and bisphenol A (BPA) in the environment is a worldwide scientific and public concern due to the persistence, toxicity and endocrine disrupting properties of these compounds. This paper introduces a new method based on accelerated solvent extraction, with a subsequent cleanup step using amino-propyl solid phase extraction cartridges and liquid chromatography-electrospray ionization tandem mass spectrometry (LC-ESI-MS/MS) for the simultaneous determination of nonylphenol (NP), octylphenol (OP) and bisphenol A (BPA) in different meats. Recovery studies were performed at different fortification levels. The average recoveries of each compound ranged from 91.5% to 99.9% for BPA, 89.0% to 93.3% for NP and 97.8% to 101.3% for OP. The limits of quantification (LOQs) were 1.00, 0.20 and 0.40 [μ]g/kg for BPA, NP and OP, respectively. Investigation of the levels in commercial samples indicated that NP was ubiquitous in different types of meat at levels ranging from 0.49 to 55.98 [μ]g/kg, and higher concentrations of NP and BPA were found in aquicolous animals.

Keywords: Alkylphenols; Bisphenol A; Accelerated solvent extraction; HPLC-ESI-MS/MS; Meat

Ana Paula R. Harbach, Mara C.R. da Costa, Adriana L. Soares, Ana M. Bridi, M. Shimokomaki, Caio A. da Silva, Elza I. Ida, Dietary corn germ containing phytic acid prevents pork meat lipid oxidation while maintaining normal animal growth performance, *Food Chemistry*, Volume 100, Issue 4, 2007, Pages 1630-1633, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.11.046.

(<http://www.sciencedirect.com/science/article/B6T6R-4JCCM6B-2/2/ed91d84f449e9d336e635118680b99be>)

Abstract:

The effects of dietary defatted corn germ meal (DCGM) containing phytic acid (PA) on pig health during development and on its *Longissimus dorsi m.* (LD) lipid oxidative stability has been evaluated. Rations of DCGM were prepared at the level of substitution of 0%, 10%, 20% and 40% and offered to twenty four animals of Landrace x Large White crossbreds throughout 25 days before slaughtering. Animals were sacrificed at an average weight of 91.24 kg (+/-0.950) and samples for meat lipid oxidation analysis were taken after seven days under refrigeration at 3 [degree sign]C. Animals fed with DCGM did not show any significant difference, in comparison to the control, in carcass characteristics, such as cold carcass weight, backfat depth, muscle depth, lean meat percentage and carcass dress yielding (p [less-than-or-equals, slant] 0.05). Finally, no difference in meat proximate chemical composition was detected solely arising from lipid oxidation since LD from DCGM-treated pigs revealed an inhibition of 63.0%.

Keywords: Lipid oxidation; Phytic acid; Corn germ; Pork meat

C. Ruiz-Capillas, P. Aller-Guiole, F. Jimenez-Colmenero, Application of flow injection analysis to determine protein-bound nitrite in meat products, *Food Chemistry*, Volume 101, Issue 2, 2007, Pages 812-816, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.12.034.

(<http://www.sciencedirect.com/science/article/B6T6R-4J8D988-2/2/5635587897a6cfdec3dac47067924054>)

Abstract:

The development and application of a methodology based on flow injection analysis (FIA) for the determination of protein-bound nitrite (PBN) in meat products was studied. Since the FIA methodology used for measuring residual nitrite was not appropriate for determining PBN (even at a concentration of 15.9 mg of PBN/kg) in meat products, the procedure was modified and then studied for residual nitrites and PBN. Ammonium chloride (A), which is used conventionally (the original FIA method), was replaced by different carriers (the modified FIA method): B (buffer 7); C (buffer 7.5); D (buffer 8); E (NaOH 0.5 M) and F (NaOH 1 M). Carriers B and C provided the lowest limits of quantification of residual nitrite, lower than that obtained using the original FIA method. The method for determining PBN in several meat products (frankfurter and dry sausages) was validated by comparing it with the method usually used. The results obtained indicate that the modified FIA method (with carriers B and C) can be used as a simple, easy, fast, accurate and precise methodology for quantifying residual nitrite and PBN in meat products.

Keywords: Meat products; Protein bound nitrite; Flow injection analysis; NaNO₂

B. Sandmeier, R. Bauerlein, C. Villmann, T. Duthorn, M. Gareis, C.-M. Becker, M. Pischetsrieder, Detection of central nervous system tissue in meat and meat products with a newly developed immunoassay selective for Myelin proteolipid protein, *Food Chemistry*, Volume 105, Issue 2, 2007, Pages 871-878, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.071.

(<http://www.sciencedirect.com/science/article/B6T6R-4N2KTMX-1/2/466137d652b800357bcef38073ed359e>)

Abstract:

Bovine spongiform encephalopathy (BSE) is most likely transmitted by the consumption of central nervous system (CNS) tissue of infected animals. In this study, an immunochemical assay for CNS in meat and meat products was developed using an antibody against Myelin proteolipid protein (PLP), which is very specifically expressed in the CNS. Solvent extraction of CNS-contaminated meat yielded a highly enriched PLP fraction. Subsequent Western blot analysis specifically detected the PLP band at 29 kDa. The detection limit for unprocessed CNS in raw meat was less than 0.025% and the quantification limit was calculated to be 0.049%. The PLP epitope was relatively stable during storage at 5 [degree sign]C or -21 [degree sign]C and during heating at 75 [degree sign]C and 95 [degree sign]C. Amounts of 0.1% CNS could be reliably detected in cooked bologna type sausage, cooked liver sausage and fermented sausage. Thus, the new assay allows highly specific and sensitive determination of CNS contaminations in meat and meat products.

Keywords: Bovine spongiform encephalopathy; Central nervous system; Myelin proteolipid protein; Solvent extraction; Western blot

Denise Bohrer, Emilene Becker, Paulo Cicero do Nascimento, Morgana Dessuy, Leandro Machado de Carvalho, Comparison of graphite furnace and hydride generation atomic absorption spectrometry for the determination of selenium status in chicken meat, *Food Chemistry*, Volume 104, Issue 2, 2007, Pages 868-875, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.10.008.

(<http://www.sciencedirect.com/science/article/B6T6R-4MC71V8-3/2/0e7aae7c3c751c44144ca1babbb75135>)

Abstract:

Four different procedures for the determination of selenium in chicken meat by atomic absorption spectrometry were investigated. They consisted on conventional ambient pressure acid digestion carried out before and after sample drying, associated or not with fat extraction. For all procedures muscle and skin were analyzed separately. Drying was carried out in a conventional oven at 65 [degree sign]C for 24 h. For fat extraction different solvents and solvent mixtures were investigated considering both extraction yield and sample adequacy for further AAS measurement. Acid

digestions were carried out with mixtures of HNO₃ and HClO₄. After digestion, selenium was measured either by Hydride Generation (HGAAS) or by Graphite Furnace Atomic Absorption Spectrometry (GFAAS). For the reduction of Se(VI) prior to the HGAAS determination, 8% (w/v) NaBr, 6 mol/l HCl (both with and without sulfamic acid), as well as UV radiation were investigated. Tests with spiked samples have shown that either UV radiation (pH 8) or NaBr/sulfamic acid presented good recoveries. In this way the HGAAS determination of selenium in tissue was carried out without interference whereas for the fatty fraction the results were satisfactory only if GFAAS was used. The results showed that drying the sample and extracting the fat prior to digestion is advantageous once the amount of acid necessary can be significantly reduced. The precision, expressed as relative standard deviation, was about 6.5% and 0.8% for GFAAS and HGAAS measurements, respectively. The limits of detection for HGAAS and GFAAS, based on three times the standard deviation of the blanks were 1 [μg/l] and 0.6 [μg/l], respectively. The results have shown that in chicken meat 59% of the selenium is found in the muscle tissue while the skin responds for 41%.

Keywords: Selenium status; Chicken meat; Sample digestion; Comparison HGAAS and GFAAS

Pilar Trespalacios, Reyes Pla, Synergistic action of transglutaminase and high pressure on chicken meat and egg gels in absence of phosphates, *Food Chemistry*, Volume 104, Issue 4, 2007, Pages 1718-1727, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.077.

(<http://www.sciencedirect.com/science/article/B6T6R-4NCR9FK-3/2/4ea2b07bf1161ede311d2fef292d868f>)

Abstract:

The effects of simultaneous application of microbial transglutaminase (MTGase) and high pressure (HP) (500, 700 and 900 MPa/40 [degree sign]C/30 min), only pressure under the same conditions or heat (75 [degree sign]C/30 min) were investigated on chicken batters with the addition of egg components and without phosphates. MTGase gels (700 and 900 MPa) showed marked increases in textural parameters compared to gels without enzyme (NE) or those obtained by heat. The addition of enzyme did not show differences between gels obtained at 700-900 MPa; however, gels obtained at 500 MPa were darker and more reddish than those obtained by heat. MTGase gels were more homogeneous and compact. Thermal analysis revealed that pressure levels above 700 MPa caused as much denaturing as did heat. The microstructure and texture of MTGase gels suggest that a higher amount and heterogeneity of crosslinks was produced when meat and egg proteins were treated in the presence of MTGase under specific conditions of pressure.

Keywords: Microbial transglutaminase; High pressure; Chicken meat; Egg components; Gelation

S. Yurchenko, U. Molder, The occurrence of volatile N-nitrosamines in Estonian meat products, *Food Chemistry*, Volume 100, Issue 4, 2007, Pages 1713-1721, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.10.017.

(<http://www.sciencedirect.com/science/article/B6T6R-4HPK90X-7/2/740a53e06896fec2939586ac50e45174>)

Abstract:

N-Nitrosamines (NAs) are a group of carcinogens, which have been detected in various meat products. The level of five NAs, namely N-nitrosodimethylamine, N-nitrosodiethylamine, N-nitrosodibutylamine, N-nitrosopiperidine, and N-nitrosopyrrolidine was determined in 386 various samples of meat during 2001-2005. Raw, fried, grilled, smoked, pickled, and canned meat products were analyzed. For a sample cleaning the two-step solid-phase extraction with Extrelut and Florisil sorbents was used. NAs were separated by gas chromatography and detected by positive-ion chemical ionization using ammonia as reagent gas. The HP 6890 Plus GC/HP 5973 MSD was used in the selected ion-monitoring mode with pulsed splitless injection. In this work, the limit of detection and the limit of quantitation of NA were approximately 0.09 and 0.29 [μg/kg], respectively, with about 85% recovery. NDMA was noted in above 88% of samples, NDEA in 27%,

NPYR in 90%, NPIP in 65%, and NDBA in 33% at the mean levels of 0.85, 0.36, 4.14, 0.98, and 0.37 [μ]g/kg, respectively. The level of total volatile NAs with the mean of 3.97 [μ]g/kg was calculated.

Keywords: N-Nitrosamines; Positive-ion chemical ionization; Gas chromatography; Mass spectrometry; Meat products

Ian Eustace, Jocelyn Midgley, Charles Giarrusso, Chris Laurent, Ian Jenson, John Sumner, An alternative process for cleaning knives used on meat slaughter floors, *International Journal of Food Microbiology*, Volume 113, Issue 1, 1 January 2007, Pages 23-27, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.06.034.

(<http://www.sciencedirect.com/science/article/B6T7K-4KXWJK8-2/2/223c03faf0767d1fdb0fd1fe2630bcc5>)

Abstract:

Traditionally on slaughter floors operator knives are cleaned by rinsing in hand wash water at 20-40 [$^{\circ}$ C] followed by brief immersion in baths termed 'sterilisers' which contain water no cooler than 82 [$^{\circ}$ C]. Under Australian legislation, both domestic and export, it is possible for a meat processing establishment to apply to the Controlling Authority for permission to implement an alternative procedure providing that it is at least the equivalent of that legislated. No firm evidence appears to exist for the 82 [$^{\circ}$ C] requirement and the possibility of replacing this element of the knife cleaning procedure with an alternative procedure using 60 [$^{\circ}$ C] water and a longer immersion time was investigated at an abattoir slaughtering cattle and sheep. Knives were tested at a range of work stations located along beef and mutton slaughter floors for Aerobic Plate Counts (APCs) and *E. coli*. For knives used on the beef chain the mean log APC/cm² was 2.18 by the current knife cleaning process and 1.78 by the alternate procedure ($P < 0.001$). Using the current system *E. coli* was isolated from cleaned knives on 20/230 (8.7%) occasions compared with 21/230 (9.1%) occasions using the alternative system. The mean log *E. coli* of positive knives was 0.43/cm² and 0.61/cm² from the current and alternative systems, respectively. On the mutton chain the mean log APC/cm² was 1.95 using the current knife cleaning process and 1.69 by the alternative procedure ($P = 0.014$). Using the current system *E. coli* was isolated from cleaned knives on 24/130 (18.5%) occasions compared with 29/130 (22.3%) occasions using the alternative system. The mean log *E. coli* of positive knives was 0.90/cm² and 0.76/cm² from the current and alternative systems, respectively. It is concluded that using two knives alternatively, rinsing them in hand wash water, then immersing them between uses in 60 [$^{\circ}$ C] water provides a microbiological outcome equivalent to rinsing them and momentary dipping in 82 [$^{\circ}$ C] water.

Keywords: Meat industry; Knife cleaning; Alternative procedure; Australian Standard; Equivalence; Operator safety

Arnaud Hequet, Veronique Laffitte, Laurence Simon, Daniel De Sousa-Caetano, Celine Thomas, Christophe Fremaux, Jean-Marc Berjeaud, Characterization of new bacteriocinogenic lactic acid bacteria isolated using a medium designed to simulate inhibition of *Listeria* by *Lactobacillus sakei* 2512 on meat, *International Journal of Food Microbiology*, Volume 113, Issue 1, 1 January 2007, Pages 67-74, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.07.016.

(<http://www.sciencedirect.com/science/article/B6T7K-4KYY3HH-1/2/13a03a8169b907576ae77980cc497dfc>)

Abstract:

Bacteriocinogenic bacteria have been proposed to protect food products from *Listeria* contamination as bioprotective cultures. *Lactobacillus sakei* 2512 was demonstrated to inhibit the growth of *Listeria* on sliced cooked ham by challenge test. A liquid medium simulating ham, BHI5L200, was designed in order to select bioprotective strains for meat protection. Two strains were selected, from the 201 lactic acid bacteria screened, that produced bacteriocins at pH 5.8 in

BHI5L200. The first one, *Leuconostoc pseudomesenteroides* 2733, produced a new bacteriocin which was purified and partially characterized. The second, *Lactobacillus curvatus* 2711, produced sakacin X and was shown to contain sakacin T and sakacin P structural genes. Co-culture experiments in BHI5L200 demonstrated that growth of *Listeria* was inhibited by *L. sakei* 2512 as well as by *L. curvatus* 2711.

Keywords: *Lactobacillus*; *Listeria*; Protective culture; Bacteriocins; Medium simulating ham; Co-culture experiments

Cristiana Garofalo, Carla Vignaroli, Giada Zandri, Lucia Aquilanti, Donatella Bordoni, Andrea Osimani, Francesca Clementi, Francesca Biavasco, Direct detection of antibiotic resistance genes in specimens of chicken and pork meat, *International Journal of Food Microbiology*, Volume 113, Issue 1, 1 January 2007, Pages 75-83, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.07.015.

(<http://www.sciencedirect.com/science/article/B6T7K-4M04HW4-4/2/56521db70b0db06337bf49d739e201c6>)

Abstract:

Antibiotic resistance (AR) in bacteria, a major threat to human health, has emerged in the last few decades as a consequence of the selective pressure exerted by the widespread use of antibiotics in medicine, agriculture and veterinary practice and as growth promoters in animal husbandry.

The frequency of 11 genes [*tet(M)*, *tet(O)*, *tet(K)*, *erm(A)*, *erm(B)*, *erm(C)*, *vanA*, *vanB*, *aac(6')-Ia*, *mecA*, *bla_Z*] encoding resistance to some antibiotics widely used in clinical practice was analysed in raw pork and chicken meat and in fermented sausages as well as in faecal samples from the relevant farm animals using a molecular approach based on PCR amplification of bacterial DNA directly extracted from specimens.

Some of the 11 AR genes were highly prevalent, the largest number being detected in chicken meat and pig faeces. The genes found most frequently in meat were *tet(K)* and *erm(B)*; *vanB* and *mecA* were the least represented. All 11 determinants were detected in faecal samples except *mecA*, which was found only in chicken faeces. *erm(B)* and *erm(C)* were detected in all faecal samples. The frequency of AR genes was not appreciably different in meat compared to faecal specimens of the relevant animal except for *vanB*, which was more prevalent in faeces.

Our findings suggest that AR genes are highly prevalent in food-associated bacteria and that AR contamination is likely related to breeding rather than processing techniques.

Finally, the cultivation-independent molecular method used in this work to determine the prevalence of AR genes in foods proved to be a rapid and reliable alternative to traditional tools.

Keywords: Antibiotic resistance genes; Direct DNA recovery; Nested PCR; Meat samples

Anas A. Al-Nabulsi, Richard A. Holley, Effects on *Escherichia coli* O157:H7 and meat starter cultures of bovine lactoferrin in broth and microencapsulated lactoferrin in dry sausage batters, *International Journal of Food Microbiology*, Volume 113, Issue 1, 1 January 2007, Pages 84-91, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.07.019.

(<http://www.sciencedirect.com/science/article/B6T7K-4KY88C5-5/2/d8b4a9bcb089eea137b2cf14d309ffcf>)

Abstract:

The effects of lactoferrin (LF) alone or with various chelating agents on the growth of 5 strains of *Escherichia coli* O157:H7 and 7 meat starter cultures were evaluated. *E. coli* O157:H7 and starter cultures were grown at 13 or 26 [degree sign]C in Lauria (LB) or All Purpose Tween (APT) broths, respectively, with both broths being supplemented with 2.9% NaCl. LF alone prevented the growth of *E. coli* O157:H7 strains 0627 and 0628 but other strains grew. The antimicrobial effectiveness of LF was enhanced by EDTA but LF alone did not affect the growth of meat starter cultures in broth. However, when LF plus EDTA and sodium bicarbonate (SB) were used the growth of all meat starter cultures except *Lactobacillus curvatus* was reduced. During dry sausage manufacture with *L. curvatus* and *Staphylococcus carnosus* starter cultures the effects of LF, unencapsulated or

microencapsulated in paste-like and dried powder forms, in sausage batters with or without EDTA and SB, on the viability of *E. coli* O157:H7 were examined. The reduction of *E. coli* O157:H7 during sausage manufacture was significantly enhanced ($p < 0.05$) by all LF treatments. The largest reduction (4.2 log units) was obtained with unencapsulated LF. However, some of the apparent reduction in *E. coli* O157:H7 numbers with all treatments was due to cell injury rather than lethality, since significantly greater numbers were recovered on APT agar overlaid with the selective medium cefixime-tellurite Sorbitol McConkey agar (ct-SMAC) than on ct-SMAC alone. The narrow spectrum of LF activity and induction of injury rather than inactivation of *E. coli* O157:H7 limit the effectiveness of this agent against the pathogen in fermented meats.

Keywords: Dry fermented sausages; *E. coli* O157:H7; Lactoferrin; Microencapsulation

Francisco Javier Trujillo, Chaiyan Wiangkaew, Q. Tuan Pham, Drying modeling and water diffusivity in beef meat, *Journal of Food Engineering*, Volume 78, Issue 1, January 2007, Pages 74-85, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.09.010.

(<http://www.sciencedirect.com/science/article/B6T8J-4HGD70H-6/2/8c6848b0fbc46ebdc868c2fa42c9c854>)

Abstract:

The diffusivity of water in meat perpendicular to the fibres was experimentally determined in the range 6.6-40.4 [degree sign]C using a drying technique. Three different mathematical methods were used to determine the diffusivity from the drying data. The first assumes constant diffusivity, volume and temperature and zero surface resistance to mass transfer. The second assumes a convective boundary condition. The third also takes into account the shrinkage of the sample during drying. Important differences in the calculated diffusivity were found using these three different methods. The model that takes shrinkage into account fits the experimental data better than the other models because it is a better representation of the actual process; the average shrinkage of the meat during drying was 70.3%. The calculated diffusivity was fitted to an Arrhenius type equation to express its dependence with temperature. The correlation coefficient obtained is 0.9888 indicating a good fit.

Keywords: Meat; Water diffusivity; Shrinkage; Drying

E. Zukal, L. Kormendy, On calculation of 'meat content' according to the quantitative ingredient declarations (QUID), *Journal of Food Engineering*, Volume 78, Issue 2, January 2007, Pages 614-621, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.10.033.

(<http://www.sciencedirect.com/science/article/B6T8J-4J0XRXM-4/2/53e8ba1447b842dcc8afa88d98fb4bc8>)

Abstract:

The respective EU directive introduces, in accordance with the quantitative ingredient declaration (QUID), a new definition of 'meat' for the purpose of labelling of products. In addition, it involves maximum numerical limits for fat content and connective tissue protein-total protein ratio depending on the species of meat. The present paper discusses the new concept of meat equivalent, indicated as QUID1, which, contrary to the definition of 'meat content' (QUID1r) in the respective regulation, may exceed 100%, indicating high quality meats with lower fat and connective tissue content than the maximum limits. Moreover, the meat equivalent (QUID1) is also an intermediary step in the QUID calculations. Results are also compared with the existing calculation methods published in the literature. A possible introduction of the unequivocal meat equivalent concept (QUID1) in practice is also discussed in this paper.

The presented QUID calculation method postulates the equality of the fat free, 'pure' muscular and connective tissue protein content. As might be expected, the fat-free nitrogen contents published in the scientific literature show appreciable differences in this respect, however, owing to the unstable nitrogen-protein conversion factors for connective tissue proteins, the definition of 'protein content' is contestable.

The QUID declaration requires chemical compositional data (fat, connective tissue protein and total protein content) as accurate as possible. The steady analytical control of each raw material is in the majority of cases practically unrealizable. So, the standardization of raw materials has an outstanding importance here.

Keywords: Meat content; Meat proteins; Connective tissue proteins; Quantitative ingredient declarations (QUID)

D.Q. Xu, M. Liu, Y.Z. Xiong, C.Y. Deng, S.W. Jiang, J.L. Li, B. Zuo, M.G. Lei, F.E. Li, R. Zheng, Identification of polymorphisms and association analysis with meat quality traits in the porcine KIAA1717 and HUMMLC2B genes, *Livestock Science*, Volume 106, Issue 1, January 2007, Pages 96-101, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.07.005.

(<http://www.sciencedirect.com/science/article/B7XNX-4KPFM00-2/2/8e19ee7df5ec597d4e4a6447c90a9c9c>)

Abstract:

Skeletal muscle genes are potential candidates for production and meat quality. Screening a subtracted cDNA library constructed with mRNA obtained from longissimus dorsi muscles of F1 hybrids Landrace x Yorkshire and their female parents Yorkshire, we isolated two partial sequences coding for the H3-K4-specific methyltransferase (KIAA1717) and skeletal muscle myosin regulatory light chain (HUMMLC2B) genes. Database search revealed KIAA1717 and HUMMLC2B encoded proteins with SET domain and EF-hand calcium binding motif, respectively. In the present work we identified their partial polymorphisms and two SNPs, one (C1354T) at the 3' untranslated region (UTR) of KIAA1717 and one (A345G) at the SINE (PRE-1) element of HUMMLC2B, both created/disrupted a restriction site for endonuclease Msp I. The selected pigs were genotyped at the KIAA1717 C1354T and HUMMLC2B A345G sites by means of a PCR-RFLP protocol. Significant associations were observed for the KIAA1717 C1354T polymorphic site with meat marbling (longissimus doris ($p < 0.05$), biceps femoris ($p < 0.01$)) and intramuscular fat ($p < 0.01$). HUMMLC2B A345G were significantly associated with meat pH (longissimus doris ($p < 0.05$), biceps femoris ($p < 0.01$)), drip loss ($p < 0.01$), water holding capacity ($p < 0.01$) and meat color value (longissimus doris ($p < 0.01$), biceps femoris ($p < 0.05$)). Further studies are needed to confirm these preliminary results.

Keywords: H3-K4-specific methyltransferase; Myosin regulatory light chain 2; Pigs; Polymorphism; Meat quality traits

C. Rehfeldt, I. Adamovic, G. Kuhn, Effects of dietary daidzein supplementation of pregnant sows on carcass and meat quality and skeletal muscle cellularity of the progeny, *Meat Science*, Volume 75, Issue 1, January 2007, Pages 103-111, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4KPPCKB-3/2/5a5185cd31ad86f0f56d1fa0ea04039d>)

Abstract:

The effects of dietary daidzein during late gestation on maternal performance, neonatal body composition, carcass and meat quality at market weight, and skeletal muscle cellularity were studied. Multiparous sows received a soybean-free diet ($n = 8$, control) or the same diet supplemented with 1 mg daidzein/kg body weight ($n = 7$) daily from d 85 of gestation to parturition. Litter size, litter weight, and birth weight remained unaffected by daidzein feeding. In newborn piglets from litters >15 , the proportions of muscle tissue and skin tended to be decreased ($P = 0.09$) or increased ($P = 0.03$), respectively, after gestational daidzein feeding. The body fat percentage was higher in response to maternal daidzein ($P = 0.04$). Postnatal growth and carcass composition at 180 d of age were not affected, however, maternal daidzein supplementation led to increases in longissimus muscle pH₄₅ ($P = 0.02$) and pH_{end} ($P = 0.11$) in pigs from large litters. The proportion of fast-twitch glycolytic fibres in semitendinosus muscle was increased ($P = 0.06$).

by maternal daidzein feeding. The results suggest that supplemental daidzein in the maternal diet during late gestation marginally affects meat quality and skeletal muscle cellularity of the progeny. Keywords: Isoflavone; Pig; Sow feeding; Carcass quality; Meat quality; Muscle fibre

C.A. Stahl, M.S. Carlson-Shannon, B.R. Wiegand, D.L. Meyer, T.B. Schmidt, E.P. Berg, The influence of creatine and a high glycemic carbohydrate on the growth performance and meat quality of market hogs fed ractopamine hydrochloride, *Meat Science*, Volume 75, Issue 1, January 2007, Pages 143-149, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.023. (<http://www.sciencedirect.com/science/article/B6T9G-4KPX926-1/2/4452ec7c5037e321b53db2f7dd70fb2a>)

Abstract:

Crossbred barrows (n = 128; 85 +/- 0.91 kg) were randomly allotted to one of four dietary treatments. A pelleted corn-soybean diet containing 5 ppm Paylean(R) (PAY) was tested against a negative control (NCON) diet formulated to meet or exceed the National Research Council's requirements for the growing pig, a pelleted corn-soybean diet containing 0.92% creatine and 2.75% dextrose (COMBO), and a pelleted corn-soybean diet containing a combination of 5 ppm Paylean(R), 0.92% creatine, and 2.75% dextrose (PAYPLUS). No treatment differences were noted when comparing ADG (P = 0.66) and hot carcass weight (P = 0.75). Over the 27 d test, barrows fed PAY and PAYPLUS produced loins with a larger (P < 0.01) loin muscle area (LMA) than those fed NCON or COMBO diets. Barrows fed the NCON diet were fatter at the 10th-rib (P < 0.01) than those animals fed the remaining dietary treatments. Dietary treatment did not affect the ultimate pH (P = 0.87), Japanese color score (P = 0.25) or Minolta L* (P = 0.61) and b* (P = 0.56) values of the loin. Loin chops from NCON, COMBO and PAYPLUS tended (P = 0.07) to contain a higher intramuscular fat content than those from barrows fed PAY. Additionally, loin chops from the NCON and COMBO fed animals were more red (higher a*-value) than those chops coming from animals fed the PAY diet (P < 0.01).

Keywords: Paylean; Creatine; Pork; Pork quality

N.C. Tipton, D.A. King, J.C. Paschal, D.S. Hale, J.W. Savell, Effects of oral vitamin D3 supplementation and supplement withdrawal on the accumulation of magnesium, calcium, and vitamin D in the serum, liver, and muscle tissue and subsequent carcass and meat quality of *Bos indicus* influenced cattle, *Meat Science*, Volume 75, Issue 1, January 2007, Pages 150-158, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.024. (<http://www.sciencedirect.com/science/article/B6T9G-4KV3Y4X-1/2/e52e9344a912b3e3768173a21bb6d66f>)

Abstract:

Bos indicus crossbred cattle (n = 79) were fed vitamin D3 (0 or 3 million IU/hd/d) for 5 d. Afterwards, half of each group was slaughtered immediately, while half was fed, without supplementation, for 7 d before processing. Serum calcium concentration was increased (P < 0.05) in cattle after supplement removal, but not immediately following supplementation. This also was observed in the *M. longissimus lumborum* and *M. triceps brachii*, but not in the *M. semitendinosus*. Liver biopsy vitamin D3 concentrations were higher (P < 0.05) in supplemented cattle immediately following supplementation, but were not different from controls after supplement removal. Vitamin D3 did not affect tenderness at supplement removal day 0, but increased the tenderness of the *M. longissimus lumborum* and *M. semitendinosus* at supplement removal day 7. Vitamin D3 supplementation improves muscle tenderness and may be more effective when supplementation is ceased 7 d before slaughter, with minimum food safety concerns.

Keywords: Beef; *Bos indicus*; Carcass quality; Meat quality; Tenderness; Vitamin D3

N.M. Werdi Pratiwi, P.J. Murray, D.G. Taylor, Feral goats in Australia: A study on the quality and nutritive value of their meat, *Meat Science*, Volume 75, Issue 1, January 2007, Pages 168-177, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4KSSWJM-3/2/2f038048a3cb3091ab4592d4a80a6912>)

Abstract:

The purpose of this study was to determine the quality of fresh and cooked meat, and the nutritive value of this meat from 62 male Australian feral goats. The goats were slaughtered at 5, 10, 20, 30, 40, 50, 60 and 70 kg liveweights. Half of the goats were castrated and half were left as intact animals. The quality profiles of meat (e.g. pH, colour, pigment concentrations, cooking loss, shear force value and eating quality of cooked meat) from both castrated and intact feral goats started to decrease when animals were slaughtered at heavier liveweights (e.g. above 40 kg). The nutritive value of the meat (chemical compositions, fatty acids and total cholesterol concentrations) changed when animals were castrated and had heavier slaughter weights. Overall, we recommend that 40 kg liveweight is the heaviest slaughter weight, since the quality characteristics of meat will be lower when feral goats were slaughtered above 40 kg liveweight.

Keywords: Feral goat; Castration; Slaughter weight; Meat quality; Nutritive value

Katarzyna Waszkowiak, Włodzimierz Dolata, The application of collagen preparations as carriers of rosemary extract in the production of processed meat, *Meat Science*, Volume 75, Issue 1, January 2007, Pages 178-183, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4M41H53-2/2/9b091b2a02323c45385be6331355f86e>)

Abstract:

The application of collagen preparations as carriers of rosemary extract in the production of wiener-type and liver sausages has been evaluated. The rosemary extract was introduced into the meat products using one of two carriers (collagen hydrolyzate or collagen fibre preparation) or directly (i.e. using no carriers). The relationship between the methods of extract introduction and its antioxidative action was assessed on the basis of the lipid oxidation (i.e. determination of peroxide value and TBARS) during cold storage of sausages in air or in vacuum. The introduction of rosemary extract to the products via the collagen fibre preparation limited lipid oxidation greater than the direct addition of the antioxidant to both meat products, irrespective of storage. On the contrary, in the case of the application of collagen hydrolyzate as a carrier of extract, a masking effect was observed, diminishing the antioxidative impact on the tested products.

Keywords: Collagen; Food additives carrier; Rosemary extract; Lipid oxidation; Meat products

A.I.A. Costa, E. Teldeschi, M.A. Gerritzen, H.G.M. Reimert, J.P.H. Linssen, J.W. Cone, Influence of flock treatment with the antibiotic tylosin on poultry meat quality: results of a preliminary experiment, *NJAS - Wageningen Journal of Life Sciences*, Volume 54, Issue 3, 2007, Pages 269-278, ISSN 1573-5214, DOI: 10.1016/S1573-5214(07)80019-4.

(<http://www.sciencedirect.com/science/article/B94T2-4WFBS6B-3/2/d247033204b588de7bb5eab3b9541917>)

Abstract:

The veterinary antibiotic tylosin was administered to broilers at sub-therapeutic and therapeutic levels to study its effect on the quality of poultry breast meat. No statistically significant differences were observed in moisture content, pH, drip loss, colour and extent of lipid oxidation between the breast meat from treated and not treated birds. However, the cooking loss of the meat from the birds administered tylosin was significantly higher than that from the not treated ones. Additionally, the mean shear force of the breast meat was significantly lower for the sub-therapeutically treated broilers than for the not treated and the therapeutically treated ones. It was concluded that the

level at which tylosin was administered to the broilers affected the quality of the breast meat, particularly its textural properties.

Keywords: breast muscle; colour; cooking loss; drip loss; lipid oxidation; moisture content; shear force; tenderness

Makiko Yamaguchi, Yoshihiko Ito, Seiya Takahashi, Fourteen-week feeding test of meat and milk derived from cloned cattle in the rat, *Theriogenology*, Volume 67, Issue 1, IETS 2007 Pre-Conference Symposia, IETS 2007, 1 January 2007, Pages 152-165, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.09.010.

(<http://www.sciencedirect.com/science/article/B6TCM-4M3BC28-2/2/203a441cd2640a6b4038322da65dd5e7>)

Abstract:

Agricultural application of cloned livestock produced by nuclear transfer requires public and governmental understanding of food-safety issues. To determine whether physiological effects occurred in animals fed products derived from cloned cattle, we conducted long-term (14 week) trials feeding Crj:CD(SD)IGS rats meat and milk from cloned cattle. Diets containing meat and milk were equal in nutritional value to the basal diet (AIN93G). Urinalysis was performed at Weeks 4, 8 and 12; at the end of the feeding period, blood sampling and autopsies were conducted. During the feeding periods, there were no significant differences in general condition, death loss, growth, battery of functional observational tests and estrous cycles among groups given diets containing meat and milk powder from non-clone, embryonic clone and somatic clone cattle. Furthermore, no significant changes attributed to consumption of clone meat or milk were detected in urinalysis, hematological and blood chemical, gross pathological or histological examinations. Therefore, we concluded that the physiologic conditions of the rats were not affected by consumption of meat and milk from bovine clones.

Keywords: Food safety; Toxicology; Pathology; Animal cloning; Risk assessment

S.C. Walker, R.K. Christenson, R.P. Ruiz, D.E. Reeves, S.L. Pratt, F. Arenivas, N.E. Williams, B.L. Bruner, I.A. Polejaeva, Comparison of meat composition from offspring of cloned and conventionally produced boars, *Theriogenology*, Volume 67, Issue 1, IETS 2007 Pre-Conference Symposia, IETS 2007, 1 January 2007, Pages 178-184, ISSN 0093-691X, DOI: 10.1016/j.theriogenology.2006.09.025.

(<http://www.sciencedirect.com/science/article/B6TCM-4MBT1MH-2/2/479c5ab0bf8f9a8f5ca70f20994d12d5>)

Abstract:

This study compares the meat composition of the offspring from boars produced by somatic cell nuclear transfer (n = 4) to that of the offspring from conventionally produced boars (n = 3). In total, 89 commercial gilts were artificially inseminated and 61 progressed to term and farrowed. All of the resulting piglets were housed and raised identically under standard commercial settings and slaughtered upon reaching market weight. Loin samples were taken from each slaughtered animal and shipped offsite for meat composition analysis. In total, loin samples from 404 animals (242 from offspring of clones and 162 from controls) were analyzed for 58 different parameters generating 14,036 and 9396 data points from offspring of clones and the controls, respectively. Values for controls were used to establish a range for each parameter. Ten percent was then added to the maximum and subtracted from the minimum of the control range, and all results within this range were considered clinically irrelevant. Of the 14,036 data points from the offspring of clones, only three points were found outside the clinically irrelevant range, two of which were within the range established by the USDA National Nutrient Database for Standard Reference, Release 18, 2005; website: <http://www.nal.usda.gov/fnic/foodcomp/search/>. The only outlier was the presence of Eicosadienoic acid (C20:2) in one sample which is typically present in minute quantities in pork; no reference data were found regarding this fatty acid in the USDA National

Nutrient Database. In conclusion, these data indicated that meat from the offspring of clones was not chemically different than meat from controls and therefore supported the case for the safety of meat from the offspring of clones.

Keywords: Pigs; Cloning; Meat composition; Cloned offspring; Food safety

Skip Seward, Sanitary design of ready-to-eat meat and poultry processing equipment and facilities, Trends in Food Science & Technology, Volume 18, Supplement 1, January 2007, Pages S108-S111, ISSN 0924-2244, DOI: 10.1016/j.tifs.2006.10.008.

(<http://www.sciencedirect.com/science/article/B6VHY-4MJJC3C-2/2/c619a4279b13730f29ab60a811701f55>)

C. Kroger, C.M. Bartle, J.G. West, R.W. Purchas, C.E. Devine, Meat tenderness evaluation using dual energy X-ray absorptiometry (DEXA), Computers and Electronics in Agriculture, Volume 54, Issue 2, December 2006, Pages 93-100, ISSN 0168-1699, DOI: 10.1016/j.compag.2006.09.002.

(<http://www.sciencedirect.com/science/article/B6T5M-4M69J9F-1/2/f0b88d4b9965583d8b70097868089d38>)

Abstract:

Previous investigations indicated that a correlation exists between the preprocessed dual energy X-ray images of an airport security scanner and subjective tenderness in meat samples [PCT International Patent Application No. PCT/NZ01/00108, 2001. A method for the non-invasive measurement of properties of meat. Filed 11 June 2001]. We performed studies to confirm the patented claims and to pin-point the correlation factors based on unprocessed X-ray images. In two separate trials the peak shear force was determined on cooked samples as a measure of objective tenderness, and DEXA images scanned. The results of Trial 1 suggest that DEXA scans of whole steaks are suitable for tenderness estimation, as a coefficient of determination of $R^2 = 0.69$ was calculated for a multiple non-linear regression. These results need to be considered in light of high within-steak coefficients of variation (mean = 16% and max = 27%). An additional, though weak correlation ($R^2 = 0.26$), was found between a single DEXA parameter correlated to composition and mechanical tenderness. Apparently small sample size and scanning of cooked and frozen meat samples rather than raw steaks were at least partially responsible for the inconclusive results of the second trial, where no correlation could be found exceeding $R^2 = 0.12$. More research is encouraged using state-of-the-art scanning techniques and optimized experimental design.

Keywords: Tenderness; DEXA; Warner-Bratzler; Shear force; Imaging

M.L. Gonzalez-Miret, M.L. Escudero-Gilete, F.J. Heredia, The establishment of critical control points at the washing and air chilling stages in poultry meat production using multivariate statistics, Food Control, Volume 17, Issue 12, December 2006, Pages 935-941, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.06.012.

(<http://www.sciencedirect.com/science/article/B6T6S-4H2FXWW-1/2/8d19f853d0de852059eeca22ef7f123>)

Abstract:

The selection of control points is one of the most important steps in the design of a Hazard Analysis and Critical Control Points (HACCP) system. Total Count, Pseudomonas and Enterobacteriaceae are microorganisms frequently analyzed on carcasses in slaughterhouses. Its usefulness can be assessed by means of univariate and multivariate statistical methods. In this study, the use of these microbiological parameters for verification of the effect of the stages of washing with pressurized water and air chilling has been evaluated. It makes clear that multivariate statistics appears as a valuable tool to check which points and stages of the process must be controlled, demonstrating that the washing stage produces significant decreases in contamination (so it must be considered a CCP). The air chilling stage maintains the decrease in

the contamination as the carcasses come out of the washing process. This is due to the control of temperature under adequate limits. The chiller air temperature would be considered a CCP in a HACCP system.

Keywords: HACCP; Poultry meat; Statistical process control

F. Russo, D. Ercolini, G. Mauriello, F. Villani, Behaviour of *Brochothrix thermosphacta* in presence of other meat spoilage microbial groups, *Food Microbiology*, Volume 23, Issue 8, December 2006, Pages 797-802, ISSN 0740-0020, DOI: 10.1016/j.fm.2006.02.004.

(<http://www.sciencedirect.com/science/article/B6WFP-4JS1MVM-1/2/2b96f77fdd053bcf87211e33a8b9fcb0>)

Abstract:

The microbial flora of fresh meat stored aerobically at 5 [degree sign]C up to spoilage was enumerated and collected in order to have mixed spoilage bacterial groups to be used in competition tests against *Brochothrix thermosphacta*. The bacterial groups collected as bulk colonies were identified by PCR-DGGE followed by partial 16S rDNA sequencing. The predominant bacteria associated with the spoilage of the refrigerated beef were *B. thermosphacta*, *Pseudomonas* spp, Enterobacteriaceae and lactic acid bacteria (LAB). The interactions between *B. thermosphacta* and the other spoilage microbial groups were studied in vitro at 5 [degree sign]C. The results showed that a decrease of the growth of *B. thermosphacta* was evidenced in presence of LAB at 5 [degree sign]C while the bacterium is the dominant organism when inoculated with mixtures of *Pseudomonas* spp., LAB and Enterobacteriaceae. A better understanding of bacterial meat spoilage interactions may lead to improved quality of fresh meat stored in refrigerated conditions.

Keywords: *B. thermosphacta*; Meat spoilage; Bacterial interaction

Xueyan Tang, Denis A. Cronin, Nigel P. Brunton, A simplified approach to the determination of thiamine and riboflavin in meats using reverse phase HPLC, *Journal of Food Composition and Analysis*, Volume 19, Issue 8, December 2006, Pages 831-837, ISSN 0889-1575, DOI: 10.1016/j.jfca.2005.12.013.

(<http://www.sciencedirect.com/science/article/B6WJH-4JTR91Y-2/2/f2f3c04056866f182d9c5cf3418eb057>)

Abstract:

A simplified procedure for the determination of thiamine and riboflavin contents in meat products is proposed. The vitamins were extracted from the meats by digestion with 0.1 M hydrochloric acid followed by an enzymatic hydrolysis step in which phosphorylated forms of both vitamins were hydrolysed using an acid phosphatase enzyme of defined activity (0.5 U/mg) derived from wheat germ. Riboflavin in the filtered hydrolysates was determined directly by high performance liquid chromatography (HPLC) on a reverse phase (C18) column using a methanol:water (40:60) mobile phase and a fluorescence detector (excitation wavelength, 450 nm; emission wavelength, 510 nm). After conversion to thiochrome and partitioning into isobutanol, thiamine was determined on the same column by fluorescence (excitation wavelength, 366 nm; emission wavelength, 434 nm) using 80:20 methanol:water as the eluent. Measured levels of both vitamins were found to be very close to certified values provided with a lyophilized reference liver sample, while the contents determined for a range of meats were also in good agreement with published values.

Keywords: Meats; Thiamine; Riboflavin; Acid phosphatase; HPLC

Da-Wen Sun, Lijun Wang, Development of a mathematical model for vacuum cooling of cooked meats, *Journal of Food Engineering*, Volume 77, Issue 3, Special Section: CHISA 2004 (pp. 379-471), December 2006, Pages 379-385, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.07.002.

(<http://www.sciencedirect.com/science/article/B6T8J-4GY86TH-4/2/8c57bd3ca40e3b1503b6939ae82fc971>)

Abstract:

In the production of cooked meats, rapid cooling is required to cool the meats immediately after the cooking process is finished in order to minimise the growth of surviving organisms. Traditional air blast, water immersion or slow air cooling cannot achieve the required rapid cooling effect for large cooked meats. Vacuum cooling has shown its high cooling efficiency for cooked meats. In this study, vacuum cooling is used to cool large block joints of cooked meats, which have abundant of water and porosity. A mathematical model of simultaneous transient heat and mass transfer with inner heat and mass generation is developed for analysing the performance of vacuum cooling cooked meats. The variable physical properties of cooked meats during cooling process were incorporated into the model. The predictions from the model are compared with the experimental results with good agreement.

Keywords: Vacuum cooling; Cooked meat; Mathematical modelling; Heat transfer; Mass transfer; Weight loss; Refrigeration; Chilling

Anna Fritzon, Thore Berntsson, Energy efficiency in the slaughter and meat processing industry--opportunities for improvements in future energy markets, *Journal of Food Engineering*, Volume 77, Issue 4, December 2006, Pages 792-802, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.08.005. (<http://www.sciencedirect.com/science/article/B6T8J-4H5DY32-3/2/ec8636a03f1b276f008fd6fbd42b3987>)

Abstract:

In the study presented in this paper different energy efficiency measures that can be carried out in a slaughter and meat processing (SMP) plant were evaluated both in terms of economy and CO₂ emission reduction for four different future energy market developments. It was found that it is economically interesting to invest in an increased heat exchanger network or heat pumps in the fictitious non-integrated plants studied and that between 5% and 35% of the total CO₂ emissions can be saved. The most cost effective way of reducing CO₂ emissions was found to be switching fuel from heavy fuel oil to natural gas or wood chips. For the studied plants that are already heat integrated it was shown that investing in a new heat pump can be economically interesting and can reduce CO₂ emissions.

The profitability of investing in a combined heat and power (CHP) unit for the SMP plants was also investigated and found to be smaller than extended heat recovery or new heat pumps in the studied plants. However, the payback period for CHP units installed at an ecocyclic industrial park, consisting of an SMP plant and for example a Swedish dairy, was found to be short enough to be interesting.

Keywords: Energy efficiency; Combined heat and power; Heat pumps; Heat recovery; Slaughter and meat processing

Maria Elena Sosa-Morales, Ronald Orzuna-Espiritu, Jorge F. Velez-Ruiz, Mass, thermal and quality aspects of deep-fat frying of pork meat, *Journal of Food Engineering*, Volume 77, Issue 3, Special Section: CHISA 2004 (pp. 379-471), December 2006, Pages 731-738, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.07.033.

(<http://www.sciencedirect.com/science/article/B6T8J-4H80SR0-2/2/4646ca8508059fee8ed7c2f09fd96d15>)

Abstract:

Simultaneous heat and mass transfer and evolution of the physical properties of pork meat during deep-fat frying were studied. Frying was conducted at 90, 100 and 110 [degree sign]C in sunflower oil and, only at 100 [degree sign]C in shortening, just for comparison purpose. The moisture diffusivity coefficient exhibited values between 1.5 and 30.2 x 10⁻⁹ m²/s, whereas the convective heat transfer coefficient ranged from 187.7 to 226.1 W/m² [degree sign]C. Both transport phenomena were dependent of the frying temperature and there was not an effect of the nature of frying medium on the transport properties ([alpha] = 0.05). Thermal diffusivity remained practically

constant through the process; in contrast, the specific heat and thermal conductivity decreased with the increasing of frying time, due to moisture loss in the meat plates. Density, crust color and texture were affected by the frying temperature and frying medium type.

Keywords: Frying; Pork meat; Heat and mass transfer; Physical properties

Raija Lantto, Paula Plathin, Markku Niemisto, Johanna Buchert, Karin Autio, Effects of transglutaminase, tyrosinase and freeze-dried apple pomace powder on gel forming and structure of pork meat, LWT - Food Science and Technology, Volume 39, Issue 10, December 2006, Pages 1117-1124, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.07.008.

(<http://www.sciencedirect.com/science/article/B6WMV-4H27CG0-1/2/0f47c5a50be7e459f8c38f5d3226bc92>)

Abstract:

Effects of microbial transglutaminase (mTG), mushroom tyrosinase and an apple powder containing transglutaminase (TG) and polyphenol oxidase (PPO) on the structure of industrial pork meat homogenate were studied. Apple powder and mTG both increased the value of storage modulus (G'). Mushroom tyrosinase was not able to affect gel forming with the used dosages and treatment conditions. All the enzymes studied were able to improve gel hardness of unheated meat homogenate at 4 [degree sign]C to a certain extent. In gel hardness measurements added cysteine affected positively on the apple powder--treated pork meat and negatively on mTG--and tyrosinase-treated meat. Surprisingly cysteine addition nullified also the action of mTG. Hence powdered apple pulp, a recovered co-product of an industrial process, may contain suitable enzyme activities for food protein stabilization.

Keywords: Transglutaminase; Tyrosinase; Polyphenol oxidase; Pork meat; Texture; Co-product

V. Thenard, R. Dumont, M. Grosse, J.M. Trommenschlager, J.L. Fiorelli, M. Roux, Grass steer production system to improve carcass and meat quality, Livestock Science, Volume 105, Issues 1-3, December 2006, Pages 185-197, ISSN 1871-1413, DOI: 10.1016/j.livsci.2006.06.008.

(<http://www.sciencedirect.com/science/article/B7XNX-4KNKH5B-1/2/3e47821c6a8dce3cda8f98e737568d8b>)

Abstract:

Three different production systems for autumn born dairy steers, managed more or less intensively, have been investigated. The aim of the production systems were to use a basic diet of grass, either grazed or conserved as silage or hay, combined in various proportions. The animals were slaughtered, aiming for the same degree of fattening, but at three ages. The intensive management aimed at slaughter in January-February at 26-28 months of age after indoor finishing with silage or hay. An 'intensive out-of-season' management wished improve at slaughter at 28-30 months of age. Finally an extensive management with finishing at grazing resulted in slaughter in May-June at 30-33 months of age.

In three successive factorial experiments, 106 steers of two genotypes, Holstein and Montbeliard were reared to test the effects of the three production systems. The animals were evaluated for productive traits, carcass quality and biochemical characteristics of *m. longissimus thoracis* and *m. rhomboideus thoracis*.

For both breeds, the 'extensive' animals produced heavier carcasses (+ 20 kg between 'intensive' and 'extensive'; $P < 0.002$). The carcass conformation evaluated by the EUROP classification did not differ between the production systems. The estimated percentage of adipose tissue of the carcass was significantly lower for the 'extensive' steers ($P < 0.05$). The shear force measured on raw meat was not significantly affected by the production system, but after cooking, the shear force was higher for the extensive management as was the total collagen content. The haeminic iron content was always lowest in the intensive management. The results of these three series of experiments show that it is possible to produce steers with a feeding regime consisting mainly of grass (from 87% to 94% of the dry matter intake) grazed or harvested as hay or silage. To make

the best use of the herbage resources of the farm and to limit the purchase of concentrates, the production of autumn born steers slaughtered at 32 months seems to be an attractive production system for dairy farmers.

Keywords: Beef production; Grass steer production; Feeding system; Livestock farming management; Carcass quality; Meat quality

L.L. Hansen, C. Claudi-Magnussen, S.K. Jensen, H.J. Andersen, Effect of organic pig production systems on performance and meat quality, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 605-615, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4KNKH1D-1/2/a26fe818f30589b33b23049b2969387a>)

Abstract:

The present study was carried out to establish knowledge of consequence for setting up guidelines of importance for production of competitive organic pork of high quality. Performance and meat quality characteristics were compared between three organic pig production systems based on indoor housing with access to an outdoor area and a Danish conventional indoor system including 100% concentrate during the finishing feeding stage.

The three organic systems used the following three feeding regimes: 100% organic concentrate according to Danish recommendations, 70% organic concentrate (restricted) plus ad libitum organic barley/pea silage and 70% organic concentrate (restricted) plus ad libitum organic clover grass silage, respectively.

With exception of a slightly lower daily gain in organic pigs fed 100% concentrate, no significant difference was found in performance and meat quality characteristics compared with results obtained in the conventional system. In contrast and independent of roughage used, organic pigs raised on 70% concentrate had a significant reduction in daily gain ($P < 0.001$) compared with pigs raised on 100% concentrate, despite the fact that no difference in feed conversion rate was seen between the tested production systems. However, the percentage of leanness increased significantly in meat from organic pigs raised on 70% concentrate plus roughage compared with meat from pigs given 100% concentrate. This was reflected in higher yield (weight) of lean cuts and lower yield of cuts with high fat content from pigs fed 70% concentrate plus roughage. In general, organic feeding resulted in a significantly higher content of polyunsaturated fatty acids in the back fat (1.8%), which increased further when restricted feeding plus roughage (4%) was used. Restricted concentrate feeding gave rise to a decrease in tenderness compared with pork from pigs fed 100% concentrate.

Keywords: Organic; Pig; Production systems; Performance; Pork; Quality; Yield

Stine Hansen, Margrethe Therkildsen, Derek V. Byrne, Effects of a compensatory growth strategy on sensory and physical properties of meat from young bulls, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 628-643, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4KCRSNR-2/2/98ff72f2206c181bdd48a266b72150e9>)

Abstract:

The objective of the present study was to investigate the sensory properties, with special emphasis on tenderness, of meat from strategically fed young bulls (13 months of age) slaughtered when a plateau in protein turnover was observed. Twelve Holstein Friesian young bulls were divided into two feeding strategies. One group of young bulls ($n = 6$) were fed ad libitum throughout the rearing period (AD) whereas the second group ($n = 6$) was subjected to a compensatory growth feeding strategy (CO). Sensory profiling of beef longissimus dorsi (LD), semimembranosus (SM) and supraspinatus (SS) was performed in addition to physical measurements (shear force) and content of intramuscular fat of LD. The data was analysed using a regression-based multivariate data analytical strategy. In relation to predictivity of the various

shear force measurement constituents for sensory texture, it was determined that a number of the responses collected (e.g. maxmm), in addition to the commonly used max(N) may be utilised to predict subtlety in the sensory texture differences of the samples (e.g. Crumbliness) with respect to compensatory feeding. Through profiling LD and SS were found to have enhanced texture and flavour properties when the young bulls were fed ad libitum during rearing. However, the SM samples were found to improve in characteristics regarding texture and appearance when the young bulls had been fed compensatorily. Thus, compensatory feeding as a texture improvement strategy proved to be highly dependant on muscle type. Of note, LD and SS were found to develop an off-flavour designated as 'steer taint' when derived from compensatory feeding. This was postulated as potentially not a problem for the consumer, in LD as the level was not significant, and in SS due to sensory masking when commonly prepared as a stew or casserole. Considering the different preparation methods used for meat from LD, SM and SS, compensatory feeding may be considered to have improved the texture and elevated the eating quality where it was most relevant, namely in SM roasts.

Keywords: Sensory tenderness; Compensatory growth; Ad libitum feeding; Young bulls; Longissimus dorsi; Semimembranosus; Supraspinatus

Sadettin Turhan, Aluminium contents in baked meats wrapped in aluminium foil, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 644-647, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4KCRSNR-3/2/9255520c912dbb29d464a6533b6a5a88>)

Abstract:

In this investigation, the effect of cooking treatments (60 min at 150 [degree sign]C, 40 min at 200 [degree sign]C, and 20 min at 250 [degree sign]C) on aluminium contents of meats (beef, water buffalo, mutton, chicken and turkey) baked in aluminium foil were evaluated. Cooking increased the aluminium concentration of both the white and red meats. The increase was 89-378% in red meats and 76-215% in poultry. The least increase (76-115%) was observed in the samples baked for 60 min at 150 [degree sign]C, while the highest increase (153-378%) was in samples baked for 20 min at 250 [degree sign]C. It was determined that the fat content of meat in addition to the cooking process affected the migration of aluminium ($r^2 = 0.83$; $P < 0.01$). It was also found that raw chicken and turkey breast meat contained higher amounts of aluminium than the raw chicken and turkey leg meat, respectively. Regarding the suggested provisional tolerable daily intake of 1 mg Al/kg body weight per day of the FAO/WHO Expert Committee on Food Additives, there are no evident risks to the health of the consumer from using aluminium foil to cook meats. However, eating meals prepared in aluminium foil may carry a risk to the health by adding to other aluminium sources.

Keywords: Aluminium; Cooking; Meat; Aluminium foil

J.K. Galbraith, G. Hauer, L. Helbig, Z. Wang, M.J. Marchello, L.A. Goonewardene, Nutrient profiles in retail cuts of bison meat, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 648-654, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4KBVX24-1/2/c99e79f6f43bc191fbbc971ee659e932>)

Abstract:

The objectives were to determine the nutrient composition and variation in eight cuts of bison meat in bulls and heifers and identify nutrient relationships in the clod and sirloin by principal component analysis. The nutrients analyzed were: energy, protein, total fat, saturated fat, monounsaturated fat, polyunsaturated fat, transfat, cholesterol, vitamin A, Ca, Fe, Na and moisture. Differences were observed in fat components between cuts and bulls had higher ($P < 0.05$) amounts of total, saturated, monounsaturated and polyunsaturated fat in the blade compared to the other cuts. The

sirloins had less ($P < 0.05$) cholesterol than all the other cuts in bulls and the clod in heifers. Fat varied more than protein and moisture in all cuts. Four principal components (PC) accounted for 63.9% of the total variation of the nutrient composition. Total, monounsaturated and saturated fats were in PC1 and cholesterol in PC2 showing that cholesterol is independent of other fats. If dietary alterations elicit changes in bison meat fatty acid profiles, it may be possible to reduce cholesterol independent of total, monounsaturated or saturated fat.

Keywords: Bison; Nutrient; Fat; Cholesterol; Principal component analysis; Cut

C. Bauchart, D. Remond, C. Chambon, P. Patureau Mirand, I. Savary-Auzeloux, C. Reynes, M. Morzel, Small peptides (<5 kDa) found in ready-to-eat beef meat, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 658-666, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4KBVX24-5/2/fbc9204419cf1d4586652d0b44a0784b>)

Abstract:

Dietary proteins can have biological properties, many attributed to bioactive peptides (2-50 amino acids). Since little is known about peptides in meat, we investigated the postmortem occurrence of low molecular weight peptides (<5 kDa) in bovine Pectoralis profundus muscle, after 14 days storage at 4 [degree sign]C and vacuum cooking for 90 min at 75 [degree sign]C. The study combined quantitative (amino acid analysis) and qualitative approaches (mass spectrometry). Eighty-nine percent of peptidic amino acids in fresh muscle corresponded to carnosine, anserine and glutathione. Levels of these compounds were lower in cooked meat compared to fresh muscle. Concomitantly, numerous larger compounds, most probably peptides, were generated in a very reproducible manner during ageing and even more during cooking of meat. Seven peptides (fragments of troponin T, nebulin, procollagen and cypher proteins) were identified in cooked meat extracts.

Keywords: Bovine muscle; Peptides; Meat ageing; Cooking; Mass spectrometry

Hanne Christine Bertram, Zhiyun Wu, Frans van den Berg, Henrik J. Andersen, NMR relaxometry and differential scanning calorimetry during meat cooking, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 684-689, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4KBVX24-4/2/81670e9bf0722efb202b9b5ee4667ee2>)

Abstract:

By combining simultaneous nuclear magnetic resonance (NMR) T2 relaxometry and differential scanning calorimetry (DSC) on pork samples heated to nine temperature levels between 25 and 75 [degree sign]C, the present study investigates the relationship between thermal denaturation of meat proteins and heat-induced changes in water characteristics. Principal component analysis (PCA) on the distributed ¹H NMR T2 relaxation data revealed that the major changes in water characteristics during heating occur between 40 and 50 [degree sign]C. This is probably initiated by denaturation of myosin heads, which however, could not be detected in the DSC thermograms obtained directly on the meat. In contrast, the DSC thermograms revealed endothermic transitions at 54, 65 and 77 [degree sign]C, probably reflecting the denaturation of myosin (rods and light chain), sarcoplasmic proteins together with collagen and actin, respectively. Simultaneous modelling of DSC and NMR data by partial least squares regression (PLSR) revealed a correlation between denaturation of myosin rods and light chains at ~53-58 [degree sign]C and heat-induced changes in myofibrillar water (T2 relaxation time ~10-60 ms) as well as between actin denaturation at ~80-82 [degree sign]C and expulsion of water from the meat. Accordingly, the present study demonstrates a direct relationship between thermal denaturation of specific proteins/protein structures and heat-induced changes in water mobility during heating of pork.

Keywords: Water distribution; Heating, Pork; T2 relaxation; DSC; Thermal denaturation

L. Faucitano, L. Saucier, J.A. Correa, S. Methot, A. Giguere, A. Foury, P. Mormede, R. Bergeron, Effect of feed texture, meal frequency and pre-slaughter fasting on carcass and meat quality, and urinary cortisol in pigs, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 697-703, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4KDBM9D-1/2/1b9261bf9cf9e820ab8e6c49750741c6>)

Abstract:

Carcass and meat quality traits, and urinary cortisol variation was studied in 96 barrows assigned to the following treatments: feed texture (FT; mash vs. pellets), meal frequency (MF; 2 vs. 5 meals per day) and fasting time (F; 4, 14 and 24 h) according to a 2 x 2 x 3 factorial design. Pigs fed mash, receiving feed five times a day and fasted for 24 h before slaughter had lower carcass dressing yield ($P < 0.001$). A higher ($P < 0.05$) bruise score was found on carcasses from pigs fasted for 14 and 24 h and fed either pelleted or mashed feed five times per day. The pHu value in the Longissimus muscle increased ($P < 0.05$) with increasing fasting time, whereas in the Adductor muscle it was higher ($P < 0.05$) in pigs fed with pellets in two meals per day and fasted for 24 h. Urinary cortisol tended to be higher in pigs fasted for 14 h compared to those fasted for 4 ($P = 0.10$) and 24 h ($P = 0.06$). The results of this study show a significant influence of pellet feeding on carcass yield in fasted pigs, while the effects of pre-slaughter fasting time on meat quality traits were limited.

Keywords: Fasting; Feeding; Skin bruise; Meat quality; Cortisol; Pigs

M.V. Sarries, M.J. Beriain, Colour and texture characteristics in meat of male and female foals, *Meat Science*, Volume 74, Issue 4, December 2006, Pages 738-745, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4KJTNS1-1/2/22688db8c568f522735f5c4f5b218c4a>)

Abstract:

The effect of livestock production system and sex was studied on the colour and on the texture profile of the longissimus dorsi muscle (LD) from 16- and 24-month-old foals aged 4 days. Besides, the effect of ageing time was also studied on the texture profile between 4 and 8 days. Females from the 16-months group were darker than their counterparts and the 4-day aged steaks of the 24-month-old foals were lighter, redder and yellower. LD muscle of the 24-month-old foals was tougher after 4 and 8 days ageing than that of the younger foals besides in the 24-month-old foals the toughness may have been accentuated by lower growth rate prior to slaughter. Ageing improved tenderness but the rate of tenderisation was different according to age. The colour coordinates a^* and b^* could differentiate the 4-day aged steaks of the foal samples according to production system to a higher degree than did the compression or WBSF values being b^* values the most important colour coordinate which could discriminate the origin of the animals.

Keywords: Foal meat; Colour; Texture; Ageing

Robyn Metcalfe, The death of Smithfield Market: Urbanization and the meat markets of 19th-century London, *Appetite*, Volume 47, Issue 3, November 2006, Page 394, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.08.037.

(<http://www.sciencedirect.com/science/article/B6WB2-4M62JN4-17/2/f287f661398bce6f445d064d25a0cc2c>)

Abstract:

Although farmers' markets are making a comeback today, they are nothing like the public food markets of the 19th century, particularly if you are looking for fresh meat. The history of fresh meat markets offers insights into society's relationship to meat, their cities, and to the animals that produce their food. Urban markets, such as the Smithfield Live Cattle Market in central London, became the focus of modernization during the 19th century. In 1852, Parliament passed the

Smithfield Market Removal Act to abolish the Smithfield Market, London's historic live cattle market. The removal of the market from the city center was a metaphor for the rupture of modern British society with the old order of pre-industrial Britain. According to George Dodd, who wrote *The Food of London* in 1856, Smithfield represented a 'continued manifestation of prejudiced adherence to an old system,' a 'continued display of the meat-buying powers of the London Public,' and a 'perennial declaration of the wonderful improvements gradually introduced in the size, quality, and condition of grazing-stock,' a testament to the industrialization and modernization of London. British economic statistics, the arrival of new technology, public discourse, and social reform movements point to a more complicated assessment Smithfield. The interplay between multiple interests includes those of Smithfield's managers, the consumers, butchers, Parliament, and social reformers. Meat would reappear in the city center, but this time as a frozen commodity, separated from live animals and their slaughter. What impact did this have upon the urban food landscape? How did the farmers respond? Perhaps a consideration of the Smithfield Live Cattle Market will shed light on similar market changes in other modern cities during the 19th century.

R. Schneider, F.J. Fernandez, M.B. Aguilar, I. Guerrero-Legarreta, A. Alpuche-Solis, E. Ponce-Alquicira, Partial characterization of a class IIa pediocin produced by *Pediococcus parvulus* 133 strain isolated from meat (Mexican 'chorizo'), *Food Control*, Volume 17, Issue 11, November 2006, Pages 909-915, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.06.010.

(<http://www.sciencedirect.com/science/article/B6T6S-4GY8710-1/2/cbf0299c82ab84896bdd4ee55b201669>)

Abstract:

Pediocin-like bacteriocins are antimicrobial substances produced by some bacteria with high antilisterial activity. Several isolates of *Pediococcus acidilactici* and two *Pediococcus parvulus* strains of vegetable origin have been reported to produce this kind of peptide. This work presents the partial characterization of the bacteriocin produced by *P. parvulus* 133 found in meat and confirms its identity as a heat resistant, antilisterial bacteriocin. This peptide has a relatively narrow inhibitory spectrum but a high antilisterial activity. Pediocin remained active after heating to 121 [degree sign]C, but its thermoresistance varied with pH. The pH selective adsorption method resulted in a 150-fold concentration of antimicrobial activity. The final extract was obtained by ultrafiltration and resulted in an additional 10-fold concentration of activity. Molecular weight was estimated as 5 kDa and isoelectric point was 8.65. The sequence of the first 17 aminoacids at the N-terminal end of the bacteriocin showed complete coincidence with that previously reported for pediocin A1 (A_{CH}) and with an antilisterial peptide produced by *Bacillus coagulans*. High sequence similarity was also found with two other antilisterial bacteriocins.

Keywords: Lactic acid bacteria; Pediocin; Meat preservation

D. Thevenot, M.-L. Delignette-Muller, S. Christieans, S. Leroy, A. Kodjo, C. Vernozzy-Rozand, Serological and molecular ecology of *Listeria monocytogenes* isolates collected from 13 French pork meat salting-curing plants and their products, *International Journal of Food Microbiology*, Volume 112, Issue 2, 1 November 2006, Pages 153-161, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.06.017.

(<http://www.sciencedirect.com/science/article/B6T7K-4KDBKW9-2/2/bb9df07b872dcca1b290922af4322e4f>)

Abstract:

The purpose of this study was dual: 1. to evaluate the serotype distribution of 1028 *Listeria monocytogenes* isolates collected in 13 French salting factories and their products and 2. to identify sources of *L. monocytogenes* contamination in these factories and trace the routes of spread by PFGE (Pulsed-Field Gel Electrophoresis) typing. Serotypes 1/2a, 1/2b, 1/2c, 4b and 4e occurred. Pulsotype diversity was high among strains collected in plants and products. Furthermore, strains showing similar pulsotypes occurred on the same surfaces after an interval of

at least two weeks and in unrelated factories. Forty five strains were genetically closely related to a 4b serotype *L. monocytogenes* strain isolated from a human clinical case of listeriosis. Our results highlighted the fact that *L. monocytogenes* is introduced into meat processing plants through raw meat. To overcome such contamination, suppliers of raw material should adhere to specific microbiological control measures. In addition, more attention should be focused on the appropriateness and compliance with procedures of cleaning and disinfection.

Keywords: *Listeria monocytogenes*; Serotypes; Pulsotypes; Contamination; Meat salting-curing plants

B.M. McKenna, J. Lyng, N. Brunton, N. Shirsat, *Advances in radio frequency and ohmic heating of meats*, *Journal of Food Engineering*, Volume 77, Issue 2, Progress on Bioproducts Processing and Food Safety - Selected Papers from the 1st International Conference of CIGR Section VI on Bioproducts Processing and Food Safety, November 2006, Pages 215-229, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.06.052.

(<http://www.sciencedirect.com/science/article/B6T8J-4H2PJ9J-1/2/7cdb137c41b6ca87dffebe95ee10e7d9>)

Abstract:

Interest in both radio frequency (RF) and ohmic heating of foods has increased in recent years. In particular, their application to meat products has been investigated. A critical factor is the dielectric constants of the products being heated. These have been measured for meats. In particular, the dielectric constant [ϵ'], dielectric loss factor [ϵ''], thermal heat capacity c_p , thermal conductivity k and thermal diffusivity [α] of two local comminuted meat products of differing diameters, both pork based, (pork luncheon roll PLR and white pudding WP) were measured between 5 and 85 [degree sign]C. Radio frequency (RF) and microwave (MW) [ϵ''] values varied across 5-85 [degree sign]C ($P < 0.05$). Microwave [ϵ'] and [ϵ''] values for WP tended to peak at 45 [degree sign]C and decrease thereafter, whereas for PLR, [ϵ'] and [ϵ''] peaked at 65 [degree sign]C which appeared to match potato starch gelatinisation within this product. WP and PLR had significantly higher c_p values at 25 [degree sign]C, which corresponded to the melting point of pork fat. At 85 [degree sign]C, k values were higher ($P < 0.05$) than at 5, 25 and 45 [degree sign]C but were not higher than values at 65 [degree sign]C. Thermal diffusivity [α] values increased with temperature ($P < 0.05$).

For ohmic heating, the electrical conductivity becomes the controlling variable. Efficacy of ohmic processing can be influenced by the conductivities of individual components within the food and their behaviour and interactions during the heating process. Conductivity measurements on pork cuts indicated that lean is highly conductive compared to fat and addition of fat to lean reduced the overall conductivity but the addition of fat over the range (i.e. 0-100%) was non-linear. Light microscopy suggested that differences in the conductivities of leg and shoulder lean (entire) (0.76 vs. 0.64 S m⁻¹, respectively) could be due to the denser muscle fibre structure and/or higher intramuscular fat in the shoulder vs. the leg meat. This could be of significance for ohmic processing of full muscle products.

Of course, for both forms of heating, the quality of the heated product becomes the critical factor. The effect of radio frequency cooking, on the quality (assessed by cook yield, water holding capacity texture profile analysis, penetration test, Warner-Bratzler shear, colour and sensory evaluation) and cooking time of two types of pork products (leg ham and shoulder ham) were compared to steam cooked samples. RF cooking of the hams resulted in a shorter cooking time. Instrumental measurements indicated that RF heated samples had a higher cook yield ($P < 0.05$), but a lower water holding capacity ($P < 0.05$). Texture profile analysis indicated that RF cooked samples were harder ($P < 0.05$), particularly for leg hams. A sensory panel also indicated that panellists could distinguish between radio frequency and steam cooked samples ($P < 0.05$).

Keywords: Ohmic; Radio frequency; Heating; Comminuted pork

S.M.H. Saif, Y. Lan, L.L. Williams, L. Joshee, S. Wang, Reduction of Escherichia coli O157:H7 on goat meat surface with pulsed dc square wave signal, Journal of Food Engineering, Volume 77, Issue 2, Progress on Bioproducts Processing and Food Safety - Selected Papers from the 1st International Conference of CIGR Section VI on Bioproducts Processing and Food Safety, November 2006, Pages 281-288, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.06.031.

(<http://www.sciencedirect.com/science/article/B6T8J-4GVGT81-4/2/8ccf02bfe36c53c1c555e5f5bf70c410>)

Abstract:

Pulsed dc square wave electric signal was applied to goat meat samples, inoculated with Escherichia coli O157:H7 on the surface, covered with a thin film of 0.15 M sodium chloride solution. Experiments were conducted with 10, 20 and 30 mA/cm² current intensities for 2, 8 and 32 min of treatment durations. Effects of 100, 1 k and 10 kHz frequency signals were tested for the survival of E. coli with 20 mA/cm² and 80% duty cycles. Three duty cycles of 30, 50 and 80% at 1 kHz frequency and 20 mA/cm² were applied to test the inactivation rate of E. coli. The results indicated that all three intensities of current effectively inactivated E. coli cells at treatment duration of 32 min. Eight log₁₀ reductions per ml of E. coli cells were achieved. A decrease in treatment duration decreased log₁₀ reduction of E. coli. Frequencies of 1 kHz or more and duty cycles of 50% or more accelerated the inactivation of E. coli cells at 20 mA/cm² current.

Keywords: Food safety; Meat; E. coli O157:H7; Electricity; Electrolyte solution

T.L. Selby, A. Berzins, D.E. Gerrard, C.M. Corvalan, A.L. Grant, R.H. Linton, Microbial heat resistance of Listeria monocytogenes and the impact on ready-to-eat meat quality after post-package pasteurization, Meat Science, Volume 74, Issue 3, November 2006, Pages 425-434, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4JMM4X0-1/2/947bb5ce5911fd15e1a4d4c6bdfd1686>)

Abstract:

Several methods using bactericides, hydrostatic pressure, and post-package pasteurization technologies to control Listeria monocytogenes (LM) in ready-to-eat meats have been attempted. In addition to controlling LM contamination, any newly developed technology must have minimal effects on organoleptic properties. The objectives of this study were to: (1) determine the heat resistance of LM in two brands (A and B) of bologna differing in formulations, and, (2) evaluate the effects of post-package pasteurization on product quality. Fat content did not affect LM heat resistance in bologna at 55, 60, and 65 [degree sign]C; however, Brand B bologna had a numerically lower inactivation rate. Microbial heat resistance differed ($P < 0.05$) with changes in pasteurization temperature. Time and temperature affected ($P < 0.05$) cook-loss and L* Hunter color value for both bologna brands. These data show that post-package pasteurization is effective but suggest that meat formulations may need modification to prevent development of negative quality characteristics.

Keywords: Post-package pasteurization; Listeria monocytogenes; Ready-to-eat meat; Bologna; Thermal inactivation kinetics

N. Prieto, S. Andres, F.J. Giraldez, A.R. Mantecon, P. Lavin, Potential use of near infrared reflectance spectroscopy (NIRS) for the estimation of chemical composition of oxen meat samples, Meat Science, Volume 74, Issue 3, November 2006, Pages 487-496, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4K7FB20-1/2/fe77c7162a2092b573a7f01744851169>)

Abstract:

Near infrared reflectance spectroscopy (NIRS) was evaluated as a tool to estimate several chemical parameters of oxen meat protected by a quality mark. Fifty-three samples of longissimus

thoracis muscle corresponding to oxen reared in extensive conditions were homogenized and scanned over the NIR spectral range (1100-2500 nm). Immediately after scanning, the samples were analyzed for crude protein (CP), myoglobin, collagen, ether extract (EE), gross energy (GE), dry matter (DM) and ash content, according to the official methods. Best NIR calibrations for chemical composition tested by cross-validation showed R² and SECV of 0.874 and 20.33 g kg⁻¹ DM (CP), 0.924 and 16.22 g kg⁻¹ DM (EE), 0.941 and 0.293 MJ kg⁻¹ DM (GE) and 0.874 and 6.75 g kg⁻¹ FM (DM). Calibrations for myoglobin, collagen and ash content showed a poor predictability, probably as a consequence of the lack of correlation between these parameters and EE content. However, NIRS technology could be an useful tool for estimating the main chemical parameters of oxen meat samples, thus guaranteeing the standards of quality marks.

Keywords: Beef; Meat; Chemical composition; NIRS

S.S. Moon, H.S. Yang, G.B. Park, S.T. Joo, The relationship of physiological maturity and marbling judged according to Korean grading system to meat quality traits of Hanwoo beef females, *Meat Science*, Volume 74, Issue 3, November 2006, Pages 516-521, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXXR7K-7/2/f42d47a8004c47a0e043e49af49275b5>)

Abstract:

Fifty seven carcasses from Hanwoo beef females were randomly selected by official meat graders and were sorted into three levels of maturity and marbling. Carcass data was collected for back fat thickness, longissimus area, carcass weight, meat colour, fat colour, marbling score, yield and quality grades. Mature carcasses had more yellow fat, coarser texture, a larger longissimus muscle area and lower quality grades and marbling scores ($P < 0.05$). Carcasses with a higher marbling score had thicker fat and a higher quality grade. Carcasses with low marbling had a higher yield grade and a coarser texture ($P < 0.05$). Higher marbling scores corresponded with lower cook and drip loss values for longissimus steaks. As the maturity of carcass was increased, the redness and lightness of meat and the yellowness of fat all tended to increase. Tenderness, flavour and overall acceptability scores for the older maturity group were lower than for younger and intermediate groups. Marbling was significantly ($P < 0.01$) correlated with quality grade, crude fat content, cook and drip losses, and Warner-Bratzler shear force. The maturity level was also significantly ($P < 0.01$) correlated with quality grade, fat colour, texture score, number of calves produced and milk teeth, meat redness and yellowness, fat yellowness, and Warner-Bratzler shear force. Results indicate that a low marbling group and older maturity group based on Korean grading system could negatively influence carcass traits and beef qualities of Hanwoo beef female.

Keywords: Marbling; Maturity; Meat quality; Carcass traits; Hanwoo beef

C. Cuvelier, A. Clinquart, J.F. Hocquette, J.F. Cabaraux, I. Dufrasne, L. Istasse, J.L. Hornick, Comparison of composition and quality traits of meat from young finishing bulls from Belgian Blue, Limousin and Aberdeen Angus breeds, *Meat Science*, Volume 74, Issue 3, November 2006, Pages 522-531, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.032.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-4/2/309a1ed612e3ba3310465c71fba7b744>)

Abstract:

Thirty-six young finishing bulls from three breeds (Belgian Blue, Limousin and Aberdeen Angus) were fattened over five months with finishing diets based either on sugar-beet pulp or on cereals. Nutritional quality traits of meat - fat content and fatty acid composition with emphasis on the n - 6 and n - 3 polyunsaturated fatty acids - along with some organoleptic quality traits were measured. The Belgian Blue bulls had the lowest intramuscular fat content associated with lower saturated and monounsaturated fatty acid contents. The polyunsaturated fatty acid content did not differ to a large extent between the breeds, the Aberdeen Angus bulls showing slightly higher values.

Relative to energy intake, the overall contribution of meat to the n - 3 fatty acid recommended intake was small, whatever the breed. By contrast, the contribution of meat to daily fat intake was of greater importance, especially for the Aberdeen Angus bulls. The quality traits of meat varied also according to the breed: compared to the Aberdeen Angus, the Belgian Blue bull meat had the stablest colour, the highest drip and the lowest cooking losses. The meat of Limousin bulls had intermediate characteristics for all the parameters.

Keywords: Finishing bulls; Fat content; Fatty acids; Nutritional quality; Quality traits

L. Vermeiren, F. Devlieghere, I. Vandekinderen, U. Rajtak, J. Debevere, The sensory acceptability of cooked meat products treated with a protective culture depends on glucose content and buffering capacity: A case study with *Lactobacillus sakei* 10A, *Meat Science*, Volume 74, Issue 3, November 2006, Pages 532-545, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-2/2/bdc01a973d16c097ca5fbaaa3c48fa99>)

Abstract:

Biopreservation has been proven to be a promising natural preservation technique, but the impact of protective cultures on the sensory properties of cooked meat products (CMP) is not well documented. This work presents a case study on the protective culture *Lactobacillus sakei* 10A to obtain a clear view on the real consequences of using protective cultures on the sensory quality of CMP. A preliminary screening study on 13 different CMP and more elaborate application trials at 7 [degree sign]C on vacuum packaged pate, cooked ham, cooked sausage and two cooked poultry products demonstrated that *L. sakei* 10A inhibits the endogenous LAB-flora, *Leuconostoc mesenteroides*, *Brochothrix thermosphacta* and *Listeria monocytogenes*. Despite these promising antagonistic effects, the application of *L. sakei* 10A to CMP was in some cases limited by a significant acidification resulting in an acid taste of the product. This was most obvious in pate and cooked sausage and less obvious in cooked turkey fillet. From the results a hypothesis could be derived that high buffering capacity and low glucose content are key elements to avoid sensory deviations when applying protective cultures on CMP.

Keywords: *Lactobacillus sakei*; Protective cultures; Cooked meat products; Biopreservation; Buffering capacity; Glucose; Sensory analysis; Lactic acid bacteria

M. Todaro, A. Corrao, C.M.A. Barone, M.L. Alicata, R. Schinelli, P. Giaccone, Use of weaning concentrate in the feeding of suckling kids: Effects on meat quality, *Small Ruminant Research*, Volume 66, Issues 1-3, November 2006, Pages 44-50, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.038.

(<http://www.sciencedirect.com/science/article/B6TC5-4H4T0WP-4/2/fc56b71696499348e71227211bf62b01>)

Abstract:

A study was conducted to investigate the effect of a feeding supplementation with starter concentrate on 'Capretto' meat production and its qualitative characteristics. To this end, 31 Girgentana kids, slaughtered at 59 days of age from two feeding groups (concentrate group (CG) and milk group (MG)) were utilised. Carcass measurements (body components, carcass joints, pelvic limb tissue composition, meat fatty acid composition and *M. longissimus dorsi* (LD) physical characteristics), body weight at birth, and at slaughter, were evaluated. The effect of concentrate supplementation did not influence the slaughter weight, slaughter and dissection data, tissue composition and meat chemical composition of the pelvic limb, and no differences were found for rheological characteristics of LD meat, except cohesiveness values, which were higher ($P < 0.05$) in the CG kids.

The effect of concentrate supplementation determined a significant variation of saturated fatty acids, which resulted higher for MG kids (41.77% versus 38.43%; $P \leq 0.05$). In fact, goat milk had an unsaturated fatty acids (UFA)/saturated fatty acids (SFA) ratio that was 0.25 lower than the

fatty acid composition of concentrate (0.84). Litter size (single or twin) influenced many of the parameters studied statistically, probably because of the greater body weight of the single kids.

Keywords: Girgentana goat; Capretto kid; Meat quality

J.P. Muir, Weight gains of meat goat kids on wheat (*Triticum aestivum* L.) pastures fertilized at different nitrogen levels, *Small Ruminant Research*, Volume 66, Issues 1-3, November 2006, Pages 64-69, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.030.

(<http://www.sciencedirect.com/science/article/B6TC5-4H4T362-4/2/74d49e940a5dd5f65f0e69db33c62de4>)

Abstract:

Wheat (*Triticum aestivum* L.) pastures are increasingly being used for cool-season forages to complement range-based goat production systems in southern USA. Because goats are more selective than cattle, ideal nitrogen (N) fertilizer rates already established for wheat grazed by cattle may be different for goats. Weight gains of Boer X Spanish doe kids (average 17 kg) as well as forage yields and crude protein (CP), acid detergent fiber (ADF) and acid detergent lignin (ADL) concentrations were measured for two winter seasons on replicated wheat paddocks fertilized with 0, 56, 112 and 224 kg N/ha per season in split autumn/spring applications at Stephenville, TX, USA. Animals were stocked in the pasture at 20 head/ha from January to April 2003 (478 mm rainfall from September to March) and 2004 (355 mm rainfall). Available forage ranged from 50 to 200 kg/ha in January and from 2300 to 6300 kg/ha in April in the 0 and 224 kg N/ha paddocks, respectively. Crude protein dry matter (DM) concentration ranged from 25 to 34% (0 and 224 kg N/ha, respectively) in January, but down to 13 and 22% across treatments in April. Average daily gains (ADG) over the 90-day trial were similar both years, 68 g per head per day for the 0 N treatment and undifferentiated among the fertilized paddocks, all near 90 g per head per day. Results indicate that N fertilizer rates above 56 kg/ha per season do not increase ADG/kid, but will increase ADG/ha if stocking rates are adjusted for forage production.

Keywords: Doe kids; Average daily gain; Grazing; Pasture; N

D.J. Jackson, C.M. Fletcher, D.H. Keisler, N.C. Whitley, Effect of melengestrol acetate (MGA) treatment or temporary kid removal on reproductive efficiency in meat goats, *Small Ruminant Research*, Volume 66, Issues 1-3, November 2006, Pages 253-257, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.07.052.

(<http://www.sciencedirect.com/science/article/B6TC5-4H5DYFG-5/2/fd559a74c817020a2e448dfe88e4303b>)

Abstract:

The use of melengestrol acetate (MGA; Summer) or temporary kid removal (4 weeks postpartum; Fall) for inducing/synchronizing estrus was evaluated in goats. In the first trial, 47 does were group-fed a commercial diet to provide 0.25 mg MGA/doe daily (n = 25) or a control diet (n = 22) for a period of 10 days. Twenty-five of the does lambing in the fall from this experiment were used in a second experiment. Beginning on day 28.1 +/- 0.8 of lactation, kids from 13 does (kid removal) were removed from their dams for 2 days while kids from the remaining 12 does (control) remained with the dams. Mature bucks wearing marking harnesses were introduced for mating at the end of MGA treatment (Experiment 1) or at the time of kid removal (Experiment 2). Does fed MGA were mated approximately 2.1 days earlier (P < 0.05) than control does. The percentage of does mated (84% versus 100%), pregnancy rate (58% versus 90%), and kidding rate (58% versus 90%) was lower (P < 0.05) for the MGA-treated versus the control does, respectively. In Experiment 2, does with kids removed were mated approximately 1.3 days earlier than the control does, but the mean weaning weight of the kids (11.0 +/- 0.4 kg for both treatments) was not influenced by treatment. The mean pregnancy rate, kidding rate, kid birth weight, or kid weaning weight was not influenced by treatment and averaged 73.0 and 79.0%, 3.3 +/- 0.2 and 16.8 +/- 0.7 kg for both treatments, respectively. Overall, although not necessary for mating, a decreased time

to first mating and increased synchrony of estrus followed both MGA treatment or temporary kid removal. This may be implemented if improved estrus synchrony is desired. However, more research is needed to overcome the decreased fertility recorded following MGA use.

Keywords: Pregnancy rate; Kidding rate; Litter size; Kids; Estrus

D.J. Jackson, B.J. Rude, K.K. Karanja, N.C. Whitley, Utilization of poultry litter pellets in meat goat diets, *Small Ruminant Research*, Volume 66, Issues 1-3, November 2006, Pages 278-281, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.09.005.

(<http://www.sciencedirect.com/science/article/B6TC5-4HDP774-1/2/0308bad2c10865ef1c01e8b0feefd93>)

Abstract:

Forty-eight crossbred meat goats were used to determine if poultry litter pellets could be used as a protein source in the diets of growing meat goats. Goats were fed one of three 19-21% CP diets containing 0 (CON; n = 18), 20% (20PL; n = 12) or 40% poultry litter pellets (40PL; n = 18). In Experiment 1, 38 animals (n = 13 CON; n = 12 20PL; n = 13 40PL) were used. Goats were allowed a 23-day adjustment period and body weight (BW) and feed intake were measured every 7 days for 42 days. In Experiment 2, 10 males fed CON or 40PL (n = 5 per diet) were used in two metabolism trials at 93.7 +/- 0.9 (Trial 1) and 121.7 +/- 0.9 d of age (Trial 2). Goats were placed in metabolism crates and after a 3-day adjustment period, feed intake and fecal and urine output were measured and sampled daily for 7 days to determine diet digestibility. In Experiment 1, ADG (79 +/- 8 g) and feed efficiency (130 +/- 12 g per kg) were not influenced by diet. In Experiment 2, for both trials, organic matter and CP digestibility were similar between diets (80 +/- 1 and 70 +/- 3% for Trial 1, respectively and 63 +/- 2 and 75 +/- 7% for Trial 2, respectively). Dry matter digestibility was greater (P < 0.05) for CON (81 +/- 1 and 82 +/- 1% for Trials 1 and 2, respectively) when compared to 40PL (77 +/- 1 and 75 +/- 1% for Trials 1 and 2, respectively). The ADF (41 +/- 4% for CON and 67 +/- 4% for 40PL) and NDF (48 +/- 4% for CON and 71 +/- 4% for 40PL) were greater (P < 0.01) for 40PL compared to CON diet in Trial 1 only. Digestibility (GE) was higher (P < 0.05) for 40PL (83 +/- 0.3%) compared to CON (82 +/- 0.3%) in Trial 2 only. The poultry litter pellets may be used effectively as a short-term feedstuff for meat goats.

Keywords: Meat goat; Poultry litter; Digestibility; Protein

Nam Hoon Kwon, Kun Taek Park, Woo Kyung Jung, Hwa Young Youn, Yeonhee Lee, So Hyun Kim, Wonki Bae, Ji Youn Lim, Ji Yeon Kim, Jun Man Kim, Soon Keun Hong, Yong Ho Park, Characteristics of methicillin resistant *Staphylococcus aureus* isolated from chicken meat and hospitalized dogs in Korea and their epidemiological relatedness, *Veterinary Microbiology*, Volume 117, Issues 2-4, 31 October 2006, Pages 304-312, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2006.05.006.

(<http://www.sciencedirect.com/science/article/B6TD6-4K19NPR-1/2/f77038d5f982e6602bbabe399ea1a932>)

Abstract:

Methicillin resistant *Staphylococcus aureus* (MRSA) is one of the most important pathogens in human and veterinary hospitals. The isolation of MRSA from animals and foodstuffs has been reported with an increased incidence. However, methicillin (oxacillin) is not used in animal husbandry or in animal hospitals in Korea. In this study, three pre-MRSA and one silent *mecA*-carrying methicillin susceptible *S. aureus* (smMSSA) were isolated from retail chicken meat, and three MRSA were isolated from hospitalized dogs in Korea. The three pre-MRSA isolates were determined to have a staphylococcal cassette chromosome *mec* (SCC*mec*) type III, and the smMSSA isolate was not classified. The animal hospital isolates were found to contain SCC*mec* type II. Seven and 15 *S. aureus* isolated from hospitalized humans and bovine milk, respectively, were also examined in this study in order to determine the epidemiological origins of MRSA. Multilocus sequencing typing (MLST) revealed that the chicken meat and bovine milk isolates were

closely related to the animal hospital isolates. The SCCmec characteristics and MLST analyses indicated the possibility of the human to animal transmission of MRSA. These results highlight the importance of identifying MRSA carriers as well as intercepting MRSA transmission because MRSA is becoming increasingly widespread without any plausible relationship with the use of methicillin (oxacillin).

Keywords: MRSA; Animal hospital; Chicken; SCCmec; MLST

E. Jordan, J. Egan, C. Dullea, J. Ward, K. McGillicuddy, G. Murray, A. Murphy, B. Bradshaw, N. Leonard, P. Rafter, S. McDowell, Salmonella surveillance in raw and cooked meat and meat products in the Republic of Ireland from 2002 to 2004, *International Journal of Food Microbiology*, Volume 112, Issue 1, 15 October 2006, Pages 66-70, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.05.013.

(<http://www.sciencedirect.com/science/article/B6T7K-4KGG1GS-2/2/a65ff6affc806df81600aa14ce4a3e7>)

Abstract:

The food industry, under the regulation of the Department of Agriculture and Food (DAF) in the Republic of Ireland, is required to undertake all microbiological testing in relation to zoonoses control, in laboratories approved by DAF. These laboratories submit a monthly report of all tests undertaken, together with all presumptive *Salmonella* isolates for confirmation, typing and storage to the Central Veterinary Research Laboratory (CVRL). Details of *Salmonella* tests on 110,229 raw and 25,189 cooked meat samples from 25 laboratories were recorded over the 3-year period 2002-2004. *Salmonella* spp. were isolated from 1.0% of the 110,229 raw meat samples and 0.1% of the 25,189 cooked meat samples tested. The percentage of raw meat samples contaminated with *Salmonella* decreased over the three-year period from 1.2% to 0.9%. There was no seasonal trend in the isolation of *Salmonella* from any of the meats or meat products. Recoveries of the organism were highest for turkey and chicken meats at 3.1% and 2.8%, respectively, followed by porcine meats at 2.1%. The recoveries were much lower for ovine meats and meat products at 0.2% and bovine meat and meat products at 0.16%.

Keywords: *Salmonella*; Surveillance; Raw meat; Cooked meat; Private laboratories; Republic of Ireland

Anna Fritzson, Thore Berntsson, Efficient energy use in a slaughter and meat processing plant--opportunities for process integration, *Journal of Food Engineering*, Volume 76, Issue 4, October 2006, Pages 594-604, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.06.007.

(<http://www.sciencedirect.com/science/article/B6T8J-4GWJ879-1/2/20d00daf06c6d5ae44223ade7adcb89d>)

Abstract:

In this paper, process integration methods are used to investigate the potential to decrease the energy usage in the slaughtering and meat processing industry. Above ambient temperatures, heating of water with different target temperatures is a large heat demand in a plant, while at subambient temperatures the refrigeration plant needs almost all of the shaftwork used at the site. Interaction between, on one hand, energy demands above ambient temperature and, on the other, cooling needs below ambient temperature can take place with freezing compressors or heat pumps. By using process integration methods above and below ambient temperatures, potentials for saving both shaftwork and external heat demand in food plants can be identified. A case study at a modern plant illustrates that even though many energy-saving measures have been taken there is still a technical potential for saving 30% of the external heat demand and more than 10% of the shaftwork used in the plant. The economic potential for the savings is dependent on the conditions at the plant.

Keywords: Process integration; Ready-made meals; Pinch analysis; Energy savings; Food processing; Slaughterhouse; Meat processing; Shaftwork; Refrigeration; Heat pump

Dilek Demirezen, Kadiriye Uruc, Comparative study of trace elements in certain fish, meat and meat products, Meat Science, Volume 74, Issue 2, October 2006, Pages 255-260, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4K2SKF9-1/2/6f9fb4552ba225bc5bc226e7b7231028>)

Abstract:

Selenium, copper, nickel, zinc, cadmium, manganese, iron, copper and lead contents of certain fish, meat and meat products consumed in Turkey were determined using inductively coupled plasma-optical emission spectrometry (ICP-OES). The order of the elements in the meat, meat products and fish samples and their concentration ranges in [μ]g 100 g⁻¹ was Fe (57.7-156.4) > Zn (20-159) > Ni (8.2-24) > Pb (11.5-13.5) > Cr (8.44-9.51) > Cu (7.18-10.01) > Cd (0.77-1.04) > Mn (3.98-10) > Se (1.32-4.6). The elemental concentrations of fish studied seemed to be close to the international standards. The highest trace element concentrations were obtained from pastirma, meat and sausage while the lowest value was observed in *Trachurus trachurus* (saurel). Iron concentrations in all samples were higher than the recommended values.

Keywords: Meat; Fish; Trace element; Pastirma; *Trachurus trachurus*

D. Phillips, D. Jordan, S. Morris, I. Jenson, J. Sumner, Microbiological quality of Australian sheep meat in 2004, Meat Science, Volume 74, Issue 2, October 2006, Pages 261-266, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4JN72D5-2/2/6f94258bcb21f55330837b07cf9a8a9c>)

Abstract:

The third national baseline microbiological survey of Australian sheep carcasses and frozen boneless sheep meat was conducted in 2004. Carcasses (n = 1117) sampled at 20 slaughter establishments were found to have a mean log total viable count (TVC, 25 [degree sign]C) of 2.28 cfu/cm² and *Escherichia coli* was isolated from 43.0% carcasses with a mean log 0.03 cfu/cm² on positive samples. In samples from 10 boning (fabrication) plants (n = 560) the mean log TVC for frozen boneless sheep meat was 1.85 cfu/g and the mean log count for the 8.2% of samples with detectable *E. coli* was 1.39 cfu/g. *E. coli* O157:H7 was isolated from 6/1117 carcasses and from 1/560 boneless samples. *Salmonella* was isolated from 0/1117 carcasses and from 3/560 samples of boneless product. *Campylobacter* sp. were isolated from 4/1117 carcasses and from 1/560 boneless samples. Coagulase positive staphylococci were isolated from 23.4% to 32.7% of carcasses and boneless sheep meat samples, respectively, with positive samples having a mean log count of 0.93 cfu/cm² and 1.14 cfu/g, respectively. The low level of bacteria described here is consistent with a very low risk to human health due to bacterial hazards in Australian sheep meat.

Keywords: National survey; Australia; Microbial quality; Carcass; Boneless meat

I. Chouliara, J. Samelis, A. Kakouri, A. Badeka, I.N. Savvaidis, K. Riganakos, M.G. Kontominas, Effect of irradiation of frozen meat/fat trimmings on microbiological and physicochemical quality attributes of dry fermented sausages, Meat Science, Volume 74, Issue 2, October 2006, Pages 303-311, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4JRT34S-2/2/894adc5ef258e024da4526942e5c43f2>)

Abstract:

Changes in microbiological and physicochemical quality attributes resulting from the use of irradiation in the production of Greek dry fermented sausage were investigated as a function of fermentation/ripening time. Results showed that irradiating meat/fat trimmings at 2 or 4 kGy prior to sausage production eliminated natural contamination with *Listeria* spp., and reduced pseudomonads, enterococci and pathogenic staphylococci, and enterobacteria, to less than 2 and

1 log cfu g⁻¹, respectively. Pseudomonads were very sensitive (>3.4 log reduction) to either radiation dose. Yeasts were the most resistant followed by inherent lactic acid bacteria; their reductions on the trimmings were radiation dose-dependent. Residual effects of irradiation were noted against enterococci, but not against gram-negatives which died off fast during fermentation even in non-irradiated samples. Growth of the starter bacteria, *Lactobacillus pentosus* and *Staphylococcus carnosus*, inoculated in the sausage batters post-irradiation was unaffected by the 2 or 4 kGy pre-treatment of the trimmings. Irradiation had little or no effect at the end of ripening period (28 days) on pH, moisture content and color (parameters L*, a*, and b*). Changes in TBA values were small but statistically significant with irradiated samples having higher TBA values than control samples.

Keywords: Fermented sausage; Salami; Irradiation; Quality; Hygiene

D. Dutaud, L. Aubry, F. Guignot, X. Vignon, G. Monin, A. Ouali, Bovine muscle 20S proteasome. II: Contribution of the 20S proteasome to meat tenderization as revealed by an ultrastructural approach, *Meat Science*, Volume 74, Issue 2, October 2006, Pages 337-344, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4JSMV8C-3/2/5132bef12a96b3721bde7cbd56f8c01e>)

Abstract:

The role of the 20S proteasome proteolytic effects was revisited using an ultrastructural approach with the aim to explain some particular structural changes identified in type I muscles and in high pH meat. In both types of meat, major changes observed after ageing are an increase in the thickness of the Z-line followed by the appearance of an amorphous protein structure spreading out over the I-band. This was followed by a total degradation of this amorphous structure and of the Z-line. Partial transversal fragmentation of the myofibrils within the I-band can also be detected. The data reported clearly demonstrate that the 20S proteasome was able to mimic these sequential structural changes, a feature never obtained with either calpains or cathepsins. It is the first time that a direct implication of this complex in postmortem muscle is postulated.

Keywords: Proteasome; Structural changes; Muscle; Bovine; High pH meat

K.C. Nam, K.Y. Ko, B.R. Min, H. Ismail, E.J. Lee, J. Cordray, D.U. Ahn, Influence of rosemary-tocopherol/packaging combination on meat quality and the survival of pathogens in restructured irradiated pork loins, *Meat Science*, Volume 74, Issue 2, October 2006, Pages 380-387, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4JV448X-2/2/28523c47d8bbe885e04ddaa6be02ab4b>)

Abstract:

Irradiated restructured pork loins treated with rosemary-tocopherol/double-packaging had lower TBARS values than vacuum-packaged control after 10 days of refrigerated storage. The rosemary-tocopherol combination, however, had no effect on the production of sulfur volatiles responsible for the irradiation off-odor, and color changes in irradiated pork. V7/A3 double-packaging was effective in reducing the sulfur volatiles significantly. Rosemary-tocopherol combination was highly effective in reducing the volatile hexanal in irradiated restructure pork. Irradiation was effective in reducing *Listeria monocytogenes* and *Salmonella typhimurium* inoculated on the surface of restructured pork loin in dose-dependent manner. The irradiation D10 values for *L. monocytogenes* and *S. typhimurium* were 0.58 and 0.55 kGy, respectively. During the 20 days of refrigerated storage, *L. monocytogenes* in both nonirradiated and irradiated samples grew gradually, but the number of *S. typhimurium* decreased. The added rosemary-tocopherol, however, showed little bacteriocidal effects to *L. monocytogenes* and *S. typhimurium*.

Keywords: Rosemary-tocopherol; Double-packaging; Meat quality; Survival of pathogen; Irradiation

B.M. Naveena, M. Muthukumar, A.R. Sen, Y. Babji, T.R.K. Murthy, Improvement of shelf-life of buffalo meat using lactic acid, clove oil and vitamin C during retail display, *Meat Science*, Volume 74, Issue 2, October 2006, Pages 409-415, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.020. (<http://www.sciencedirect.com/science/article/B6T9G-4K8SCB7-1/2/81fa51a99a0b1a3a2fcac5c33658810f>)

Abstract:

Buffalo meat steaks dipped in either (1) distilled water (control), (2) lactic acid (LA), (3) LA + clove oil (clove), or (4) LA + clove + vitamin C (Vit C) were displayed at 4 ± 1 [degree sign]C, illuminated by a standard fluorescent lamp. The pH, 2-thiobarbituric acid reactive substances (TBARS), instrumental colour (CIE L*, a*, b*), aerobic plate counts (APC), psychrotrophic counts (PPC), coliform counts and sensory colour and odour were determined up to 12th day of display at 3 days interval. Results showed that, all the treatments have significantly ($P < 0.05$) reduced the TBARS values compared to control. Among treatments, use of LA + clove has exhibited significantly ($P < 0.05$) lowest TBARS values throughout display period than others. Buffalo meat steaks treated with either LA + clove or LA + clove + Vit C had significantly ($P < 0.05$) lower APC, PPC and coliform counts than control or LA treated samples. LA + clove + Vit C treated samples maintained significantly ($P < 0.05$) higher a* and b* values during display as well as improvement in sensory colour and odour than others. Treatment with either LA + clove or LA + clove + Vit C extended the display life of buffalo meat steaks at 4 ± 1 [degree sign]C. There appears to be a significant advantage to using LA + clove or LA + clove + Vit C over LA alone.

Keywords: Buffalo meat; Lactic acid; Clove; Vitamin C

S.H. Choi, Y.H. Choy, Y.K. Kim, S.N. Hur, Effects of feeding browses on growth and meat quality of Korean Black Goats, *Small Ruminant Research*, Volume 65, Issue 3, October 2006, Pages 193-199, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.04.031. (<http://www.sciencedirect.com/science/article/B6TC5-4GTW8W6-1/2/d51baa3b4197b87001d6bfaa0c45be5b>)

Abstract:

Effects of feeding browses on growth and meat quality of Korean Black Goats were investigated. Twenty-eight bucks were divided in equal numbers into four treatment groups and fed fibrous diets of oak browse, pine browse, fermented pine browse or rice straw each with concentrate supplement. Metabolic profile, growth rate, feed intake, carcass yield, meat quality and serum were investigated. Average daily gains of bucks were 45.3 g for oak browse, 36.4 g for rice straw, 28.1 g for pine browse and 30.0 g for fermented pine browse. Daily forage intake per goat was 197 g DM for oak browse, which was higher than those for the other diets. Bucks fed fermented pine browse ate only 74 g forage per day. Body metabolism was normal with all sources of browses from the results of serological inspection. Dressing percentage was 45.1-46.2%. Meat percentage was 55.2-55.9% and fat percentage was 7.31% for oak browse which was lower than those for pine browse and fermented pine browse. Shear force of goat meat was 4.11-5.11 kg/cm² for browses and 6.30 kg/cm² for rice straw. Cooking loss was 29.6% for pine browse which was lower than the others. Juiciness, tenderness and flavor of the goat meat were the best for the fermented pine browse followed by other browses and rice straw.

Keywords: Browses; Daily gain; Meat quality; Serum composition; Korean Black Goat

Qinghui Ai, Kangsen Mai, Beiping Tan, Wei Xu, Qingyuan Duan, Hongming Ma, Lu Zhang, Replacement of fish meal by meat and bone meal in diets for large yellow croaker, *Pseudosciaena crocea*, *Aquaculture*, Volume 260, Issues 1-4, 29 September 2006, Pages 255-263, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2006.06.043.

(<http://www.sciencedirect.com/science/article/B6T4D-4KKFP4R-1/2/5efdaadb0b6f7f14e2659e78af2a8658>)

Abstract:

A growth experiment was conducted to investigate the effects of replacement of fish meal (FM) by meat and bone meal (MBM) in diets on the growth and body composition of large yellow croaker (*Pseudosciaena crocea*). Six isonitrogenous (43% crude protein) and isoenergetic (20 kJ g⁻¹) diets replacing 0, 15, 30, 45, 60 and 75% FM protein by MBM protein were formulated. Each diet was randomly allocated to triplicate groups of fish in sea floating cages (1.0 x 1.0 x 1.5 m), and each cage was stocked with 180 fish (initial average weight of 1.88 +/- 0.02 g). Fish were fed twice daily (05:00 and 17:30) to apparent satiation for 8 weeks. The water temperature ranged from 26.5 to 32.5 [degree sign]C, salinity from 32 to 36[per mille sign], and dissolved oxygen content was approximately 7 mg l⁻¹ during the experimental period. Survival decreased with increasing dietary MBM and the survival in the fish fed the diet with 75% protein from MBM was significantly lower than other groups ($P < 0.05$). There were no significant differences in specific growth rate (SGR) among the fish fed the diets with 0 (the control group), 15, 30 and 45% protein from MBM. However, SGR in the fish fed the diets with 60 and 75% protein from MBM were significantly lower than other groups ($P < 0.05$). No significant differences in feeding rate were observed among dietary treatments. The digestibility experiment showed that the apparent digestibility coefficients (ADC) of dry matter, protein, lipid and energy of MBM were significantly lower compared with those of FM ($P < 0.05$). Essential amino acid index was found to be correlated positively with SGR in the present study, suggesting that essential amino acid balance was important. Body composition analysis showed that the carcass protein and essential amino acids were not significantly affected by dietary MBM. The lipid and n-3 highly unsaturated fatty acid (n-3 HUFA) in fish muscle, however, significantly decreased with increasing dietary MBM. These results showed that 45% of FM protein could be replaced by MBM protein in diets of large yellow croaker without significantly reducing growth. It was suggested that the reduced growth with higher MBM was due to lower digestibility and imbalance of essential amino acids.

Keywords: Large yellow croaker; *Pseudosciaena crocea*; Fish meal; Replacement; Meat and bone meal; Feeding and nutrition

T.X. Jin, H.M. Zhu, L. Xu, Moisture Movement Characteristics and Their Effect on the Ultrastructure of Cooked Meat during Vacuum Cooling, *Biosystems Engineering*, Volume 95, Issue 1, September 2006, Pages 111-118, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2006.06.004.

(<http://www.sciencedirect.com/science/article/B6WXV-4KJTNKP-3/2/743f7509282769765fe7c17eb475a908>)

Abstract:

A study was conducted to investigate cooling characteristics, the variations of moisture content of cooked meat and evaporation rate of moisture and the effect of moisture movement on the interior tissue structure of cooked meats by using a transmission electron microscopy (TEM). Experimental results showed that the cooling rate was higher at the beginning of the cooling. It took only about the first 4-5 min for the vacuum cooling to reduce the surface temperature of the cooked meat from 63 to 10 [degree sign]C. The average moisture content of cooked meat decreased from 71 to 60[middle dot]7% during vacuum cooling. The weight loss of cooked meat was 10[middle dot]3%. For evaporation rate during vacuum cooling, there were two periods: an accelerating period and a falling period. It can be concluded from theoretical analysis and experimental results that moisture movement of free water within cooked meat during vacuum cooling consists of two parts. One is free water migration within cooked meat caused by chemical potential; the other is water vapour movement produced by evaporation or ebullition caused by pressure drop. In addition, the latter dominates in the process of moisture movement of free water. At the same time, TEM observations revealed that morphology of muscular tissue at the surface and the core of cooked meat treated by vacuum cooling remained intact. However, muscle fibre

separation and formation of large inter-cellular spaces occurred in the intact muscle fibre of muscular tissue treated by vacuum cooling.

Gabriele Ghisleni, Stefano Robba, Ottavia Germani, Eugenio Scanziani, Identification and prevalence of *Sarcocystis* spp. cysts in bovine canned meat, *Food Control*, Volume 17, Issue 9, September 2006, Pages 691-694, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.04.013.

(<http://www.sciencedirect.com/science/article/B6T6S-4GD4SDV-1/2/45858bdf61f44358636c47081c137ea2>)

Abstract:

One hundred and twenty eight cans of beef in jelly (64 cans prepared with meat coming from animals bred in Argentine and 64 cans with meat coming from animals bred in Brazil) were histologically examined to evaluate the prevalence of *Sarcocystis* spp. and the microscopic lesions of the muscular tissue. Morphology of tissues was well preserved in all samples examined. The prevalence and infection density of *Sarcocystis* spp. was lower in Brazilian beef (positive rate 6.25%; average infection density 0.08) compared to Argentinean beef (positive rate 23.44%; average infection density 0.98). Most of the cysts (92.65%) had a thin wall consistent with *Sarcocystis* *bovicanis*. The prevalence of *Sarcocystis* spp. cysts was never associated with microscopic muscular lesions. This study validates histological examination to identify canned tissues and to estimate parasitic prevalence in canned meat. This study demonstrates a lower amount of *Sarcocystis* spp. than described in previous studies on meat from other countries. *Sarcocystis* spp. are considered harmless in cooked meat, nevertheless a low prevalence can be included among quality parameters as an indication of good sanitation of the meat.

Keywords: Canned cooked meat; Bovine; *Sarcocystis* spp.; Histology; Prevalence

Andrew Pointon, Ian Jenson, David Jordan, Paul Vanderlinde, Jo Slade, John Sumner, A risk profile of the Australian red meat industry: Approach and management, *Food Control*, Volume 17, Issue 9, September 2006, Pages 712-718, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.04.008.

(<http://www.sciencedirect.com/science/article/B6T6S-4GC1R8V-2/2/f2de2035e6b7e252de2a386824f06cf5>)

Abstract:

A risk profile of microbial, chemical and physical hazards across the supply continuum for the Australian beef, sheep and goat meat industries was developed. The aim was to provide risk managers with a risk rating of hazard:meat and meat product combinations, advise on the feasibility and advisability of risk analyses and identify research and development priorities. Hazard:red meat combinations arising from manufacturing and catering settings that have been associated with food-borne illness and their risk ranking are reported elsewhere. The profiling process was completed within a one-year timeframe and involved a planned iterative consultation process between risk managers and assessors to ensure outputs remained relevant to current risk management concerns.

Keywords: Risk profile; Red meat; Australia

M. Uyttendaele, K. Baert, Y. Ghafir, G. Daube, L. De Zutter, L. Herman, K. Dierick, D. Pierard, J.J. Dubois, B. Horion, J. Debevere, Quantitative risk assessment of *Campylobacter* spp. in poultry based meat preparations as one of the factors to support the development of risk-based microbiological criteria in Belgium, *International Journal of Food Microbiology*, Volume 111, Issue 2, 1 September 2006, Pages 149-163, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.05.023.

(<http://www.sciencedirect.com/science/article/B6T7K-4KHC2XS-3/2/c46b85c93d74f73f33468cb48fe48e02>)

Abstract:

The objective of this study was to do an exercise in risk assessment on *Campylobacter* spp. for poultry based meat preparations in Belgium. This risk assessment was undertaken on the demand of the competent national authorities as one of the supportive factors to define risk-based microbiological criteria. The quantitative risk assessment model follows a retail to table approach and is divided in different modules. The contamination of raw chicken meat products (CMPs) was represented by a normal distribution of the natural logarithm of the concentration of *Campylobacter* spp. ($\ln[\text{Camp}]$) in raw CMPs based on data from surveillance programs in Belgium. To analyse the relative impact of reducing the risk of campylobacteriosis associated with a decrease in the *Campylobacter* contamination level in these types of food products, the model was run for different means and standard deviations of the normal distribution of the $\ln[\text{Camp}]$ in raw CMPs. The limitation in data for the local situation in Belgium and on this particular product and more precisely the semi-quantitative nature of concentration of *Campylobacter* spp. due to presence/absence testing, was identified as an important information gap. Also the knowledge on the dose-response relationship of *Campylobacter* spp. was limited, and therefore three different approaches of dose-response modelling were compared. Two approaches (1 and 2), derived from the same study, showed that the reduction of the mean of the distribution representing the $\ln[\text{Camp}]$ in raw CMPs is the best approach to reduce the risk of *Campylobacter* spp. in CMPs. However, for the simulated exposure and approach 3 it was observed that the reduction of the standard deviation is the most appropriate technique to lower the risk of campylobacteriosis. Since the dose-response models used in approach 1 and 2 are based on limited data and the reduction of the mean corresponds with a complete shift of the contamination level of raw CMPs, demanding high efforts from the poultry industry, it is proposed to lower the standard deviation of the concentration of *Campylobacter* spp. in raw CMPs. This proposal corresponds with the elimination of the products that are highly contaminated. Simulation showed that eating raw chicken meat products can give rise to exposures that are 1010 times higher than when the product is heated, indicating that campaigns are important to inform consumers about the necessity of an appropriate heat treatment of these type of food products.

Keywords: *Campylobacter*; Quantitative risk assessment; Poultry based meat preparations; Microbiological limit

Hugo A. Caldironi, Mario E. Manes, Proximate composition, fatty acids and cholesterol content of meat cuts from tegu lizard *Tupinambis merianae*, *Journal of Food Composition and Analysis*, Volume 19, Issues 6-7, Biodiversity and nutrition: a common path, September-November 2006, Pages 711-714, ISSN 0889-1575, DOI: 10.1016/j.jfca.2005.09.005.

(<http://www.sciencedirect.com/science/article/B6WJH-4HVDYR4-2/2/15dfeb38c4c0cbe601b8fc8e509afd88>)

Abstract:

The proximate composition, fatty acid composition and cholesterol content of three different cuts of meat from tegu *Tupinambis merianae* were determined. Moisture (72.0 \pm 0.7%), protein (23.6 \pm 0.7%), fat (4.0 \pm 1.3%) and ash (1.2 \pm 0.2%) did not differ from values obtained from beef or chicken meat. The cholesterol content (18.2 \pm 5.8 mg/100 g tissue) was similar among the cuts and was lower in tegu meat than in other meats of similar fat content such as beef, chicken or fish. The relation between polyunsaturated and saturated fatty acids (1.09) was comparable to that of some species of fish, and the fat presents nutritional qualities comparable with those of chicken meat.

Keywords: Lizard meat; *Tupinambis merianae*; Fatty acid composition; Tegu

Ivis T. Forrester-Anderson, James McNitt, Robin Way, Mark Way, Fatty acid content of pasture-reared fryer rabbit meat, *Journal of Food Composition and Analysis*, Volume 19, Issues 6-7, Biodiversity and nutrition: a common path, September-November 2006, Pages 715-719, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.02.011.

(<http://www.sciencedirect.com/science/article/B6WJH-4K3D1F2-2/2/bbdc332f3044798f9bf6de99d48f36ff>)

Abstract:

This study evaluated the fatty acid content of rabbit meat from New Zealand Whitex Californian cross fryers born and reared outdoors on pasture (O/O), born and reared indoors in cages (I/I), or born indoors in cages and reared outdoors on pasture (I/O). The rabbits were sacrificed at 104 days of age and the left loin muscle (m. Longissimus dorsi) harvested for fat analysis. The standard AOAC methods were used to determine total fat and fatty acid contents. Compared to animals reared in cages, rabbits reared outdoors on pasture had significantly less total fat, higher proportions of eicosatrienoic and docosaenoic fatty acids and higher amounts of the n-3 fatty acids docosahexaenoic, docosapentaenoic and eicosapentaenoic. These data suggest that a grass-based diet may alter the fatty acid profile of rabbit meat, thus enhancing the n-3 fatty acid content and the nutritional value of the meat.

Keywords: Pastured rabbit; Fatty acids

S. Belgin Unal, Ferruh Erdogan, H. Ibrahim Ekiz, Effect of temperature on phosphate diffusion in meats, *Journal of Food Engineering*, Volume 76, Issue 2, September 2006, Pages 119-127, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.04.041.

(<http://www.sciencedirect.com/science/article/B6T8J-4GHRBST-8/2/65faea91e56aeea4d980a20adee25715>)

Abstract:

Polyphosphates are important functional additives used in meats and other food products, and the phosphate movement in meats is assumed to occur by a diffusion process. The objective of this study was to investigate the effects of temperature on phosphate diffusion mechanism in meat samples (prepared in 2 x 2 x 2 cm) dipped in different concentrations of sodium tripolyphosphate (STP) solutions. For this purpose, different combinations of STP solutions (0%, 2%, 4% and 6%; w/v) at different temperatures (~18-20, ~20-22, ~28-30 and ~34-36 [degree sign]C) were applied. During experiments, meat samples were dipped in the STP solutions for 30 min, and both phosphate content changes of meat samples and STP solutions were determined using a modified spectrophotometric method. The experimental data was then used to determine the diffusion coefficients (D-values) of STPs. The D-values for STPs changed with dipping time, and therefore average D-values were determined using the least squares analysis. Naturally occurred orthophosphates in meats and STPs in the solutions resulted in a counter-current diffusion, and this was important in interpretation of the phosphate diffusion and evaluation of the D-values of both STPs and orthophosphates. The counter-current diffusion was found to be strongly temperature-dependent. Knowledge of D-values at different conditions may lead to predict the diffused amount of STPs into meat samples, and these findings may also be used for further optimization studies in different industrial applications.

Keywords: Phosphates; Counter-current diffusion; Temperature effects; Variable diffusion

S.F. Zanini, G.L. Colnago, M.R. Bastos, B.M.S. Pessotti, F.P. Casagrande, V.R. Lima, Oxidative stability and total lipids on thigh and breast meat of broilers fed diets with two fat sources and supplemented with conjugated linoleic acid, *LWT - Food Science and Technology*, Volume 39, Issue 7, September 2006, Pages 717-723, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.05.005.

(<http://www.sciencedirect.com/science/article/B6WMV-4HTCWB9-1/2/e05a1bfa7c9dd88daaaf4e8ea97f312c>)

Abstract:

Two hundred broiler chickens of 21 days of age were distributed in a completely randomized factorial arrangement 2x5 (two oil sources, i.e. soybean or canola oil and five levels of CLA supplementation, i.e. 0.0%, 0.25%, 0.50%, 0.75% and 1.00%). The purpose of this study was to evaluate the dietary supplementation of broiler diets with CLA and oil sources on the lipid content

and on the oxidative stability of chicken meat submitted to refrigeration or freezing storage temperatures. The use of canola oil and increasing CLA levels resulted in a linear reduction ($P < 0.05$) on the total lipids in breast meat. These results can explain a linear reduction ($P < 0.05$) observed in the malonaldehyde content of refrigerated and frozen meat of birds receiving canola oil. Birds receiving soybean oil and supplemented with CLA showed an abrupt reduction of total lipids on breast meat from 0.89 g/100 g at 0% CLA to 0.36 g/100 g at 0.5% CLA followed by a small increase at higher levels of CLA ($P < 0.05$). These observations may help to explain the reduction ($P < 0.05$) of oxidation in breast meat during frozen storage at 50 and 100 days as well as during cold storage at 5 [degree sign]C.

Keywords: Broilers; Malonaldehyde; Meat; Lipids; Conjugated linoleic acid

Declan J. Troy, Joseph Buckley, Briege Byrne, Rachel Pearce, 52nd International Congress of Meat Science and Technology (52nd ICoMST), Dublin, Ireland, 13-18 August 2006, Meat Science, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 1-2, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4KBG8KR-2/2/9b7d357c12d10aac00846cf85c7218eb>)

A.M. Mullen, P.C. Stapleton, D. Corcoran, R.M. Hamill, A. White, Understanding meat quality through the application of genomic and proteomic approaches, Meat Science, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 3-16, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4JWDY4N-2/2/c89b9ce9c725a9b09234ef59eb6f1eec>)

Abstract:

During the past few decades, advances in molecular genetics have led to the identification of multiple genes or genetic markers associated with genes that affect traits of interest in livestock, including single genes of large effect and QTL (genomic regions that affect quantitative traits). Transcriptomics enables analysis of the complete set of RNA transcripts produced by the genome at a given time and provides a dynamic link between the genome, the proteome and the cellular phenotype. Through a functional genomics approach to understanding the molecular basis of meat quality, we can gain further insight into the complex interplay of gene expression events involved in the development of meat quality. Proteomics permits visualisation of the protein content of the cell under varying conditions, combining powerful separation techniques with highly sensitive analytical mass spectrometry. To date, both the human and bovine genome projects have advanced our understanding of gene expression and helped elucidate the function of large portions of the genome. Advantages from this research have permeated through to a broader spectrum of research including that of meat science. Meat quality is manifested through a complexity of events in the muscle and their interactions with many environmental stimuli in both the live animal and during the post-mortem period. A lot of progress has been made in our understanding of the biological processes that contribute to the delivery of consistent quality meat. Through the application of tools of genomics and proteomics we are gaining a deeper insight into these processes and their interaction with environmental factors. Knowledge gained from these approaches can be beneficial in defining and optimising management systems for quality, providing assurance of meat quality and in tailoring quality to suit market needs.

Keywords: Transcriptome; Meat management system; 2-D Electrophoresis; QTL; Marker assisted selection; Microarray

Nigel Scollan, Jean-Francois Hocquette, Karin Nuernberg, Dirk Dannenberger, Ian Richardson, Aidan Moloney, Innovations in beef production systems that enhance the nutritional and health value of beef lipids and their relationship with meat quality, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 17-33, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-1/2/1f588ced5bcd3f3c8d61b0b7cbe5673d>)

Abstract:

Consumers are becoming more aware of the relationships between diet and health and this has increased consumer interest in the nutritional value of foods. This is impacting on the demand for foods which contain functional components that play important roles in health maintenance and disease prevention. For beef, much attention has been given to lipids. This paper reviews strategies for increasing the content of beneficial omega-3 polyunsaturated fatty acids (PUFA) and conjugated linoleic acid (CLA) and reducing saturated fatty acids (SFA) in beef. Particular attention is given to intramuscular fat (IMF) and the relationships between fatty acid composition and key meat quality parameters including colour shelf life and sensory attributes. Despite the high levels of ruminal biohydrogenation of dietary PUFA, nutrition is the major route for increasing the content of beneficial fatty acids in beef. Feeding grass or concentrates containing linseed (rich in [α]-linolenic acid, 18:3n - 3) in the diet increases the content of 18:3n - 3 and its longer chain derivative eicosapentaenoic acid (EPA, 20:5n - 3) in beef muscle and adipose tissue, resulting in a lower n - 6:n - 3 ratio. Grass feeding also increases docosahexaenoic acid (DHA, 22:6n - 3). Feeding PUFA rich lipids which are protected from ruminal biohydrogenation result in further enhancement of the PUFA in meat with concomitant beneficial improvements in the ratio of polyunsaturated:saturated fatty acids (P:S ratio) and n - 6:n - 3 ratio. The main CLA isomer in beef is CLA cis-9, trans-11 and it is mainly associated with the triacylglycerol lipid fraction and therefore is positively correlated with level of fatness. The level of CLA cis-9, trans-11 in beef is related to (1) the amount of this isomer produced in the rumen and (2) synthesis in the tissue, by δ -9 desaturase, from ruminally produced trans vaccenic acid (18:1 trans-11; TVA). Feeding PUFA-rich diets increases the content of CLA cis-9, trans-11 in beef. Trans-fatty acids in foods are of rising importance and knowledge of the differential effects of the individual trans isomers is increasing. TVA is the major trans 18:1 isomer in beef and as the precursor for tissue CLA in both animals and man should be considered as a neutral or beneficial trans-isomer. Increasing the content of n - 3 PUFA in beef can influence colour shelf life and sensory attributes of the meat. As the content of n - 3 PUFA increases then sensory attributes such as 'greasy' and 'fishy' score higher and colour shelf life may be reduced. Under these situations, high levels of vitamin E are necessary to help stabilise the effects of incorporating high levels of long chain PUFA into meat. However, grass feeding not only increases n - 3 PUFA and CLA but, due to its high content of vitamin E, colour shelf life is improved. It is evident that opportunities exist to enhance the content of health promoting fatty acids in beef and beef products offering opportunities to add value and contribute to market differentiation. However, it is imperative that these approaches to deliver 'functional' attributes do not compromise on the health value (lipoperoxidation) or the taste of beef products.

Keywords: Beef; Nutrition; Meat quality; Fatty acids; Health

M. Koohmaraie, G.H. Geesink, Contribution of postmortem muscle biochemistry to the delivery of consistent meat quality with particular focus on the calpain system, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 34-43, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXXR7K-1/2/faa6dda58fa14c013dc2296e10cb31e7>)

Abstract:

Tenderness has been repeatedly reported as the most important quality aspect of meat. However, a number of studies have shown that a significant portion of retail meat can be considered tough. As a consequence, a significant consumer segment is willing to pay a premium for guaranteed tender meat. However, apart from measuring the shear force, there is no reliable method to predict tenderness. Most of the branded meat programs therefore attempt to ensure eating quality by controlling some of the factors that affect tenderness.

Meat tenderness is determined by the amount and solubility of connective tissue, sarcomere shortening during rigor development, and postmortem proteolysis of myofibrillar and myofibrillar-associated proteins. Given the effect of postmortem proteolysis on the muscle ultrastructure, titin and desmin are likely key substrates that determine meat tenderness.

A large number of studies have shown that the calpain proteolytic system plays a central role in postmortem proteolysis and tenderization. In skeletal muscle, the calpain system consists of at least three proteases, [mu]-calpain, m-calpain and calpain 3, and an inhibitor of [mu]- and m-calpain, calpastatin. When activated by calcium, the calpains not only degrade substrates, but also autolyze, leading to loss of activity. m-Calpain does not autolyze in postmortem muscle and is therefore not involved in postmortem tenderization. Results from a number of studies, including a study on calpain 3 knockout mice, have shown that calpain 3 is also not involved in postmortem proteolysis. However, a large number of studies, including a study on [mu]-calpain knockout mice, have shown that [mu]-calpain is largely, if not solely, responsible for postmortem tenderization. Research efforts in this area should, therefore, focus on elucidation of regulation of [mu]-calpain activity in postmortem muscle. Discovering the mechanisms of [mu]-calpain activity regulation and methods to promote [mu]-calpain activity should have a dramatic effect on the ability of researchers to develop reliable methods to predict meat tenderness and on the meat industry to produce a consistently tender product.

Keywords: Meat; Tenderness; Postmortem; Calpain

Ahmed Ouali, Carlos Hernan Herrera-Mendez, Gerald Coulis, Samira Becila, Abdelghani Boudjellal, Laurent Aubry, Miguel Angel Sentandreu, Revisiting the conversion of muscle into meat and the underlying mechanisms, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 44-58, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-B/2/49efd8bd0579b54c8c8458450db0e7bd>)

Abstract:

The conversion of muscle into meat is a complex process in which all mechanisms responsible for the development of meat qualities are very likely interdependent. Colour and flavour are thus both dependent on oxidative mechanisms. Oxidation and proteolysis are probably two processes involved in the development of meat tenderness. This paper reviewed the consequences of programmed cell death or apoptosis on muscle cells structure and biochemistry and on meat qualities as well. We therefore look at different new hypothesis susceptible to highlight the meat science field and provide new supports for a more dynamic meat research. One of them which would have appeared evident for our purpose since a decade, deals with the fact that, after animal bleeding, muscle cells have no other alternative to only enter the programmed cell death procedure or apoptosis. If we introduce an early phase corresponding to apoptosis, taking place before the rigor onset and overlapping it, we will see that the known consequences of that process bring forward possible answers to still unexplained observations. After an overview of the actual state-of-the-art in meat science, we will introduce the programmed cell death and its underlying mechanisms. We then described the strong analogies between the known consequences of apoptosis and the postmortem changes affecting a set of different muscle characteristics.

Keywords: Meat qualities; Muscle; pH; Calcium; Caspases; Apoptosis; Cell death

Isabel Walls, Role of quantitative risk assessment and food safety objectives in managing *Listeria monocytogenes* on ready-to-eat meats, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 66-75, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.029.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXXR7K-9/2/57028d8600f68e47a9f1f95a8c4a633d>)

Abstract:

Listeria monocytogenes may be found on ready-to-eat (RTE) meats, posing a public health risk. To minimize the public health impact, an appropriate level of protection (ALOP) can be established for a population with respect to *L. monocytogenes*, and ideally should be based on a scientific assessment of the risk, as well as societal and economic factors. Food safety systems can be based on meeting the ALOP. Food safety objectives (FSO) provide a link between the ALOP and performance objectives that are established to control a foodborne hazard. An FSO can be used as a risk management tool for *L. monocytogenes* in RTE meats, as the FSO establishes the stringency of the measures being used to control the hazard, by specifying the frequency and/or cell number of the pathogen in the food that should not be exceeded at the time of consumption. Typically, this requires setting performance objectives or performance criteria at an earlier point in the food chain, to ensure that the product will meet the FSO. Establishing an FSO requires an assessment of the risk of the hazard to the population of interest. Risk management strategies such as use of HACCP systems and Good Manufacturing Practices can then be used to ensure that the FSO is met.

Keywords: Microbial risk assessment; Food safety objectives; *Listeria monocytogenes*

Tom Humphrey, Frieda Jorgensen, Pathogens on meat and infection in animals - Establishing a relationship using campylobacter and salmonella as examples, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 89-97, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0D7XV-1/2/666f36f69bda2617b8add68234feb9b9>)

Abstract:

A high proportion of human campylobacter and salmonella infections is likely to originate from farm animals, usually directly from the consumption of contaminated meat or milk. Surveillance shows that campylobacter and salmonella genotypes are shared between human case isolates, farm animals and foods, although with the latter there can be marked differences between infection frequency in live animals and contamination rates in raw foods. This is supported by a variety of data from around the world, using a range of different methods. In this paper the evidence for farm animals being the reservoir of human salmonella and campylobacter infection is presented. However, a note of caution is sounded about the complex nature of zoonotic diseases caused by these two pathogens. Thus, many salmonellas and campylobacter types found routinely in food animals do not appear to cause human infections. Is this an artefact of the surveillance and/or microbiological methods used or are some strains of these bacteria genuinely non-pathogenic in man?

Keywords: Campylobacter; Salmonella; Typing; Sources; Epidemiology

M.P. Doyle, M.C. Erickson, Emerging microbiological food safety issues related to meat, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 98-112, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4JW7FJN-1/2/b958e4329da8992820d0d523cfa64bf5>)

Abstract:

Avian influenza viruses and antibiotic-resistant pathogens have become topics of current public health interest. This paper will focus on the significance of these pathogens to the meat industry as well as other emerging microbiological food safety topics likely to impact the meat industry. These include surveillance of foodborne pathogens, microbial source tracking, risk assessment, and human populations at increased risk of infection by foodborne microbes. These emerging issues will likely lead to even greater challenges to producing microbiologically safe meat products than the industry has ever experienced. However, accompanying such challenges will be innovative solutions that provide even greater public health protection to meat-containing foods.

Keywords: Avian flu; Antibiotic resistance; Surveillance; Microbial source tracking; Food attribution; Sensitive populations

J.P. Kerry, M.N. O'Grady, S.A. Hogan, Past, current and potential utilisation of active and intelligent packaging systems for meat and muscle-based products: A review, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 113-130, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.024.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXXR7K-2/2/7990b54e6a9354139a2f4935fa9eb3e8>)

Abstract:

Interest in the use of active and intelligent packaging systems for meat and meat products has increased in recent years. Active packaging refers to the incorporation of additives into packaging systems with the aim of maintaining or extending meat product quality and shelf-life. Active packaging systems discussed include oxygen scavengers, carbon dioxide scavengers and emitters, moisture control agents and anti-microbial packaging technologies. Intelligent packaging systems are those that monitor the condition of packaged foods to give information regarding the quality of the packaged food during transport and storage. The potential of sensor technologies, indicators (including integrity, freshness and time-temperature (TTI) indicators) and radio frequency identification (RFID) are evaluated for potential use in meat and meat products. Recognition of the benefits of active and intelligent packaging technologies by the food industry, development of economically viable packaging systems and increased consumer acceptance is necessary for commercial realisation of these packaging technologies.

Keywords: Meat; Packaging; Active; Intelligent

J.N. Belcher, Industrial packaging developments for the global meat market, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 143-148, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.031.

(<http://www.sciencedirect.com/science/article/B6T9G-4JYTJ91-1/2/e9dbb1313fe5a87efabf98f74af06b32>)

Abstract:

Packaging companies must carefully monitor retail and consumer trends to best utilize, direct, or prioritize their research dollars in developing packaging and packaging systems to meet these demands. This paper reviews packaging developments that are resulting from numerous trends taking place in the meat industry and in the retail sector. Current case ready packaging solutions that meet the needs of retailers to reduce labor in the back of the retail stores, and the consumer needs for a fresh product with excellent quality and palatability are also discussed. It will also review the current packaging options that are being developed to help consumers battle their 'time crunch' with ready meal solutions. Finally, the necessity to increase food safety or eliminate

pathogens while producing a high quality product continues to drive packaging development. Current systems and packaging available for post packaging pasteurization will be discussed.

Keywords: Meat packaging; Case ready fresh red meat; Ready meals; Post packaging pasteurization; Consumers; Technology

Klaus G. Grunert, Future trends and consumer lifestyles with regard to meat consumption, Meat Science, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 149-160, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4JWMFB8-1/2/339c52d44ab0be6d13cf90902509093f>)

Abstract:

Using the food-related lifestyle model as a conceptual framework, one possible trend each is discussed for the following four components of food-related lifestyle: quality aspects, ways of shopping, cooking methods, and purchase motives. These trends refer to the increasing use of extrinsic cues in quality perception, shopping fast and easy vs. shopping in specialized outlets, the role of convenience and meat avoidance in cooking, and the role of concerns about the meat production process in purchasing. Indicators for each of these trends are discussed.

Keywords: Consumers; Lifestyle; Extrinsic cues; Convenience; Meat avoidance

Xavier Gellynck, Wim Verbeke, Bert Vermeire, Pathways to increase consumer trust in meat as a safe and wholesome food, Meat Science, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 161-171, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4JW7FJN-5/2/5468bf212c11502c8b6dbc3f5b02bb>)

Abstract:

This paper focuses on the effect of information about meat safety and wholesomeness on consumer trust based on several studies with data collected in Belgium. The research is grounded in the observation that despite the abundant rise of information through labelling, traceability systems and quality assurance schemes, the effect on consumer trust in meat as a safe and wholesome product is only limited. The overload and complexity of information on food products results in misunderstanding and misinterpretation. Functional traceability attributes such as organisational efficiency and chain monitoring are considered to be highly important but not as a basis for market segmentation. However, process traceability attributes such as origin and production method are of interest for particular market segments as a response to meat quality concerns. Quality assurance schemes and associated labels have a poor impact on consumers' perception. It is argued that the high interest of retailers in such schemes is driven by procurement management efficiency rather than safety or overall quality. Future research could concentrate on the distribution of costs and benefits associated with meat quality initiatives among the chain participants.

Keywords: Food safety; Information; Traceability; Quality assurance schemes

N.J. Simmons, C.C. Daly, C.R. Mudford, I. Richards, G. Jarvis, H. Pleiter, Integrated technologies to enhance meat quality - An Australasian perspective, Meat Science, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 172-179, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.05.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4K0C9K9-8/2/093a7963d314045efa3c26c5e6f41639>)

Abstract:

Ensuring meat quality attributes meet the requirements of the diverse range of markets is a critical component for the continued success of the New Zealand and Australian meat industries. Developing cost-effective and flexible technologies to help meet this requirement is a central objective of a current Meat and Wool New Zealand and Meat and Livestock Australia funded programme. This initiative was developed three years ago; it is a collaborative programme that involves meat scientists, electrical engineers and commercial meat processors.

To ensure this programme successfully delivers technologies and knowledge to the Australasian meat industry, the following strategies have been developed: measurement of meat quality attributes 'on-line' during processing; development of 'expert systems' that can integrate and interpret on-line measurements and development of quality-related feedback systems from the market that can be fed back to producers; and, development of methods to manipulate structural and biochemical events in meat to create new commercial opportunities for both producers and processors.

This paper gives an overview of some of the new technologies that have developed from this programme that are being used commercially or, are undergoing the final stages of commercial validation.

Keywords: pH fall; Carcass chilling; Stimulation; Immobilisation; Electrical stunning; Hot-boning; Meat quality

Eoin Desmond, Reducing salt: A challenge for the meat industry, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 188-196, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4JWDY4N-1/2/e051c49076955eaf7cf6fab3bd210b3f>)

Abstract:

Intake of dietary sodium has been linked to hypertension and consequently increased risk of cardiovascular disease (CVD). The estimated cost of CVD to both the EU and US economies is [euro]169B and \$403B, respectively. Currently the daily sodium adult intake is approximately three times the recommended daily allowance (Ireland and UK) and therefore public health and regulatory authorities are recommending reducing dietary intake of sodium to 2.4 g (6 g salt) per day. Processed meat products comprise one of the major sources of sodium in the form of sodium chloride (salt). Salt has an essential function in meat products in terms of flavour, texture and shelf-life. Apart from lowering the level of salt added to products there are a number of approaches to reduce the sodium content in processed foods including the use of salt substitutes, in particular, potassium chloride (KCl) in combination with masking agents, the use of flavour enhancers which enhance the saltiness of products when used with salt and finally optimising the physical form of salt so that it becomes more functional and taste bioavailable. The ultimate goal of ingredient suppliers and meat processors is to produce reduced sodium meat products that consumers can enjoy as part of an ongoing healthier diet and lifestyle. This article reviews some of the technological aspects of reduced salt meat products and how the meat and food ingredient industries are responding to this current health issue.

Keywords: Salt; Salt reduction; Sodium; Sodium reduction; Meat products; Reduced salt meat products; Health; Sensory and technological aspects

L.C. Hoffman, E. Wiklund, Game and venison - meat for the modern consumer, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 197-208, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4JV448X-3/2/107750954038ee7d3a51cb39a04db209>)

Abstract:

This review focuses on how game meat from southern Africa and venison that are increasingly being imported into Europe and the US addresses consumer issues as pertaining to production (wild, free range or intensive production) and harvesting methods, healthiness (chemical composition, particularly fatty acid composition), and traceability. Although African game meat species are farmed extensively, deer species are farmed using extensive to intensive production systems. However, the increasingly intensive production of the cervids and the accompanying practices associated with this (castration, velvetting, feeding of balanced diets, etc.) may have a negative impact in the near future on the consumer's perception of these animals. These alternative meat species are all harvested in a sustainable manner using acceptable methods. All these species have very low muscle fat contents consisting predominantly of structural lipid components (phospholipid and cholesterol) that have high proportions of polyunsaturated fatty acids. This results in the meat having desirable polyunsaturated:saturated and n - 6:n - 3 fatty acid ratios. The South African traceability system is discussed briefly as an example on how these exporting countries are able to address the requirements pertaining to the import of meat as stipulated by the European Economic Community.

Keywords: Game meat; Deer; Venison; Lipids; Fatty acids; Cholesterol; Kangaroo

D.I. Givens, Kirsty E. Kliem, Rachael A. Gibbs, The role of meat as a source of n - 3 polyunsaturated fatty acids in the human diet, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 209-218, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4JW0WST-1/2/ac3eef8fd064a2deca3403eecbdb309>)

Abstract:

It is considered that consumption of very long chain (VLC, carbon chain length [greater-or-equal, slanted]20) n - 3 PUFAs in most Western populations is sub-optimal and benefits in relation to chronic disease would be gained from increased consumption. This review examines the current contribution that meat makes to dietary intake of VLC n - 3 PUFA and given its current low contribution, how ruminant meat may be enriched. Enrichment both directly with VLC n - 3 fatty acids and indirectly by increasing intake by the animals of [alpha]-linolenic acid (ALNA; C18:3 n - 3) are considered. Since it now appears that dietary ALNA is a very limited source of VLC n - 3 PUFA in humans, the indirect route is controversial but since some forages are rich sources of ALNA this route has many sustainability and environmental attractions. Consideration is also given to the increased concentrations of trans and conjugated fatty acids that will arise from enriching ruminant meat with PUFA.

Keywords: Meat; n - 3 fatty acids; Chronic disease; Forages

Keizo Arihara, Strategies for designing novel functional meat products, *Meat Science*, Volume 74, Issue 1, 52nd International Congress of Meat Science and Technology (52nd ICoMST) 13-18 August 2006 Dublin, Ireland, September 2006, Pages 219-229, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.04.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXXR7K-8/2/f42335681f7590b8f5e25e15a9c2ed64>)

Abstract:

In recent years, much attention has been paid to physiological functions of foods due to increasing concerns for health. Although there has been limited information of physiological functions of meat until recently, several attractive meat-based bioactive compounds, such as carnosine, anserine, L-carnitine, conjugated linoleic acid, have been studied. Emphasizing these activities is one possible approach for improving the health image of meat and developing functional meat products. This

article provides potential benefits of representative meat-based bioactive compounds on human health and an overview of meat-based functional products. Strategies for designing novel functional meat products utilizing bioactive peptides and/or probiotic bacteria, is also discussed. This article focuses particularly on the possibility of meat protein-derived bioactive peptides, such as antihypertensive peptides. There are still some hurdles in developing and marketing novel functional meat products since such products are unconventional and consumers in many countries recognize meat and meat products to be bad for health. Along with accumulation of scientific data, there is an urgent need to inform consumers of the exact functional value of meat and meat products including novel functional foods.

Keywords: Meat; Meat products; Functional foods; Bioactive peptides; Antihypertensive peptides; Probiotics; Prebiotics

A.R. Sen, A. Santra, S.A. Karim, Effect of dietary sodium bicarbonate supplementation on carcass and meat quality of high concentrate fed lambs, *Small Ruminant Research*, Volume 65, Issues 1-2, September 2006, Pages 122-127, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.05.032. (<http://www.sciencedirect.com/science/article/B6TC5-4HGD791-1/2/e32a0ec57a6cd25806e7be8afc7e072a>)

Abstract:

Effect of sodium bicarbonate (NaHCO₃) in high concentrate fed lambs was studied on carcass and meat quality characteristics. Twenty-four weaner (90 days old) Malpura lambs divided into four equal groups (G1, G2, G3 and G4) were fed basal diet (25:75 roughage:concentrate, G1) or basal diet supplemented with 0.75% (G2), 1.50% (G3) and 2.25% (G4) sodium bicarbonate for 90 days. Lambs were slaughtered for carcass and meat quality evaluation. Longissimus dorsi was collected and analysed for meat quality traits. Pre-slaughter weight was higher ($P < 0.05$) in sodium bicarbonate-supplemented (G2, G3, and G4) groups than in the control group (G1). The muscular development as indicated by loin eye area was higher ($P < 0.05$) in the treatment groups (G2, G3 and G4) as compared to control. There were no significant differences ($P > 0.05$) in visceral fat contents in lambs of control and treated groups. The carcass fat content was lesser ($P < 0.05$) in treated lambs than control groups. In leg, the lean content was more ($P < 0.05$) in treated groups (G3 and G4) as compared to control (G1). Cook loss% was higher ($P < 0.05$) in treated groups as compared to control. There was no significant difference ($P > 0.05$) in shear force value of meat from control or treated lambs. It is concluded from the study that dietary supplementation of sodium bicarbonate in high concentrate diets did not exert much influence on carcass and meat quality characteristics. However, the dressing yield improved and total separable carcass fat was reduced by supplementing buffer to high concentrate fed lambs.

Keywords: Carcass; Lambs; Meat quality; Sodium bicarbonate

Andrew C. Beer, Paul C. Southgate, Spat collection, growth and meat yield of *Pinna bicolor* (Gmelin) in suspended culture in northern Australia, *Aquaculture*, Volume 258, Issues 1-4, 31 August 2006, Pages 424-429, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2006.04.014. (<http://www.sciencedirect.com/science/article/B6T4D-4JSMV70-1/2/508ed1bdb23b3fa3f8ba10733c42ef21>)

Abstract:

Five species within the Family Pinnidae were collected on spat collectors at Pioneer Bay, Orpheus Island, north Queensland, Australia. *Pinna bicolor* represented > 99% of recruits. Approximately 950 *P. bicolor* spat recruited to collectors during 12 months of study beginning in late summer (March) with recruitment showing a distinct pulse during March/April with mean (+/- S.E.) recruitment of 72 +/- 7 spat per collector. There was no significant difference between the intensity of recruitment at depths of 2 and 6 m ($P < 0.05$). *P. bicolor* spat grew rapidly following removal from spat collectors and had a mean hinge length (HL) of over 150 mm after 1 year in suspended culture. Gonad development was evident within 12 months and a reduced growth rate at this time

may be attributable to reproductive activity. After 80 weeks, mean (\pm S.E.) HL was 176.5 \pm 3.9 mm with a mean (\pm S.E.) whole wet weight of 114.3 \pm 17.5 g. Tissue wet weight was 27.5 \pm 0.5% of whole wet weight and the wet weight of the posterior adductor muscle was 3.5 \pm 0.1% of whole wet weight and 12.8 \pm 0.3% of tissue wet weight.

Keywords: *Pinna bicolor*; Pinnidae; Spat collection; Recruitment; Growth; Meat yield

Takehisa Yamamoto, Toshiyuki Tsutsui, Takashi Nonaka, Sota Kobayashi, Akiko Nishiguchi, Itsuro Yamane, A quantitative assessment of the risk of exposure to bovine spongiform encephalopathy via meat-and-bone meal in Japan, *Preventive Veterinary Medicine*, Volume 75, Issues 3-4, 17 August 2006, Pages 221-238, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2006.03.003.

(<http://www.sciencedirect.com/science/article/B6TBK-4K07FHM-1/2/e5722423b3684ddb255c790fe1325706>)

Abstract:

The feeding of meat-and-bone meal (MBM) derived from cattle infected with bovine spongiform encephalopathy (BSE) is a major source of BSE infection. The risks of BSE infection via MBM in Japan were examined quantitatively to estimate infectivity to cattle via MBM derived from a single clinically infected animal being rendered. Three routes of exposure were modeled: (i) feeding cattle concentrates containing MBM as an ingredient, (ii) feeding cattle concentrates contaminated with MBM from non-ruminant feed at feed plants and (iii) directly feeding MBM in supplemental form to cattle on farms. The effectiveness of measures designed to restrict the feeding of ruminants with ruminant MBM (feed restriction) as well as differences in the risk of exposure among regions were examined using the model.

The model revealed that the median total infectivity fed to dairy cattle via MBM derived from one infected animal was approximately 0.49 cattle oral ID₅₀ (5th percentile = 0.43 ID₅₀, 95th percentile = 0.54 ID₅₀). This value was reduced by 55% after the addition of MBM to cattle concentrates was restricted in 1996. The risk of exposure in dairy cattle was twice that in beef cattle. Comparisons of regional differences in exposure risk indicated that the risk was highest in a region where 14 of the 20 BSE cases reported to date were born. Our model suggested that the routes of exposure via MBM were unlikely to result in increased propagation of BSE in Japan. Furthermore, despite some regional variation, the risk of exposure declined further after the feed restriction was imposed in 1996.

Keywords: BSE; Meat-and-bone meal; Risk assessment

L. Lu, C. Ji, X.G. Luo, B. Liu, S.X. Yu, The effect of supplemental manganese in broiler diets on abdominal fat deposition and meat quality, *Animal Feed Science and Technology*, Volume 129, Issues 1-2, 4 August 2006, Pages 49-59, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.12.005.

(<http://www.sciencedirect.com/science/article/B6T42-4J2M4DV-1/2/efcb2dccaed1752254d1d5ad1f639277>)

Abstract:

An experiment was conducted using a total of 288 day-old Arbor Acres male broilers to study the effect of supplemental manganese (Mn) levels on carcass traits, meat quality and relative enzyme activities in the abdominal fat and meat. Birds were randomly allotted by body weight to one of six treatments (eight replicate cages of six chicks per cage) in a completely randomized design. Broilers were fed on Mn-unsupplemented maize-soybean meal basal diets containing 9.5 g Ca/kg and 22.74 mg Mn/kg for the first phase of 21 days and adjusted to 8.8 g Ca/kg and 18.86 mg Mn/kg for a second phase of 21 days (42 days total), or fed basal diets supplemented with 100, 200, 300, 400 or 500 mg/kg Mn as Mn sulphate (MnSO₄·H₂O) for the duration of the 42 days. The supplemental Mn level had no effect ($P > 0.05$) on the dressing percentage, the percentage of breast or leg muscles, water-holding capacity, L* value, a* value, shear force, and intramuscular

fat in breast and leg muscles. Additionally, the supplemental Mn level did not influence ($P > 0.05$) pH values in leg muscles, b^* value, malondialdehyde (MDA) content and Mn-containing superoxide dismutase (MnSOD) activity in breast muscle, or malate dehydrogenase (MDH) activity and hormone sensitive lipase (HSL) activity in abdominal fat. However, Mn did influence the content of abdominal fat ($P < 0.01$), pH in breast muscle ($P < 0.05$), b^* value and MDA content in leg muscle ($P < 0.05$). Furthermore, Mn affected lipoprotein lipase (LPL) activities in abdominal fat ($P < 0.001$) and MnSOD activities in leg muscles ($P < 0.05$). Abdominal fat content and LPL activities in the abdominal fat decreased quadratically ($P < 0.01$) as dietary Mn level increased. The pH in breast muscle decreased linearly ($P < 0.01$) with increasing Mn levels. As dietary Mn level increased, MDA content and MnSOD activities in leg muscle decreased and increased quadratically ($P < 0.05$), respectively. The results from the study indicate that the addition of 100 mg Mn/kg to broiler diets might decrease the abdominal fat content by reducing LPL activity in abdominal fat, and decrease MDA content in leg muscle by increasing MnSOD activity in leg muscle.

Keywords: Broilers; Manganese; Carcass traits; Meat quality; Enzyme activities

Arun K. Das, A.S.R. Anjaneyulu, S. Biswas, Effect of carnosine preblending on the quality of ground buffalo meat, Food Chemistry, Volume 97, Issue 3, August 2006, Pages 531-538, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.05.034.

(<http://www.sciencedirect.com/science/article/B6T6R-4GV9878-1/2/9443f1c29efcfe5f3fa6e0682ffeeb9d>)

Abstract:

A study was conducted on carnosine preblending at 0%, 0.5%, 1.0% and 1.5% levels with ground buffalo meat obtained from spent, adult, male Murrah buffalo carcasses, to identify the level of carnosine required for improving the quality of the meat during refrigerated storage at 4 ± 1 [degree sign]C. It was observed that meat samples containing 1.0% and 1.5% carnosine significantly inhibited metmyoglobin formation and brown colour development. Carnosine also improved meat pH, and water-holding capacity and lowered cooking loss and 2-thiobarbituric acid-reacting substances (TBARS) values as compared to control sample. Carnosine also improved desired visual colour and odour, and gave higher LTCU 'R' and chroma of meat samples. Visual colour was inversely correlated with metmyoglobin, aerobic mesophiles and psychrotrophs plate count, and odour was inversely correlated with TBARS values. Use of 1.0% carnosine for preblending extended the shelf life of ground buffalo meat up to 8 days under refrigerated storage.

Keywords: Carnosine; Ground buffalo meat; Preblending; Meat quality

Musleh Uddin, Emiko Okazaki, Moin Uddin Ahmad, Yutaka Fukuda, Munehiko Tanaka, NIR spectroscopy: A non-destructive fast technique to verify heat treatment of fish-meat gel, Food Control, Volume 17, Issue 8, August 2006, Pages 660-664, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.04.009.

(<http://www.sciencedirect.com/science/article/B6T6S-4GCX07D-2/2/b7d494447bf452ab6a5f06dbf72585f7>)

Abstract:

Attempts have been made to assess previous heat treatment of fish-meat gels prepared from walleye pollack and horse mackerel surimi, since surimi-based products have been gaining popularity for their protein quality, low fat content and convenience in consumption. Visible-NIR spectra of gels ($30-90$ [degree sign]C) were collected from 650 to 1100 nm with a surface interactance fibre optic accessory. Partial least squares (PLS) and multiple linear regression (MLR) techniques were employed for data analysis. Spectral changes upon heat treatment were related to the heating temperature which reflected the changes in the environment of the secondary structure due to the denaturation of proteins, and to changes in the state of water. A promising linear relationship ($R = 0.98$) was observed between NIR-predicted temperatures and the actual heating temperatures with prediction error of 1.85 [degree sign]C.

Keywords: Fish-meat gel; Heat treatment; NIR spectroscopy; MLR; PLS

H.J. Kadhum, H.J. Ball, E. Oswald, M.T. Rowe, Characteristics of cytotoxic necrotizing factor and cytolethal distending toxin producing *Escherichia coli* strains isolated from meat samples in Northern Ireland, *Food Microbiology*, Volume 23, Issue 5, August 2006, Pages 491-497, ISSN 0740-0020, DOI: 10.1016/j.fm.2005.07.003.

(<http://www.sciencedirect.com/science/article/B6WFP-4H2PJJR-1/2/fc13a88f7f00c3831972957821642371>)

Abstract:

Swabs collected from pig, lamb and beef carcasses and samples of pork, lamb and beef mince were cultured for *Escherichia coli* strains. Strains harbouring cytotoxic necrotizing factors (CNF1 and 2) and cytolethal distending toxins (CDT-I,-II,-III and -IV) were identified in plate cultures of the isolates by colony hybridization with labelled probes and multiplex PCR assays. Simplex and multiplex PCR assays were used to further characterize the isolates to determine the presence of P, S and F17 fimbriae as well as afimbrial adhesins and haemolysin. The serotype was also determined where possible. Thirty strains with the capacity to code for CNF (4), CDT (24) or both (2) were isolated and characterized, and a wide range of associated factor patterns was observed. The methods utilized were successful in demonstrating the detection of viable strains with potentially significant pathogenic factors from human food sources.

Keywords: Pathogenic *Escherichia coli*; Meat

Ryouta Takahashi, Francis Shahada, Takehisa Chuma, Karoku Okamoto, Analysis of *Campylobacter* spp. contamination in broilers from the farm to the final meat cuts by using restriction fragment length polymorphism of the polymerase chain reaction products, *International Journal of Food Microbiology*, Volume 110, Issue 3, 1 August 2006, Pages 240-245, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.04.043.

(<http://www.sciencedirect.com/science/article/B6T7K-4K8S5F6-4/2/a86c58e432098aa4d6ca9c2db63d918e>)

Abstract:

We investigated the genotype diversity and dynamics of *Campylobacter jejuni* and *Campylobacter coli* in six commercial broiler farms during rearing and abattoir processing. In total, 223 *C. jejuni* and 36 *C. coli* strains isolated (on farm, transportation crates, carcasses after defeathering, and chicken wing meat at the end of the processing line) were subtyped by PCR-RFLP based on flagellin (fla typing) gene. Eleven (*C. jejuni*) and four (*C. coli*) different RFLP patterns were found. Multiple *C. jejuni* genotypes were identified in five out of six farms (except Farm 5). Furthermore, a clear tendency for dominance of particular genotypes was observed in almost all farms except Farm 3. Although diverse *C. jejuni* genotypes were isolated on the farms and transport crates, they were not detected in chicken wing cuts at the end of the processing line. We also observed varied distribution of types in different sampling stages both at the farm level and the processing environment. However, the interpretation of such fluctuations is precarious as new types occurred on some occasions, particularly during processing. Our results show that chicken wing meat contamination resulted mainly from farm strain carryover, and that the carcasses were probably contaminated during processing. In addition, the new strain types observed were isolated more frequently after defeathering as compared to other processing steps. Therefore, this stage, in addition to evisceration, is one of the critical control points in the processing line to prevent cross-contamination and for controlling the spread of campylobacters.

Keywords: *Campylobacter jejuni*; *C. coli*; Broiler contamination; PCR-RFLP

T.X. Jin, L. Xu, Development and validation of moisture movement model for vacuum cooling of cooked meat, *Journal of Food Engineering*, Volume 75, Issue 3, August 2006, Pages 333-339, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.04.022.

(<http://www.sciencedirect.com/science/article/B6T8J-4GDK9FS-1/2/641ea6bbb5961e641921ee9cf9fdd108>)

Abstract:

The objective of this work is to develop and validate moisture movement model for vacuum cooling of cooked meat. Vacuum cooling of cooked meat with cylindrical shape was carried out to obtain the variations of temperature, moisture content and evaporation rate. Developed model was tested by the experimental data. The calculated results were compared with the experimental data. The maximum deviation between the calculated and the experimental temperatures is within 10 [degree sign]C. The results show that moisture movement model can predict the temperature and pressure distributions within the cooked meat. In addition, the calculated and experimental results suggest that total pressure differences within cooked meat and between cooked meat and vacuum chamber are the major driving forces of moisture movement that controls the vacuum cooling rate.

Keywords: Moisture movement; Vacuum cooling; Cooked meat

S. Barbut, Effects of caseinate, whey and milk powders on the texture and microstructure of emulsified chicken meat batters, LWT - Food Science and Technology, Volume 39, Issue 6, August 2006, Pages 660-664, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.03.017.

(<http://www.sciencedirect.com/science/article/B6WMV-4G9GP2V-2/2/0ba4470d88e629aa30b7d832202bfe10>)

Abstract:

The effects of adding dry caseinate, whole milk, skim milk, regular, and modified whey protein powders, at a level of 2 g/100 g, to meat batters were studied. All dairy additives, except for the regular whey, significantly reduced cook loss (30-50% reduction). Caseinate and modified whey formed distinct dairy protein gel regions within the meat batters, as revealed by light microscopy. Both also contributed more to enhancing the textural properties of the meat batters compared to the other dairy proteins; i.e., increasing texture profile analysis fracturability, and hardness, respectively. Overall, the most cost-effective ingredient appeared to be the modified whey, which also provided the best moisture retention.

Keywords: Chicken; Dairy; Microstructure; Milk; Poultry; Protein; Texture

J. Carballo, J. Ayo, F. Jimenez Colmenero, Microbial transglutaminase and caseinate as cold set binders: Influence of meat species and chilling storage, LWT - Food Science and Technology, Volume 39, Issue 6, August 2006, Pages 692-699, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.03.020.

(<http://www.sciencedirect.com/science/article/B6WMV-4G94J2X-3/2/10cd03920c4b3854b3bdc23f6106722c>)

Abstract:

The effect of microbial transglutaminase/sodium caseinate (MTG/C) systems on meat batter characteristics (water binding and textural properties of raw and cooked products) was studied in the presence of NaCl (1.5 g/100 g) and sodium tripolyphosphate (0.5 g/100 g), and storage time (96 h at 3 [degree sign]C) for three meat species (pork, chicken, lamb). Samples prepared from pork and lamb with only MTG/C (no salts) had the highest cooking loss (CL) values, about 23 and 29 g/100 g, respectively; for chicken, the CL was less than 13 g/100 g. Hardness (Hd) and chewiness (Cw) generally tended to be higher in cooked samples containing MTG/C than in samples containing only salts. Products combining salts and MTG/C had higher (P<0.05) Hd and Cw. The efficiency of the MTG/C system as a texture conditioner of cooked products varied with the meat source.

Keywords: Pork; Chicken; Lamb; Meat batters; Microbial transglutaminase; Caseinate; Physicochemical characteristics

Monika Simonova, Viola Stropfova, Miroslava Marcinakova, Andrea Laukova, Satu Vesterlund, Mariluz Latorre Moratalla, Sara Bover-Cid, Carmen Vidal-Carou, Characterization of *Staphylococcus xylosum* and *Staphylococcus carnosus* isolated from Slovak meat products, *Meat Science*, Volume 73, Issue 4, August 2006, Pages 559-564, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4JMKWR5-3/2/2f915c33d2ad11f2048cc10b3d55232b>)

Abstract:

The aims of this study were to isolate, identify and characterize the population of coagulase-negative staphylococci in different types of Slovak traditional sausages and to determine the metabolic properties of selected *Staphylococcus xylosum* and *S. carnosus* strains for the selection of potential starter cultures to use in the processing of sausages. The strains were tested for lactic acid production, survival in the presence of bile and sensitivity to antibiotics. Bacteriocin production, adhesion ability as well as biogenic amine (BA) production by isolates were also analysed. Most of the isolates were identified as *S. xylosum* and *S. carnosus*. Lactic acid values ranged from 0.40 to 1.03 mmol/l and strains survived in the presence of 1% bile. Most of the strains studied were sensitive to all antibiotics. Two strains, *S. xylosum* SO3/1M/1/2 and *S. carnosus* SO2/F/2/5 inhibited *Listeria innocua* and *Pseudomonas* sp. *S. xylosum* strains did not produce any BA, while *S. carnosus* SO2/F/2/5 did. *S. xylosum* SO3/1M/1/2 and *S. carnosus* SO2/F/2/5 appeared as the most adhesive strains. *S. xylosum* SO3/1M/1/2 with antimicrobial activity against *Enterococcus avium* EA5, *L. innocua* LMG13568 and *Pseudomonas* sp. SO1/1M/1/4, adhesion ability and free BA production could be used as starter culture in sausage manufacture.

Keywords: *Staphylococcus xylosum*; *S. carnosus*; Fermented sausage; Bacteriocin

Omer Zorba, Sukru Kurt, Optimization of emulsion characteristics of beef, chicken and turkey meat mixtures in model system using mixture design, *Meat Science*, Volume 73, Issue 4, August 2006, Pages 611-618, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4JXR5F6-1/2/ab4afe41bc4bea11c0f04019bf33261d>)

Abstract:

Emulsion pH (pHe), emulsion capacity (EC), emulsion stability (ES), emulsion density (ED) and apparent yield stress of emulsion (raw emulsion, AYSe) and emulsion gel (cooked emulsion, AYSg) of beef, chicken and turkey meats and their mixtures were studied using a model system.

Turkey meat homogenate was found to have higher protein concentration than chicken or beef homogenates. The highest pHe, EC and ES values and the lowest ED and AYSe values were found in chicken meat. However, the highest AYSg value was found in chicken-turkey meat mixture. Generally, the increasing amount of chicken meat in mixtures increased EC and ES, and decreased ED and AYSe values. Also, chicken-turkey meat mixtures had lower ES values than the mixtures containing only chicken or only turkey meat. With beef, the addition of chicken and turkey meats improved emulsion characteristics significantly. Optimum levels of beef, chicken and turkey meats were found to be 0-23%, 9-30% and 53-91% respectively.

Keywords: Emulsion; Capacity; Yield stress; Mixture design

I.T. Kadim, O. Mahgoub, A. Al-Kindi, W. Al-Marzooqi, N.M. Al-Saqri, Effects of transportation at high ambient temperatures on physiological responses, carcass and meat quality characteristics of three breeds of Omani goats, *Meat Science*, Volume 73, Issue 4, August 2006, Pages 626-634, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4JWFMRJ-2/2/51c8a11f64ecef72bd49338df6173f0f>)

Abstract:

The experiment was designed to determine the effects of short road transportation in an open truck during the hot season on live weight shrink, physiological responses, carcass, and meat quality characteristics in three breeds of Omani goats. Forty-two male goats (12 months of age) representing equally three breeds of Omani goats (Batina, Dhofari, and Jabal Akhdar) were divided into two groups: 2 h transportation stress (TS) or not transported (NT). The NT group remained unstressed in holding pens with feed and water provided ad libitum prior to slaughter, while the TS group was transported on the day of slaughter 100 km in an open truck. The average temperature during transportation was 37 [degree sign]C. All animals were blood-sampled before loading and prior to slaughter via jugular venipuncture. Animals were weighed just before loading onto a truck and after transport to assess shrinkage. Muscle shear force, sarcomere length, pH, expressed juice, color, and cooking loss were measured on samples from Mm longissimus dorsi (LD), biceps femoris (BF), and semitendinosus (ST) muscles collected at 24 h postmortem at 1-3 [degree sign]C. Live weight shrinkage losses were between 1.07 and 1.28 kg. The TS goats had higher plasma cortisol ($P < 0.01$), adrenaline, nor-adrenaline, and dopamine concentrations ($P < 0.05$) than NS goats. Blood serum from Batina goats had significantly ($P < 0.05$) higher cortisol, adrenaline and dopamine and nor-adrenaline concentrations than those from Jabal Akhdar goats. Transportation stress had a significant ($P < 0.05$) effect on meat quality characteristics of the LD, BF, and ST muscles. Meat from TS goats had significantly higher ultimate pH, expressed juice, cooking loss percentage, shear force, but significantly lower sarcomere length, L^* , a^* , and b^* values. LD muscles of Batina goats had significantly higher ultimate pH values and lower L^* values than Dhofari and Jabal Akhdar goats. These results indicated that subjecting goats to the 2-hour road transportation with high ambient temperatures can generate major physiological and muscle metabolism responses.

Keywords: Goats; Breed; Meat quality; Stress; Blood metabolite

M. Hermida, M. Gonzalez, M. Miranda, J.L. Rodriguez-Otero, Mineral analysis in rabbit meat from Galicia (NW Spain), *Meat Science*, Volume 73, Issue 4, August 2006, Pages 635-639, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4JH6C7N-1/2/4e2c76d13508401a1eb13da0407128d7>)

Abstract:

A total of 54 rabbits 50, 70 and 90 days old, were taken from farms in Galicia (NW Spain); 18 rabbits of each age were sampled. The minerals in the muscle meat from the back legs of the rabbits were analysed, and the following average concentrations were found: ash 1.21/100 g, potassium 388 mg/100 g; phosphorus 237 mg/100 g; sodium 60 mg/100 g; magnesium 27 mg/100 g; calcium 8.7 mg/100 g; zinc 10.9 mg/kg; iron 5.56 mg/kg; copper 0.78 mg/kg; and manganese 0.33 mg/kg.

The high potassium and low sodium concentration may make rabbit meat particularly recommended for hypertension diets. Rabbit meat is rich in phosphorus, and 100 g provides approximately 30% of the recommended daily intake. However, rabbit meat provides less zinc and iron than meats of other species. The Galician rabbit meat analysed in this study, shows higher copper and manganese, and lower calcium contents than those found in the literature for rabbit meat of other origins.

Keywords: Rabbit meat; Macrominerals; Trace elements

P. Hernandez, B. Arino, A. Grimal, A. Blasco, Comparison of carcass and meat characteristics of three rabbit lines selected for litter size or growth rate, *Meat Science*, Volume 73, Issue 4, August 2006, Pages 645-650, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.03.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4JWMXPP-2/2/f7fe307a8a75142ad3dd3aef02007138>)

Abstract:

Rabbits from three synthetic lines were compared. Line V and A were selected for litter size at weaning and line R was selected for growth rate between weaning and slaughter time. Forty animals of each line were slaughtered at 9 week of age. Comparisons between lines were made using Bayesian statistical techniques. Line R had a higher meat/bone ratio, higher loin percentage and higher ultimate pH of *M. Longissimus lumborum* (LL) than A and V, but lower dressing out and lower hind part percentages. Some differences between lines in carcass and meat colour were found. No differences were found for percentage of released water of LL and for the activity of energy metabolic enzymes. At present, rabbit carcasses are not costed according to their retail cuts or meat/bone ratio, but dressing out percentage is taken into account, thus breeding companies should be concerned about lower carcass yield of lines selected by growth rate.

Keywords: Rabbit; Line comparison; Bayesian statistics; Meat quality

S.A. Soto-Navarro, R. Puchala, T. Sahlu, A.L. Goetsch, Effects of dietary ratios of fish and blood meals on sites of digestion, small intestinal amino acid disappearance and growth performance of meat goat wethers, *Small Ruminant Research*, Volume 64, Issue 3, August 2006, Pages 255-267, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.04.026.

(<http://www.sciencedirect.com/science/article/B6TC5-4GC1RFX-2/2/1cbb1eec7a45ebf34a0aea51959d4d5e>)

Abstract:

Six yearling Boer x Spanish wether goats (37 +/- 1.6 kg initial live weight; LW) and 24 growing Boer x Spanish and 24 Spanish wethers (21 +/- 3.1 and 20 +/- 2.6 kg initial LW, respectively) were used to determine the effects of total CP and two supplemental protein sources (fish meal, FIM; blood meal, BLM) in a 70% concentrate diet on sites of digestion, small intestinal amino acid disappearance and growth performance. Diets were formulated to be 12 or 15% CP (DM basis), with predicted ruminally undegraded intake protein (UIP) from FIM and BLM of 1.2 and 3.0% DM, respectively, achieved from FIM supplying 100, 67 and 33% and BLM 0, 33 and 67%, respectively (100F, 67F and 33F, respectively). True ruminal OM and N digestibilities were greater ($P < 0.05$) for 12% versus 15% CP and decreased linearly ($P < 0.05$) as level of FIM decreased. Duodenal flows of both microbial and non-microbial, non-ammonia (feed plus endogenous) N were greater ($P < 0.05$) for 15% than for 12% CP and increased linearly with decreasing FIM level in the diet. Correspondingly, small intestinal disappearance of essential amino acids was greater ($P < 0.05$) for 15% versus 12% CP and increased ($P < 0.05$) with decreasing FIM. In an 18-week growth experiment, DM intake (935 g/day versus 783 g/day), average daily gain (ADG; 145 g versus 108 g) and ADG:DM intake (155 g/kg versus 138 g/kg) were greater ($P < 0.05$) for Boer x Spanish compared with Spanish wethers. Regardless of genotype, neither level of total CP nor of FIM influenced growth performance. In conclusion, with diets relatively high in concentrate and a CP level of 12%, amino acid requirements of common genotypes of growing meat goats in the US may be satisfied by basal dietary ingredients, with little or no potential to enhance performance by addition of feedstuffs high in UIP regardless of amino acid profile.

Keywords: Meat goats; Crude protein; Amino acids

Carlos Hernan Herrera-Mendez, Samira Becila, Abdelghani Boudjellal, Ahmed Ouali, Meat ageing: Reconsideration of the current concept, *Trends in Food Science & Technology*, Volume 17, Issue 8, August 2006, Pages 394-405, ISSN 0924-2244, DOI: 10.1016/j.tifs.2006.01.011.

(<http://www.sciencedirect.com/science/article/B6VHY-4JFHF15-1/2/5d69223f1157fe3da40646e18f137336>)

Abstract: Summary

Meat tenderisation is majoritarily enzymatic in nature and involves endogenous proteolytic systems. Up to date, scientists have focused their attention on two systems, i.e. the cathepsins and the calpains. Most of them actually considered that calpain system and especially calpain 1 is the most important and can explain a large part, if not all, of the variability in meat tenderness.

However, this assumption has never been definitely proven. We, therefore, look at different new hypothesis susceptible to open a new door for a more dynamic research in the meat science field. One of them which would have appeared evident for our purpose since 10 years deals with the fact that after animal bleeding, muscle cells have no other alternative to only enter the programme cell death procedure or apoptosis. If we introduce a precece phase corresponding to apoptosis, we will see that the known consequences of that process bring forward answers to numerous still unexplained observations. This review intended to present in the first part what is programmed cell death and its underlying mechanisms. We then described the strong analogies between the known consequences of apoptosis and the post-mortem changes affecting a set of different muscle characteristics.

Keywords: Meat ageing; Tenderness; Muscle; pH; Calcium; Caspases; Apoptosis

Ester Peeters, Bert Driessen, Christel P.H. Moons, Frank O. Odberg, Rony Geers, Effect of temporary straw bedding on pigs' behaviour, performance, cortisol and meat quality, *Applied Animal Behaviour Science*, Volume 98, Issues 3-4, July 2006, Pages 234-248, ISSN 0168-1591, DOI: 10.1016/j.applanim.2005.10.002.

(<http://www.sciencedirect.com/science/article/B6T48-4HJRRJF-1/2/74a83a0d9ce609ff097b6082e19bd7eb>)

Abstract:

The effect of temporary straw bedding for a period of 6, 4, or 2 weeks before slaughter was studied on pigs' performance, behaviour, cortisol concentration, intermediary metabolism, and meat quality. Pigs were barren housed on slatted concrete floors during growth and allocated to one of following four treatments (T): straw bedding during 6 weeks (6wk), 4 weeks (4wk), 2 weeks (2wk) before slaughter, and a control treatment without straw bedding (0wk). This experiment was replicated six times but in two replicates T6wk could not be included. A total of 220 pigs were involved, of which 132 served as focal animals for behavioural observations. The meat quality of 110 of these pigs was measured and 48 pigs were also sampled for salivary cortisol. The pigs of T6wk and T4wk had a higher average daily weight gain after 2 weeks of straw bedding, whereas no differences in feed intake or feed conversion were observed over the whole test period, nor effects on carcass weight or back fat thickness. The weekly observation of the focal animals during 5 min showed that straw provision decreased pen manipulation ($P = 0.001$) and pen mate manipulation ($P = 0.0001$). The time pigs spent on postures and specific behaviours like eating, biting and fighting was not different between treatments. Saliva samples, taken every 2 weeks, revealed no cortisol concentration differences between the treatments. No differences in plasma cortisol, glucose, lactate, or NEFA concentrations were found at slaughter. The concentration of creatine kinase tended to be lower in pigs of T6wk compared to pigs of T0wk ($P = 0.07$). No treatment effects on skin lesions of the front, middle, and hind regions were observed in the slaughter line. Finally, meat quality measurements in the longissimus dorsi muscle revealed no differences in pH 45 min post-mortem or in pH, electrical conductivity, colour, and water-holding capacity 24 h post-mortem. It is concluded that straw redirects the pigs' behaviour from pen manipulation and pen mate manipulation to straw manipulation after straw provision, but that there are no or only minor differences in carcass quality, cortisol concentrations, intermediary metabolites, and meat quality of pigs given a temporary straw bedding of 6, 4, or 2 weeks before slaughter or no straw.

Keywords: Behaviour; Cortisol; Meat quality; Performance; Pigs; Straw

Ronald B. Pegg, Ryszard Amarowicz, William E. Code, Nutritional characteristics of emu (*Dromaius novaehollandiae*) meat and its value-added products, *Food Chemistry*, Volume 97, Issue 2, July 2006, Pages 193-202, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.04.002.

(<http://www.sciencedirect.com/science/article/B6T6R-4G7NT70-4/2/5e015e23ca957f2ca919accee35ed251>)

Abstract:

The objectives of the present study were to ascertain the nutritional value (i.e., macro and microconstituents) of emu (*Dromaius novaehollandiae*, Latham) meat and a value-added product derived therefrom. The contents of creatine, creatinine and phosphocreatine in fresh emu meat and the impact of processing on these bioactives during the production of jerky were of particular interest. For comparative purposes, a beef counterpart was prepared. The proximate compositional data indicated that the macroconstituents of emu meat and the fabricated jerky product were not so different from their beef analogues. Analysis of the microconstituents in emu samples revealed that the levels of a number of nutritionally important oil- and water-soluble vitamins and minerals were typical of those for red meat species. The creatine content in emu meat (29.3 mg/g dry matter) was similar to that of beef; slightly higher creatine levels were detected, however, in the emu jerky (22.8 mg/g dry matter) compared to its beef counterpart, and these were significant ($P < 0.01$) when the data was analysed on a dry weight basis. This demonstrates a potential for the emu meat snack to be considered as a functional food for athletes looking for performance enhancement, and who are interested in consuming greater quantities of creatine from a natural food source.

Keywords: Emu meat; Jerky; Creatine; Minerals; Vitamins; Ergogenic dietary aid; Functional food; Compositional analysis

Takeshi Nagai, Reiji Inoue, Norio Kanamori, Nobutaka Suzuki, Toshio Nagashima, Characterization of honey from different floral sources. Its functional properties and effects of honey species on storage of meat, *Food Chemistry*, Volume 97, Issue 2, July 2006, Pages 256-262, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.03.045.

(<http://www.sciencedirect.com/science/article/B6T6R-4GDKB40-3/2/8e19fe775d1ad12a294abb625f23c723>)

Abstract:

The antioxidative effects of honey species and their related products were evaluated using a lipid peroxidation model system. The antioxidant activities of honey species gradually decreased with passage of time. Buckwheat honey was as effective as 1 mM [α]-tocopherol. Superoxide-scavenging activities of propolis and royal jelly were strongest among the honey species tested. 1,1-Diphenyl-2-picrylhydrazyl radical scavenging ability of sample species were lower than those of 1 mM ascorbic acid and [α]-tocopherol. Hydroxyl radical scavenging activity was very high in all honeys (over 77% inhibition). From the results of the bacterial test on storage of meat and muscle, each honey exhibited the inhibition of bacterial growth. In particular, propolis and royal jelly exhibited the strongest inhibitory effects against bacterial growth. This suggests that honey species from different floral sources possess strong antioxidative and antibacterial activities and are scavengers of active oxygen species.

Keywords: Honey species; Royal jelly, Propolis; Antioxidative activity; Scavenging abilities against active oxygen species; Antibacterial activity

Sweetie R. Kanatt, Ramesh Chander, Arun Sharma, Effect of radiation processing of lamb meat on its lipids, *Food Chemistry*, Volume 97, Issue 1, July 2006, Pages 80-86, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.03.024.

(<http://www.sciencedirect.com/science/article/B6T6R-4G6J8BV-2/2/827b49984334a84af0a6a9cd27d9c706>)

Abstract:

The changes in lipid content of radiation processed lamb meat were investigated. Meat from the rib region of lamb had almost double the lipid content found in the leg region. No differences were observed in the lipid profile of the radiation processed and non-irradiated meat. TLC detected all the five major classes of lipids in both irradiated and non-irradiated meat. However, there was a radiation dose dependent decrease in phospholipid (PL) and cholesterol content, while an

increase was observed in the free fatty acid content. The predominant fatty acids present were oleic acid, palmitic acid and stearic acid. There was a significant decrease in the ratio of PUFA/SFA of phospholipids on irradiation. Lipid peroxidation measured in terms of thiobarbituric acid-reactive substances (TBARS) increased on irradiation and chilled storage.

Keywords: Lipid; Irradiation; Lamb; Fatty acid composition; Phospholipids

Peter M. Horchner, Denis Brett, Bruce Gormley, Ian Jenson, Andrew M. Pointon, HACCP-based approach to the derivation of an on-farm food safety program for the Australian red meat industry, *Food Control*, Volume 17, Issue 7, July 2006, Pages 497-510, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.02.012.

(<http://www.sciencedirect.com/science/article/B6T6S-4G0DDY2-1/2/0ea236d96d8e25532a4c4604a074ee3d>)

Abstract:

The standard Codex HACCP approach was modified to allow a hazard analysis to be conducted at an industry level which could then be used to derive appropriate on-farm food safety control measures for cattle, sheep and goat production in Australia. Scientific information from a through chain risk profile of the red meat industry was used as a major resource for the hazard analysis. The process resulted in the identification of critical control points for control of bovine spongiform encephalopathy (BSE), prevention of violations of maximum residue limits with agricultural and veterinary chemicals and infection with *Cysticercus bovis* (Beef Measles). By applying this HACCP-based approach it was determined that the application of a simple set of good agricultural practices (GAP) on-farm would be effective in ensuring low risk. It was, therefore, concluded that on-farm food safety schemes may not warrant full HACCP plans at the individual enterprise level as long as appropriate GAP is in place. The results provide red meat producers with the elements of a HACCP-based food safety scheme that is scientifically justifiable, understandable and realistic to apply which are essential elements that underpin successful implementation and compliance by industry. Subsequently, an on-farm food safety program has been developed to provide an appropriate level of protection for consumers as well as to protect Australia's trade from food safety-related issues.

Keywords: HACCP; Meat safety; Farm

T. Zorman, M. Heyndrickx, S. Uzunovic-Kamberovic, S. Smole Mozina, Genotyping of *Campylobacter coli* and *C. jejuni* from retail chicken meat and humans with campylobacteriosis in Slovenia and Bosnia and Herzegovina, *International Journal of Food Microbiology*, Volume 110, Issue 1, 1 July 2006, Pages 24-33, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.03.001.

(<http://www.sciencedirect.com/science/article/B6T7K-4K0FFN0-1/2/84b61f382793c54d00c3e82b72483461>)

Abstract:

Thermotolerant *Campylobacter jejuni* and *C. coli* are one of the major causes of bacterial foodborne enteric infection. Consuming and/or handling poultry meat is the most consistent risk factor, linked to the high prevalence of campylobacters in retail poultry meat. The aim of the present study was to ascertain the genetic diversity and/or possible specificity of thermotolerant *Campylobacter* isolates according to species (*C. coli*, *C. jejuni*), isolation source (retail chicken meat and human clinical samples) and geographic origin (Goriska in Slovenia and Zenica-Doboj Canton in Bosnia and Herzegovina (BIH)). With the pulsed-field gel electrophoresis (PFGE) after *Sma*I macrorestriction we distinguished 80 PFGE types among 118 strains and *Cfo*I restriction fragment length polymorphism of the amplified flagellin gene (*fla*-RFLP) gave 12 *fla*-RFLP types. Beside the higher discriminatory power and strain typeability, PFGE discriminated the *C. jejuni* and *C. coli* groups of isolates. A high proportion of *C. coli* strains was isolated, especially from poultry samples. Identical or very similar PFGE types among the isolates from animal, food and human samples indicate the transmission of *C. jejuni* and *C. coli* from the chickens on the farm to the

retail chicken meat, as well as possible cross-contamination of retail meat and transmission to humans. However, the identity of the isolates from non-related samples but with identical PFGE and fla-RFLP types should be confirmed with additional typing. Reliable tracing of the source of *Campylobacter* strains by molecular typing of the chicken meat isolates is therefore very difficult. The reasons include contamination of meat samples with multiple strains, possible cross-contamination and extreme heterogeneity of the isolates (mainly for *C. jejuni*) on one side and a limited power of the genotyping methods used to distinguish non-related strains on the other side (mainly for *C. coli*).

Keywords: *Campylobacter coli*; *Campylobacter jejuni*; PFGE; fla-RFLP; Chicken meat; Human campylobacteriosis

R.R.B. Singh, K.H. Rao, A.S.R. Anjaneyulu, G.R. Patil, Water desorption characteristics of raw goat meat: Effect of temperature, *Journal of Food Engineering*, Volume 75, Issue 2, July 2006, Pages 228-236, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.04.013.

(<http://www.sciencedirect.com/science/article/B6T8J-4GTVYBH-1/2/8c24305ba1fb931c35d54d19952c96d1>)

Abstract:

Moisture desorption isotherms of raw goat meat were obtained at 10, 25 and 50 [degree sign]C. Sigmoid desorption isotherms were observed for these samples. The sorption data were analyzed using mathematical equations of BET, Caurie, Halsey, modified Mizrahi, Oswin and GAB. The modified Mizrahi and GAB equations gave the best fit over the entire temperature range. The temperature dependence of GAB constants was evaluated and excellent fit was obtained. The net isosteric heats of sorption were calculated by applying Clausius-Clapeyron equations. The GAB and BET monolayer moisture values were not significantly different ($P > 0.01$) and decreased with increasing temperature. Number of adsorbed monolayers, density and amount of bound water and surface area of adsorption (Caurie's equations) also decreased as the sorption temperature increased. The pores, in general, enlarged with rising temperature.

Keywords: Raw goat meat; Sorption isotherm models; Monolayer moisture; Isosteric heats of sorption; Bound water; Pore size

J.-R. Ji, K. Takahashi, Changes in concentration of sarcoplasmic free calcium during post-mortem ageing of meat, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 395-403, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4JVSWXC-1/2/658397822510b6736e2afb680bef2a7d>)

Abstract:

We studied post-mortem changes in the concentrations of sarcoplasmic free calcium in various meats to clarify the tenderisation mechanism of meat, taking sufficient care to prevent contamination with calcium ions other than those in meat. When minced meats were homogenised and concentrations of soluble calcium ions were determined by atomic absorption spectrophotometry, it was found that the concentration of free calcium increased, the rate of increase varying depending on the species, and reached a narrow range of 210-230 [μ]M regardless of the anatomical class of skeletal muscle, chronological ageing or animal and fowl species. The calcium concentration was 100 nM immediately post-mortem when homogenisation was performed in the presence of 2 mM ATP. Phospholipids were liberated from the sarcoplasmic reticulum during ageing of meat. It is likely that calcium ions leak into the sarcoplasm through channels formed by phospholipid liberation.

Keywords: Sarcoplasmic calcium; Post-mortem changes; Meat tenderisation; Post-mortem ageing; Calcium theory

Isabelle Ortigues-Marty, Emilie Thomas, D.P. Preveraud, Christiane L. Girard, D. Bauchart, D. Durand, A. Peyron, Influence of maturation and cooking treatments on the nutritional value of bovine meats: Water losses and vitamin B12, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 451-458, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4JCCM6G-4/2/20e0de543ca166a601d86fe195e26d8f>)

Abstract:

The aim of the study was to determine the influence of maturation and of cooking processes on water losses and on the vitamin B12 content of meat. Three types of muscle (*Longissimus lumborum*, *Longissimus thoracis* and *Triceps brachii*) were sampled from a total of 16 animals, representative of animals raised for meat production in France. Three durations of maturation were compared: 1, 3 and 14 days. Different cooking processes were applied: *Longissimus lumborum* was deep-fat fried or roasted, *Longissimus thoracis* was pan fried or grilled and *Triceps brachii* was braised. The cooking yield averaged 55-56% for *Triceps brachii*, 73-77% for *Longissimus lumborum* and 85-87% for *Longissimus thoracis*. Vitamin B12 concentration in raw meat was significantly higher in *Triceps brachii* than in *Longissimus lumborum* and *Longissimus thoracis* (20.86, 11.53 and 9.21 ng/g wet tissue, in the same respective order). When expressed on a wet weight basis, all concentrations were significantly increased by cooking. When expressed on a lipid-free dry basis, significant losses in vitamin B12 were measured only in the braised *Triceps brachii* (-25%) and in the deep-fat fried *Longissimus lumborum* (-5.5%) as a result of long duration and high temperature of cooking, respectively. Maturation did not affect the vitamin B12 content of meat, whether raw or cooked.

Keywords: Meat; Nutritional value; Cooking; Vitamin B12; Muscles

S. Barbera, S. Tassone, Meat cooking shrinkage: Measurement of a new meat quality parameter, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 467-474, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4JJ884W-3/2/0bf71c239571d22bba5a3282518742f9>)

Abstract:

A parameter, meat cooking shrinkage (MCS), has been introduced based on investigations carried out on meat shrinkage caused by heat during cooking. MCS is the difference between the raw and cooked areas of the meat sample, expressed as a percentage of the raw area. The method uses a disk of meat (10 mm thick and 55 mm wide) measured before and after cooking in a hot air oven at 165 [degree sign]C for 10 min, the meat having reached an internal temperature of 70 [degree sign]C. Video image analysis was used to measure the meat sample area. The proposed MCS protocol permits us to measure cooking loss and to reduce cost and variability, moreover it could be improved to obtain color and marbling measurements by developing the image analysis software. Analysing two or more parameters on the same sample, the correlations among them should improve analysis efficacy. A detailed description of the measurement protocol of MCS is reported as well as its application to beef and pork.

Keywords: Meat; Cooking shrinkage; VIA system

M.D. Guardia, L. Guerrero, J. Gelabert, P. Gou, J. Arnau, Consumer attitude towards sodium reduction in meat products and acceptability of fermented sausages with reduced sodium content, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 484-490, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4JHMFJRJ-2/2/e219cfd0a5feba05d63b499c03cc77ef>)

Abstract:

Lowering salt content in meat products is possible from a technological and sensorial point of view, although little information is available about the consumers' attitude and acceptance of these products.

Attitude towards low salt meat products, following the Theory of Planned Behaviour (TPB) proposed by Ajzen, was evaluated by 392 consumers. Acceptability of small calibre fermented sausages with 50% molar substitution of NaCl by six different mixtures of KCl (0-50%) and K-lactate (0-50%) and the control (22 g NaCl/kg) was determined by 98 consumers. The preference of the previous best two treatments was compared to the batch control by 279 consumers.

In general consumers had a positive attitude towards low salt meat products, being higher for women than for men. Women showed stronger ideas and higher Perceived Control on the Behaviour towards reduced sodium meat products than men. Smokers showed lower intense beliefs than non-smokers. Consumers with a basic level of education were more affected by what other people important for them thought they should do. The final model obtained using the Theory of Planned Behaviour showed a good predictive capacity ($R^2 = 0.60$) and a good internal consistency. Regarding the acceptability study, batches with substitution levels of 50% and 40% by K-lactate, showed lower overall acceptance than the control batch. Significant differences in acceptability were found regarding the gender and place of residence of the consumers. The preference study showed no differences between the batch control and batches with 50% KCl and 40% KCl + 10% of K-lactate substitution levels. According to these results and from a sensorial point of view, it is possible to reduce NaCl content in small calibre fermented sausages by 50% and obtain a product acceptable for consumers.

Keywords: Reduced sodium content; Meat products; Fermented sausages; Consumer attitudes; Acceptability and preference

P. Severiano-Perez, A.M. Vivar-Quintana, I. Revilla, Determination and evaluation of the parameters affecting the choice of veal meat of the 'Ternera de Aliste' quality appellation, Meat Science, Volume 73, Issue 3, July 2006, Pages 491-497, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4JFHFFG-1/2/a2f88e660633c5167faefdf63f01cb1d>)

Abstract:

The aim of the present work was to determine and assess the parameters affecting the choice of veal under the 'Ternera de Aliste' quality appellation. The parameters affecting the choice proved to be colour, taste, odour, hardness and juiciness. Using these parameters, sensory evaluation, both analytical (with trained judges, QDA) and affective (with consumers, the home-use test) was carried out on four veal types, and the relative preferences for the samples assessed. Colour, hardness and losses due to cooking were also analysed instrumentally. The results revealed that the methodology is important for discriminating small differences between samples. The same trend was observed for the results of the panel of judges, consumers, and instrumental analyses regarding both hardness and juiciness. Regarding the determinant parameters in the choice of veal, in raw meat consumers prefer light colours but when expressing their general relative preferences for samples, juiciness, taste and hardness of the cooked meat had the greatest weight.

Keywords: Meat beef; Sensory analysis; Consumer; Preferences

A.C. Seydim, J.C. Acton, M.A. Hall, P.L. Dawson, Effects of packaging atmospheres on shelf-life quality of ground ostrich meat, Meat Science, Volume 73, Issue 3, July 2006, Pages 503-510, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.01.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4JJ884W-4/2/afbf2fe6f4eca39ef7e8384ce9f6cc98>)

Abstract:

Fresh ground ostrich meat was packaged under high oxygen (O₂), high nitrogen (N₂), vacuum (VAC) and ambient air (AIR) atmospheres, stored at 4 ± 1 [degree sign]C and displayed under 1700 ± 100 lux of fluorescent lighting for 9 days. The meat was evaluated for changes in typical shelf-life characteristics consisting of pH, color properties (CIE L*, a*, b*, and total color difference, [Delta]E), oxidative changes (thiobarbituric acid value and hexanal content) and bacterial counts (total viable cell, coliform, lactic acid bacteria, Enterobacteriaceae, Pseudomonas spp.) Initial meat pH was 6.16 and declined slightly during storage. TBA values and hexanal content were highest in O₂ and lowest (P [less-than-or-equals, slant] 0.05) in VAC and N₂ atmospheres. Surface lightness (L*) and redness (a*) were highest in O₂ packaging initially, decreasing (P [less-than-or-equals, slant] 0.05) by day 9. [Delta]E of the ground ostrich increased during storage in only O₂ and AIR packaging. All packaging methods had generally similar effects on microbial outgrowth. Total aerobic bacteria attained >10⁶ CFU/g meat between day 3 and day 6. Ground ostrich meat was below saleable quality in less than 6 days based on all of the meat attributes. For O₂ packaging however, quality based on lipid oxidation and color properties indicated a shelf-life of less than 3 days. Oxidation is likely the limiting factor for shelf-life of ground ostrich meat.
Keywords: Quality; Ostrich; Meat; Shelf-life; Modified atmosphere packaging

A. Veberg, O. Sorheim, J. Moan, V. Iani, P. Juzenas, A.N. Nilsen, J.P. Wold, Measurement of lipid oxidation and porphyrins in high oxygen modified atmosphere and vacuum-packed minced turkey and pork meat by fluorescence spectra and images, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 511-520, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.001.
(<http://www.sciencedirect.com/science/article/B6T9G-4JJGC7J-1/2/ff38e69239f8cb748e939f8c65daced3>)

Abstract:

This paper illustrates that fluorescence spectroscopy and imaging can be used to measure the extent and distribution of lipid oxidation in meat. Minced turkey thighs and pork semimembranosus muscles were stored for 7 and 12 days at 4 [degree sign]C in high oxygen (O₂) modified atmosphere packages and vacuum. Turkey meat packed in high O₂ atmosphere was oxidised already after 7 days of storage. The sensory rancid odour score was 4.7 (on a scale from 1 to 9) and the TBARS value was 1.86 mg MDA/kg. There was also an increase in fluorescence emission intensity in the 410-550 nm region, which arises from lipid oxidation products. The combination of unsaturated fatty acids and access to O₂ resulted in lipid oxidation gradients in the turkey meat samples, and these gradients were clearly visualised by fluorescence images. In comparison, pork meat was more stable against lipid oxidation, with TBARS values <0.2 mg MDA/kg and no development of fluorescent lipid oxidation products was detected. The fluorescence spectra measured in the present experiment suggest that turkey thighs and pork semimembranosus muscle in addition to protoporphyrin also have a natural content of Zn protoporphyrin. The porphyrin content was higher in pork meat than in turkey meat. It increased during storage time when the meat was packed in vacuum, and it decreased with O₂ availability. The distribution of porphyrins in the meat was visualised by fluorescence imaging.

Keywords: Fluorescence spectroscopy; Fluorescence imaging; Turkey meat; Pork meat; Lipid oxidation; Porphyrins; Modified atmosphere packaging; High oxygen atmosphere

Vladimiro Christodoulou, John Ambrosiadis, Evangelia Sossidou, Vasileios Bampidis, John Arkoudilos, Borris Hucko, Constantin Iliadis, Effect of replacing soybean meal by extruded chickpeas in the diets of growing-finishing pigs on meat quality, *Meat Science*, Volume 73, Issue 3, July 2006, Pages 529-535, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.02.008.
(<http://www.sciencedirect.com/science/article/B6T9G-4JMKWR5-1/2/bc04d049ea3a97c66fa02be67b613303>)

Abstract:

The main objective of this study was to evaluate the effect of the replacement of soybean meal by extruded chickpeas in diets of growing-finishing pigs on meat quality. In a 17 wk study 48 growing-finishing crossbred pigs were fed ad libitum. The experimental design included four treatments, each one of 12 pigs; the ECKP0 treatment was fed with diet containing soybean meal and no chickpeas (control), while treatments ECKP100, ECKP200 and ECKP300 were fed with diets containing 100, 200 and 300 kg/t of extruded chickpeas, respectively. The lean meat quality of the longissimus lumborum et thoracis muscle was evaluated by chemical analysis (moisture, protein, fat and ash), fatty acid profile, pH measurement, cooking loss, color evaluation, and sensory evaluation. Odor and taste, tenderness, juiciness, and overall acceptability were scored on 1-10 scales by a group of 10 experienced assessors after a standard cooking regime. Small differences were observed between control and experimental groups in chemical composition ($P > 0.05$). Fatty acid profiles, pH measurements and color evaluation did not differ among treatments ($P > 0.05$), while cooking loss was significantly lower in the control group ($P < 0.05$). The taste panel gave slightly higher scores for the tenderness and juiciness for the control group compared with the chickpea treatments ($P < 0.05$). No differences were observed between control and experimental groups in taste scores ($P > 0.05$). It is concluded that the replacement of soybean meal by extruded chickpeas, when substituted isonitrogenously and isoenergetically at inclusion levels up to 300 kg/t of pig, does not influence significantly meat quality.

Keywords: Chickpeas; Extrusion; Pigs; Meat quality

Victoria J. Allen, Islay D. Marsden, Norman L.C. Ragg, S. Giese, The effects of tactile stimulants on feeding, growth, behaviour, and meat quality of cultured Blackfoot abalone, *Haliotis iris*, Aquaculture, Volume 257, Issues 1-4, 30 June 2006, Pages 294-308, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2006.02.070.

(<http://www.sciencedirect.com/science/article/B6T4D-4JGGD84-1/2/a985de6d6141b7741a1bbd78cf0ec35b>)

Abstract:

The New Zealand Blackfoot abalone or paua, *Haliotis iris* uses both tactile and chemosensory cues to detect and feed on drifting seaweed in its natural habitat. In aquaculture situations, abalone are usually provided with static artificial food pellets, effectively removing the tactile stimulus. This study investigated the effects of tactile stimuli from suspended particles on pellet ingestion, growth, behaviour and meat quality of juvenile paua (length 40-45 mm). Over eleven months, individuals were offered a commercial pellet diet (AbFeed(TM)) and small quantities of one of four particulate materials: macerated seaweed (*Gracilaria* spp. and *Macrocystis pyrifera*) and 2 sizes of synthetic PVC fragments. There was seasonal variation in the ingestion rate of abalone from all treatments and the control (no stimulants) with lowest rates during winter (June to September) and highest rates in summer (December to February). The specific growth rate (% body weight gain per day) and shell length increase varied seasonally. Of the four treatments, the only effective stimulant was *Gracilaria* spp. which resulted in summer shell growth of 110.6 ± 3.2 [μ]m d⁻¹ compared with 86.9 ± 4.0 [μ]m d⁻¹ for control abalone. Behavioural observations showed that when *Gracilaria* particles were present, abalone spent > 80% of their time engaged in feeding-related activity. Control abalone, without the algal stimulant, spent most of their time in a sedentary position. None of the particulate stimulants tested had any significant effect on food conversion ratio, water content, protein, lipid and glycogen levels or meat tenderness. These parameters were, however, significantly affected by season. A preliminary trial of the *Gracilaria* particle treatment in a commercial system over 90 days enhanced the growth of cultured *H. iris* (45 \pm 5 mm shell length) by 15.3%. The main commercial implication of this research is that the addition of algal stimulants is suggested as a cost-effective means of improving abalone performance using pre-existing culture systems and food types.

Keywords: Abalone; Growth; *Gracilaria* spp.; *Haliotis iris*; Ingestion; Meat quality; Paua; Phagostimulant; Season

A. Mateo, F. Soto, J.A. Villarejo, J. Roca-Dorda, F. De la Gandara, A. Garcia, Quality analysis of tuna meat using an automated color inspection system, *Aquacultural Engineering*, Volume 35, Issue 1, June 2006, Pages 1-13, ISSN 0144-8609, DOI: 10.1016/j.aquaeng.2005.06.007.

(<http://www.sciencedirect.com/science/article/B6T4C-4HC772M-3/2/f95fa2dab6836a33fec8affc6273ec32>)

Abstract:

Depending on whether they are reared in cages or in the open sea and depending on the method of capture (electroslaughtering, shooting, etc.), differences are observed and changes take place in the organic nature of Blue Fin Tuna (*Thunnus thynnus*) meat, affecting appearance and quality. These changes are caused by an increase and accumulation of lactate, which negatively affects the quality. This drop in quality translates into loss of value of the meat in Japanese tuna markets (Tsukiji and Sashimi markets are the main destinations of tuna captured off the southeast coast of Spain). In order to evaluate these changes, Japanese experts are employed to carry out visual inspections, which therefore constitute a subjective assessment. This paper describes the development of an automated visual inspection system that can analyze, model and detect these changes. The ultimate aim is to establish quality indicators and classifiers that will accompany tuna meat from the time of capture and so make it possible to track this product in the main tuna meat export markets. In this way, we can establish a connection between variation of tuna meat quality and the feeding and slaughtering methods used, thus providing feedback to the fattening and slaughtering processes so as to improve the global quality of Blue Fin Tuna catches.

Keywords: Tuna meat; Quality analysis; Vision system; Color; Color texture

Linn Anne Brunborg, Kare Julshamn, Ragnar Nortvedt, Livar Froyland, Nutritional composition of blubber and meat of hooded seal (*Cystophora cristata*) and harp seal (*Phagophilus groenlandicus*) from Greenland, *Food Chemistry*, Volume 96, Issue 4, June 2006, Pages 524-531, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.03.005.

(<http://www.sciencedirect.com/science/article/B6T6R-4G5BJW4-1/2/6c24e2c53b7281699c9ade9ded2e0071>)

Abstract:

Seal blubber and skin are widely used, but the utilisation of blubber and meat for human consumption is limited. The aim of this study was to evaluate the nutritional composition of seal blubber and meat. The fatty acid composition, selected minerals and trace-elements, vitamins, amino acids and proximal composition of blubber and meat from hooded seal (*Cystophora cristata*) and harp seal (*Phagophilus groenlandicus*) from the 'West Ice' near Greenland were analysed. The results showed that seal blubber is an excellent source of long- and very long-chain (VLC) n - 3 polyunsaturated fatty acids (PUFAs), in addition to long- and VLC monounsaturated fatty acids (MUFAs). Eicosapentaenoic acid (EPA) content contributed to a clear separation between blubber and meat from the two species. The blubber of harp seal showed the highest EPA (9.2%), whereas the muscle of harp seal showed the lowest EPA (3%) content. Seal meat is lean with less than 2% total fat, mainly composed of MUFAs, long- and VLC n - 3 PUFAs. In addition, the meat contains a high amount of proteins with a well-balanced amino acid composition. The trace-element content of seal meat is very high, particularly iron (379 $\mu\text{g/g}$ muscle in hooded seal) and zinc (30 $\mu\text{g/g}$ muscle in harp seal), as also is the vitamin content, especially vitamins A, D3 and B12. The seals included in this study varied greatly in age and size, which in turn may be the principal reason for the great individual variation observed in nutritional composition. On average, however, consumption of only 40 g seal meat covers the recommended daily intakes of iron and vitamin B12 for young women. In conclusion, as long as the products fulfil the amending legislations regarding contaminants, both seal blubber and meat, from the present species, represent high quality food regarding nutrients and bioactive components beneficial for human health.

Keywords: Hooded seal; Harp seal; Seal blubber; Seal meat; Human nutrition; n - 3 Fatty acids; EPA; DPA; DHA; Minerals; Trace-elements; Essential amino acids

Chuan-Yi Yeh, Shin-Jung Lin, Deng-Fwu Hwang, Biogenic amines, histamine and label of dressed fried fish meat products in Taiwan, Food Control, Volume 17, Issue 6, June 2006, Pages 423-428, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.02.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4FPN9T7-3/2/eab47e7c91315814764d6b157166a8b5>)

Abstract:

One hundred and four dressed fried fish meat products, including 44 packaged and 60 unpackaged, were purchased from supermarkets and retail outlets, respectively in Taiwan between September 2002 and March 2003. The levels of histamine and biogenic amines and labeling condition were determined. It was found that 9%, 11%, 2%, and 18% of the packaged products did not meet the labeling requirement of ingredient, expiry date, address and telephone information, and nutrition information, respectively. Although no sample exceeded histamine level of 500 ppm, all packaged products and 24 out of 60 unpackaged ones showed detectable amounts of histamine. Fourteen samples of packaged products and two samples of unpackaged ones had histamine above 50 ppm, with level ranged from 53 to 87 ppm and from 75 to 108 ppm, respectively. The biogenic amines content of packaged product was higher than unpackaged one with average level of 725 +/- 252 ppm and 595 +/- 181 ppm, respectively. The dressed fried fish meat products with histamine level above 50 ppm sold in Taiwan should be considered.

Keywords: Dressed fried fish meat; Biogenic amines; Histamine

Salim Ammor, Gregoire Tauveron, Eric Dufour, Isabelle Chevallier, Antibacterial activity of lactic acid bacteria against spoilage and pathogenic bacteria isolated from the same meat small-scale facility: 1--Screening and characterization of the antibacterial compounds, Food Control, Volume 17, Issue 6, June 2006, Pages 454-461, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.02.006.

(<http://www.sciencedirect.com/science/article/B6T6S-4FTWJHK-2/2/6b39fed6312a81a27c74b00f11f840ba>)

Abstract:

A total of 87 lactic acid bacteria (LAB) (36 *Lactobacillus sakei*, 22 *Enterococcus faecium*, 16 *Lactococcus garvieae*, 11 *Vagococcus carniphilus* and 2 *Enterococcus* sp.) isolated from a small-scale facility producing traditional dry sausages were screened for antagonistic activity against other LAB and some spoilage and pathogenic microorganisms, also isolated from the same processing facility, except *Listeria innocua* (in lieu of *Listeria monocytogenes*) and *Escherichia coli*. The final goal was to investigate LAB antibacterial activity within the facility microbial ecosystem and to select interesting strains for the role of bio-preservatives.

Twenty-one *Ec. faecium*, 6 *Vc. carniphilus*, 4 *Lc. garvieae*, 3 *Lb. sakei* and 2 *Enterococcus* sp. were shown to inhibit the growth of some indicator microorganisms in an agar well diffusion assay. Except 2 *Lb. sakei* and an *Enterococcus* sp., all these isolates exhibited antibacterial activity against *L. innocua*, but only 3 *Ec. faecium*, 5 *Vc. carniphilus* and 3 *Lc. garvieae* displayed also antagonistic activity against *Staphylococcus aureus*. The 5 *Vc. carniphilus* isolates were also found to be inhibitory for the Gram-negative bacterium *Hafnia alvei*.

Isolates displaying antibacterial activity against *L. innocua* and/or *Sc. aureus* were investigated for the nature of antibacterial compounds synthesized against these indicator microorganisms. Bacteriocin-like production could be detected only on agar plated in overlay assays, and was unsuccessfully researched in cell-free culture supernatant fluids under conditions that eliminate acid and hydrogen peroxide inhibition. Results also showed that a *Lb. sakei* isolate displayed an additional inhibitory effect by H₂O₂ against *L. innocua*. These isolates will be investigated for their ability to repress the growth of undesirable bacteria in biofilms, i.e., the real mode of bacterial attachment.

This is the first report on bacteriocin-like from *Vc. carniphilus* and on bacteriocin-like from *Lc. garvieae* active against both *L. innocua* and *Sc. aureus* species.

Keywords: Antibacterial activity; Bacteriocins; Lactic acid bacteria; Traditional dry sausages; Small-scale facility

Salim Ammor, Gregoire Tauveron, Eric Dufour, Isabelle Chevallier, Antibacterial activity of lactic acid bacteria against spoilage and pathogenic bacteria isolated from the same meat small-scale facility: 2--Behaviour of pathogenic and spoilage bacteria in dual species biofilms including a bacteriocin-like-producing lactic acid bacteria, *Food Control*, Volume 17, Issue 6, June 2006, Pages 462-468, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.02.007.

(<http://www.sciencedirect.com/science/article/B6T6S-4FVCBX7-1/2/b4977ba2c33e15139cab58a08c973354>)

Abstract:

The survival of *Listeria innocua* ATCC 33090, *Staphylococcus aureus* E1S-5 and/or *Hafnia alvei* E1E-25 in dual species biofilms with bacteriocin-like producing lactic acid bacteria (5 *Vagococcus carniphilus*, 3 *Enterococcus faecium*, 1 *Lactobacillus sakei* and 1 *Enterococcus* sp.) was investigated. The aim was to select strains able to repress the growth of undesirable bacteria in biofilms, i.e., the real mode of bacterial attachment.

Two *E. faecium* and 3 *V. carniphilus* species were highly antagonistic to *L. innocua*, *S. aureus* and *H. alvei* repressing their growth by reduction levels able to reach 2, 2.7 and 2.4 log₁₀ cfu/ml compared to the positive control made of sole the target microorganism. Furthermore, planktonic cells were more sensitive to the bacteriocin-like substances than sessile ones.

First results suggest the possibility of selecting bio-preservatives among the endogenous house flora of the studied small-scale facility, that could be implemented on the processing surfaces to repress the growth of undesirable microorganisms.

Keywords: Antibacterial activity; Lactic acid bacteria; Traditional dry sausages; Small-scale facility; Bacteriocins; Biofilms; Co-culture; Barrier flora

M. Javanmard, N. Rokni, S. Bokaie, G. Shahhosseini, Effects of gamma irradiation and frozen storage on microbial, chemical and sensory quality of chicken meat in Iran, *Food Control*, Volume 17, Issue 6, June 2006, Pages 469-473, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.02.008.

(<http://www.sciencedirect.com/science/article/B6T6S-4FVCBX7-2/2/889ee8caffc7b13b41f4c3fd7c9414b7>)

Abstract:

Irradiation is considered one of the most efficient technological processes for the reduction of microorganisms in food. It can be used to improve the safety of food products, and to extend their shelf lives. The aim of this study was to evaluate the effects of gamma irradiation and frozen storage as a combination process for improvement of chicken meat shelf life. Broiler chicken were treated with 0 (non irradiated), 0.75, 3.0, and 5.0 kGy of gamma irradiation and held frozen for 9 months. The control and irradiated samples were stored at -18 [degree sign]C and underwent microbial analysis, chemical characteristics and sensory evaluation at 3 months intervals. Microbial analysis indicated that irradiation and freezing storage had a significant effect ($P < 0.05$) on the reduction of microbial loads. There was no significant difference in sensory quality and chemical characteristics during freezing storage in chicken meat. The combination of frozen storage plus irradiation resulted in greater overall reductions on microbial loads, extending shelf-life of chicken meat for commercial application and critical condition.

Keywords: Irradiation; Chicken meat; Frozen storage safety and shelf-life; Microbial analysis; PV; TVN; Sensory preference

I-sanna Gibbons, Abiodun Adesiyun, Nadira Seepersadsingh, Saed Rahaman, Investigation for possible source(s) of contamination of ready-to-eat meat products with *Listeria* spp. and other

pathogens in a meat processing plant in Trinidad, *Food Microbiology*, Volume 23, Issue 4, June 2006, Pages 359-366, ISSN 0740-0020, DOI: 10.1016/j.fm.2005.05.008.

(<http://www.sciencedirect.com/science/article/B6WFP-4GPW3FX-1/2/f0e341b0df72ad2302b66e5b1870f105>)

Abstract:

In 2003, there was a recall of three processed (chicken franks, spice ham and turkey ham ready-to-eat (RTE) meat products by a large processing plant in Trinidad as a result of contamination by *Listeria monocytogenes*. The study was conducted to investigate the possible source(s) of *Listeria* contamination of recalled RTE meat products and to determine the prevalence of *Listeria* spp., *Salmonella* spp., *Escherichia coli* and *Campylobacter* spp. in the products and air within the plant. Raw and processed meat products, as well as food contact surfaces were also tested for *Salmonella* spp., *Listeria* spp. and *Campylobacter* spp. initially after thorough clean-up and close-down of the plant. Faecal and effluent samples from the piggery, in close proximity to the plant, were tested for the presence of *Salmonella* spp., *Listeria* spp. and *Campylobacter* spp. Air samples and food contact surfaces were negative for the tested organisms. Ten (58.8%) of the 17 effluent samples and 4 (11.8%) of the 34 faecal samples were positive for *Campylobacter coli*. Of the 11 raw meat products tested, 10 (90.9%) were positive for *E. coli* and *Listeria* spp. either singly or in combination. Of the 32 processed RTE products tested, 11 (34.4%) were positive for *E. coli*, *Salmonella* spp., *Listeria* spp. and *Campylobacter* spp. in combination or singly. Eleven (61.1%) of 18 processed products contained unacceptable levels of aerobic bacteria using international standards. Four months later, following the implementation of recommended cleaning, sanitizing and hygienic practices at the plant, pre- and post-processed products were sampled and *Listeria* spp. were identified in 4 (80.0%) of the 5 raw products and in 1 of the 5 (20.0%) finished products. Two (40.0%) of the finished products contained unacceptable microbial levels. It was concluded that the close proximity of the piggery to the processing plant was not the probable source of *Listeria* contamination of the recalled meat products. The data suggested that improved sanitary practices on food contact surfaces and during handling of products, reduced the risk of *Listeria* spp. and other pathogens studied. The problem at the plant can therefore, be inferred to be due to lapses in good sanitary practices, inadequate heat treatments or the presence of pathogens particularly *Listeria* in biofilms on different surfaces continuously or occasionally contaminating finished products.

Keywords: *Listeria monocytogenes*; Enteric pathogens; Ready-to-eat meats; Health risk

F. Hasan, Y. Kumada, N. Hashimoto, T. Katsuda, M. Terashima, S. Katoh, Fragmentation of Angiotensin-I Converting Enzyme Inhibitory Peptides from Bonito Meat Under Intestinal Digestion Conditions and their Characterization, *Food and Bioproducts Processing*, Volume 84, Issue 2, June 2006, Pages 135-138, ISSN 0960-3085, DOI: 10.1205/fbp.05152.

(<http://www.sciencedirect.com/science/article/B8JGD-4RTVVMX-6/2/d847aec99b4b972485457d54b28e2660>)

Abstract:

Kinetics of fragmentation of angiotensin-I converting enzyme inhibitory peptides obtained by digestion in gastric juice were studied under intestinal digestion conditions and their inhibitory activities were determined. A fragment IKYGD produced by digestion, as well as IKWGD synthesized, showed similar inhibitory activity to the original peptides. These peptides somehow were resistant to tryptic and/or chymotryptic digestion, and IK + aromatic amino acid might be important functional parts in some kinds of ACE inhibitory peptides.

Keywords: angiotensin-I converting enzyme; inhibitory peptide; anti-peptide antibody; intestinal digestion; bonito; competitive inhibitor

F.L. Leaes, A.P. Daniel, G.B. Mello, V. Battisti, S. Bogusz Jr., T. Emanuelli, L.L.M. Fries, I. Costabeber, Degradation of polychlorinated biphenyls (PCBs) by *Staphylococcus xylosus* in liquid

media and meat mixture, Food and Chemical Toxicology, Volume 44, Issue 6, June 2006, Pages 847-854, ISSN 0278-6915, DOI: 10.1016/j.fct.2005.11.008.

(<http://www.sciencedirect.com/science/article/B6T6P-4HYMYBM-3/2/1188753babe9348ec41befae52117f13>)

Abstract:

We investigated the growth of the meat starter *Staphylococcus xylosum* (104 cells mL⁻¹) in liquid media containing 0.01 ppm of each polychlorinated biphenyls (PCBs 10, 28, 52, 138, 153, and 180) and its ability to degrade PCBs during 168 h of incubation in liquid media (104 cells mL⁻¹, 0.01 ppm of each PCB congener) and cured meat mixture (0.1% of meat starter, 1 [μg] g⁻¹ fat of each PCB congener). PCBs did not affect the growth of the starter microorganism in nutritive (brain heart infusion, BHI) or mineral salts medium (MSM) when compared to control (no PCB). *S. xylosum* degraded some of the PCB congeners tested. PCBs 138 and 153 were degraded both in BHI (78% and 68%, respectively; $p < 0.05$) and in MSM (71% and 66%, respectively; $p < 0.05$), with maximum degradation being observed within 24 h. Highly significant negative exponential relationships were observed between incubation time and concentrations of PCB 28 and 180 in BHI, as well as for PCBs 52 and 180 in MSM. In the cured meat mixture highly significant negative exponential relationship was observed between incubation time and the concentration of PCB 10. These results indicate that although *S. xylosum* reduced residues of various PCB congeners in liquid media, it was less effective in cured meat.

Keywords: Degradation; Polychlorinated biphenyls; *Staphylococcus xylosum*, Meat mixture

Tien Hoac, Charlotte Daun, Ursula Trafikowska, Josefin Zackrisson, Bjorn Akesson, Influence of heat treatment on lipid oxidation and glutathione peroxidase activity in chicken and duck meat, Innovative Food Science & Emerging Technologies, Volume 7, Issues 1-2, June 2006, Pages 88-93, ISSN 1466-8564, DOI: 10.1016/j.ifset.2005.10.001.

(<http://www.sciencedirect.com/science/article/B6W6D-4JDN6FB-4/2/3d51f889fcbf6dcdadc900b06e92ed8>)

Abstract:

To study the role of glutathione peroxidase for lipid oxidation in meat, chicken and duck muscle were heated to an internal temperature of 60, 70 or 80 [degree sign]C and the meats were then stored at 8 [degree sign]C for up to 6 days. Thiobarbituric-acid-reactive substances (TBARS) and glutathione peroxidase (GSHPx) activity were measured on days 0, 1, 3 and 6. In heated muscle samples, TBARS increased during 6 days of storage. GSHPx activity was diminished with increasing temperature and was much more affected by the internal temperature than by the length of the subsequent cold storage, whereas the formation of TBARS was affected by both the final temperature and storage time. Meat samples, which had been heated to 80 [degree sign]C, were also used to investigate the effect of added GSHPx on lipid oxidation. GSHPx (2 or 4 U) was added per 1 g meat after cooking, and the concentration of TBARS and GSHPx activity were measured on day 0 and 6. Chicken muscle samples with added GSHPx had a lower TBARS concentration on day 6 (2 U/g meat: 58% and 4 U/g meat: 54%) compared to the control without added GSHPx. In contrast, GSHPx addition had no effect on lipid oxidation in heated duck muscle. The study shows that there was a reciprocal relationship between TBARS formation and GSHPx activity and that addition of GSHPx could decrease lipid oxidation. Industrial relevance

This study is of relevance because it deals with the important issue of effectiveness of added antioxidants on possibly diminishing lipid oxidation in chicken or duck meat. Of main relevance seems to be the fact that heat treatment and internal temperature of meat had a more pronounced effect on lipid oxidation inhibiting enzymes than the length of subsequent cold storage.

Keywords: Lipid oxidation; TBARS; Glutathione peroxidase; Heat treatment; Chicken; Duck

Katarzyna Kajak, Danuta Kolozyn-Krajewska, Construction of predictive models of growth of microorganisms in salted and cured meat products, Innovative Food Science & Emerging

Technologies, Volume 7, Issues 1-2, June 2006, Pages 152-159, ISSN 1466-8564, DOI: 10.1016/j.ifset.2005.09.003.

(<http://www.sciencedirect.com/science/article/B6W6D-4JDN6FB-6/2/659211536f581762e46e8d4db674847e>)

Abstract:

The aim of the research was to produce mathematical models for the growth of natural microflora (as total plate count, TPC) in the model salted and cured meat products representing a group of products made of minced meat. Research material comprised meat products in the form of meat balls prepared under the laboratory conditions. Microbiological analyses were performed in the raw product, after roasting (day 0) and after 4, 8, 12 and 16 days of storage at the temperature of 5, 10 and 15 [degree sign]C. Total plate count (TPC) (cfu/g) was determined on a nutrient agar (Oxoid). On the basis of data obtained in the performed experiments parameters of non-linear Gompertz models and logistic of the total plate count growth log (cfu/g) in meat products stored at various temperatures were matched in a satisfactory way. The addition of NaNO₂ at the level of 60 ppm affected the inhibition of the number of microorganisms in a statistically significant way. At the level of 2% NaCl no inhibitory effect on bacterial growth was observed.

Keywords: Predictive microbiology; Cured beef meat; Gompertz function; Logistic function; Predictive modelling of microbial growth is highly essential for food safety and regulatory reasons. The present work describes the development of a mathematical model of the growth of total plate count - natural microflora in minced meat model products. The ultimate aim of the ongoing efforts will be the development of a computer programme including the effects of various environmental factors - including preservatives - on growth and inactivation of microorganisms.

S.R. Baggio, N. Bragagnolo, Cholesterol oxide, cholesterol, total lipid and fatty acid contents in processed meat products during storage, LWT - Food Science and Technology, Volume 39, Issue 5, June 2006, Pages 513-520, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.03.007.

(<http://www.sciencedirect.com/science/article/B6WMMV-4G3KC2S-3/2/006a8c439500c1871b976205c485b3b3>)

Abstract:

The effects of storage time on the formation of cholesterol oxides and on alterations in the fatty acid composition of processed meat products manufactured by Brazilian industries were investigated in this study. Cholesterol oxides and cholesterol were determined by HPLC using photodiode array and refractive index detectors. Samples of jerked beef, Italian-type salami, chicken mortadella and Chester mortadella were analysed at 30 day intervals starting at zero time, for 90 days for the mortadella and 120 days for the jerked beef and salami. The mortadellas were stored under refrigeration at 6 [degree sign]C and the jerked beef and salami at room temperature, but protected from the light. No cholesterol oxides were formed during the storage time in any of the samples. The cholesterol content, the fatty acid composition and total lipid contents showed no significant differences during storage with the exception of the total lipid content of the jerked beef, which varied from 3.5 at zero time to 2.4 g/100 g after 120 days storage.

Keywords: Storage; Cholesterol oxidation products; Cholesterol; Fatty acid; Meat products

R. Marino, M. Albenzio, A. Braghieri, A. Muscio, A. Sevi, Organic farming: effects of forage to concentrate ratio and ageing time on meat quality of Podolian young bulls, Livestock Science, Volume 102, Issues 1-2, June 2006, Pages 42-50, ISSN 1871-1413, DOI: 10.1016/j.livsci.2005.11.004.

(<http://www.sciencedirect.com/science/article/B7XNX-4J791RY-2/2/8b86bea9df9c9e87903475a5f8198652>)

Abstract:

This study aimed to assess the effect of a different forage to concentrate ratio (60 to 40 (HC group) vs. 70 to 30 (LC group)) and ageing (15 vs. 21 days) on meat quality of Podolian young

bulls, organically farmed. Longissimus dorsi was divided in two sections, aged in vacuum-packaging at 4 [degree sign]C until 15 and 21 days postmortem, respectively. Meat chemical composition was unaffected by diet and ageing time. Colour parameters were not affected by diet, while red index a^* and chroma decreased from 15 to 21 days of ageing, and yellow index and hue angle were found higher ($P < 0.001$) at 21 than at 15 days postmortem. The meat from the LC group showed lower ($P < 0.01$) Warner-Bratzler shear force (WBSF) values than that from the HC group after 15 days of maturation. Extending ageing time from 15 to 21 days produced a significant ($P < 0.001$) reduction of WBSF. Diet effect on sensory tenderness was significant ($P < 0.05$) after 15 days of ageing with higher tenderness scores in the LC than in the HC group. Ageing positively affected sensory tenderness ($P < 0.05$) in the HC group. Flavour intensity was increased by the extension of the ageing period ($P < 0.001$), whereas no diet effect was evidenced on this parameter.

Keywords: Podolian young bulls; Forage to concentrate ratio; Ageing time; Tenderness; Sensory properties

I. Revilla, A.M. Vivar-Quintana, Effect of breed and ageing time on meat quality and sensory attributes of veal calves of the 'Ternera de Aliste' Quality Label, Meat Science, Volume 73, Issue 2, June 2006, Pages 189-195, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4J3WSMS-1/2/8d14b735c5f9348c3284a7e6093b8168>)

Abstract:

The effect of breed, sex and ageing time on carcass, meat and eating quality were examined in 32 calves of the 'Ternera de Aliste' Spanish Quality Label. Swiss Brown x Alistano-Sanabresa heifers were mated with Charolais or Limousin bulls in order to study the effect of breed. Bull and heifer calves were slaughtered when they were 6-7 months old. Samples of the M. longissimus dorsi were aged for 3, 5 or 7 days and chemical and sensory analyses were done. The results showed no differences due to sex but Charolais sires produced meat which was more tender, juicier and had more odour intensity with a darker colour than meat of the Limousin sired animals. Ageing influenced both sensory and instrumental hardness, colour and odour intensity. After seven days of maturation the meat from such young animals achieved a high quality.

Keywords: Breed; Ageing; Meat quality; Sensory analysis; Veal; Calves

N. Atti, M. Mahouachi, H. Rouissi, The effect of spineless cactus (*Opuntia ficus-indica* f. *inermis*) supplementation on growth, carcass, meat quality and fatty acid composition of male goat kids, Meat Science, Volume 73, Issue 2, June 2006, Pages 229-235, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4J2TVX7-3/2/89c2f8be3efbeca15eb236ac921a8bd3>)

Abstract:

The objective of this study was to determine the effects of grain compared to spineless cactus feeding on goat kids growth, carcass characteristics and FA profile. For this purpose, 21 kids were used and allocated to 3 groups receiving a low quantity (200 g) of oat hay. The control group received ad libitum a concentrate containing 130 g crude protein (CP) per kg of dry matter (C130). The second group received half of that contained consumed by the control one but its CP content was 260 g/kg DM and spineless cactus ad libitum (C260-Cac). In the third group, concentrate intake was limited to soya bean at a quantity that provided the same CP quantity as the two other groups and also cached spineless cactus was distributed ad libitum (Soya-Cac). Animals of all groups had free access to water. At the end of the growth trial which lasted for 74 days, all kids were slaughtered. Samples of longissimus dorsi muscle were used for meat quality and FA composition study.

Animals in the control group and those in the C260-Cac had higher growth rate than Soya-Cac diet animals. Muscle and adipose tissue mean weights were higher in the first groups while the bone weight was similar in all treatments. Animals given Soya-Cac diet had relatively less fat (10.5%) than those fed other diets ($p < 0.001$). Carcass fat content tended to be lower ($p = 0.07$) in C260-Cac goats (13.5%) than in those of the C130 group (15.8%). The ultimate pH ranged between 6.18 and 6.48; it was higher in meat from control goats (C130) than in animals receiving cactus. Dietary treatment had no significant effect ($p > 0.05$) on meat moisture, ash, crude fat and protein contents. The intra muscular lipid composition in fatty acids showed differences between the control group and those receiving cactus. Cactus in the diet was associated with more C18:2 and conjugated linoleic acid (CLA) as well as a higher proportion of PUFA and PUFA:SFA ratio than control ones. In conclusion, this study showed that cactus feeding of goat kids maximises the proportion of CLA, PUFA and PUFA:SFA ratio.

Keywords: Spineless cactus; Goat kids; Carcass; Meat; Fatty acids; CLA

Mounia Oussalah, Stephane Caillet, Linda Saucier, Monique Lacroix, Antimicrobial effects of selected plant essential oils on the growth of a *Pseudomonas putida* strain isolated from meat, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 236-244, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4J3WSMS-2/2/c0f745e6c656a78c8b665b0ec8b14bd0>)

Abstract:

The inhibitory effect of 60 different essential oils was evaluated on a *Pseudomonas putida* strain of meat origin, associated with meat spoilage. Essential oils were tested at concentrations from 0.003 to 0.8% (wt/vol) to determine minimum inhibitory and maximal tolerated concentrations (MIC and MTC, respectively) using an agar medium culture. Of the 60 samples tested, *Corydothymus capitatus* essential oil was the most active showing a MIC of 0.025% and a MTC of 0.06%. Seven essential oils (*Cinnamomum cassia*, *Origanum compactum*, *Origanum heracleoticum*, *Satureja hortensis*, *Satureja montana*, *Thymus vulgaris carvacroliferum*, *Thymus vulgaris thymoliferum*) have shown a strong antimicrobial activity against *P. putida* with a MIC of 0.05% and a MTC ranging from 0.013% to 0.025%. Ten other oils (*Cinnamomum verum* (leaf and bark), *Eugenia caryophyllus*, *Cymbopogon martinii* var. *motia*, *Cymbopogon nardus*, *Melaleuca linariifolia*, *Origanum majorana*, *Pimenta dioica*, *Thymus satureoides*, *Thymus serpyllum*) showed a high antimicrobial activity showing a MIC ranging from 0.1% to 0.4%, while the remaining were less active showing a MIC [greater-or-equal, slanted] 0.8%.

Keywords: Antimicrobial activity; Essential oils; *Pseudomonas putida*; Minimum inhibitory concentration; Maximal tolerated concentration

J.R. Claus, O. Sorheim, Preserving pre-rigor meat functionality for beef patty production, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 287-294, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.12.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4JBGKDS-1/2/37f07ecf0d22602f4c32b12406972c12>)

Abstract:

Three methods were examined for preserving pre-rigor meat functionality in beef patties. Hot-boned semimembranosus muscles were processed as follows: (1) pre-rigor ground, salted, patties immediately cooked; (2) pre-rigor ground, salted and stored overnight; (3) pre-rigor injected with brine; and (4) post-rigor ground and salted. Raw patties contained 60% lean beef, 19.7% beef fat trim, 1.7% NaCl, 3.6% starch, and 15% water. Pre-rigor processing occurred at 3-3.5 h postmortem. Patties made from pre-rigor ground meat had higher pH values; greater protein solubility; firmer, more cohesive, and chewier texture; and substantially lower cooking losses than the other treatments. Addition of salt was sufficient to reduce the rate and extent of glycolysis.

Brine injection of intact pre-rigor muscles resulted in some preservation of the functional properties but not as pronounced as with salt addition to pre-rigor ground meat.

Keywords: Beef; Pre-rigor meat; Hot processing; Patties

M. Lanza, M. Bella, A. Priolo, D. Barbagallo, V. Galofaro, C. Landi, P. Pennisi, Lamb meat quality as affected by a natural or artificial milk feeding regime, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 313-318, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.12.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4J91NMV-1/2/9ece381dd3557e952f93866ae46863f6>)

Abstract:

Fourteen Barbaresca lambs were divided into two groups of seven at 24 h from birth and reared exclusively on natural milk (NR) or on artificial milk (AR). Lambs were slaughtered at 40 days of age. The NR group tended ($P < 0.10$) to grow faster, thus resulting in a higher ($P < 0.10$) carcass weight as compared to the AR group. AR meat was darker ($P < 0.05$), leaner ($P < 0.001$) and with a higher moisture ($P < 0.10$) and ash ($P < 0.05$) content than its counterpart. The proportion of polyunsaturated fatty acids was higher ($P < 0.01$), while that of saturated lower ($P < 0.01$) in meat from the AR group, resulting in a higher ($P < 0.01$) polyunsaturated/saturated ratio. Linoleic acid content ($P < 0.001$) and its n-6 series derivatives, except 9-12 trans C18:2 n-6 ($P < 0.001$), increased more in the AR group meat than in the NR group. On the other hand, [α]-linolenic ($P < 0.001$) and other n-3 series fatty acids were higher in meat from the NR group than in the AR group, leading to a lower ($P < 0.001$) n-6/n-3 ratio. Furthermore, 9 cis 11 trans CLA was higher ($P < 0.001$) in NR meat compared to AR meat. Finally, a milk-feeding regime exclusively based on artificial milk adversely affected the dietetic value of lamb meat compared to a natural rearing system, reducing the level of desirable fatty acids such as n-3 series and CLA.

Keywords: Milk replacer; Lamb; Meat quality; Intramuscular fatty acid composition

P.K. Theil, I.L. Sorensen, M. Therkildsen, N. Oksbjerg, Changes in proteolytic enzyme mRNAs relevant for meat quality during myogenesis of primary porcine satellite cells, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 335-343, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.12.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4JCBPJC-1/2/9c00a50a15688eab37da5a5efdf2b9e0>)

Abstract:

The objective was to study the regulation of proteolytic enzyme mRNA's in porcine satellite cells during proliferation and differentiation. Beyond 80% confluence, cells were grown in absence or presence of 1 [μ]M insulin. The temporal changes in transcription of micro molar-, milli molar- and muscle specific calpains (p94), calpastatin and caspase 3 in response to insulin was evaluated and myogenin transcription and creatine kinase activity was determined to indicate differentiation. The housekeeping genes (GAPDH and [β]-actin) were slightly affected by developmental stage and transiently by the insulin treatment but this did not affect the conclusions. The mRNA abundance of micro molar calpain, p94 and calpastatin increased from proliferation to differentiation. Milli molar calpain- and caspase 3-transcriptions were up-regulated in two steps, suggesting these two enzymes are involved in two distinct processes. Insulin stimulated differentiation as indicated by elevated creatine kinase activity but did not affect myogenin transcription. Insulin down-regulated milli molar calpain and calpastatin transcription and tended to down-regulate caspase 3 transcription but did not affect p94 or micro molar calpain. In conclusion, proteolytic enzymes relevant for post-mortem tenderisation are regulated at the gene level during myogenesis, indicating they are involved in muscle cell and muscle fibre development. Thus, a porcine satellite cell culture may be a model system to study regulation and relative contribution to proteolysis by the calpains.

Keywords: Calpains; Cell culture; Gene expression; Pigs; Proteolysis; Satellite cells

E. Caceres, M.L. Garcia, M.D. Selgas, Design of a new cooked meat sausage enriched with calcium, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 368-377, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.12.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4JCBPJC-3/2/540187ed6d1504aa7d98632587ddbcea>)

Abstract:

The effect of calcium lactate, calcium gluconate and calcium citrate addition on the sensory properties of cooked meat sausages has been studied. Conventional and reduced-fat products (approx. 40%) were manufactured. The calcium salts studied were added in sufficient amounts to 100 g of final product to give 20% and 25% of calcium RDA (1200 mg). The energy value reduction in the final products was close to 30%. The instrumental measurement of colour and texture was performed. The presence of calcium salts only slightly decrease the lightness of the sausage and few changes were observed in relation to the texture. These were mainly related to increased hardness, observed at levels of calcium at 25% RDA. Sensory properties were estimated by a hedonic test. In general terms, they were very acceptable, which indicated that it is possible to manufacture conventional and reduced-fat cooked meat products enriched with calcium as a new healthier meat product.

Keywords: Cooked meat sausages; Low calorie; Calcium; Sensory analysis; Healthy food

Kaja Tikk, Meelis Tikk, Anders H. Karlsson, Henrik J. Andersen, The effect of a muscle-glycogen-reducing finishing diet on porcine meat and fat colour, *Meat Science*, Volume 73, Issue 2, June 2006, Pages 378-385, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.12.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4JBGKDS-2/2/2493aba7c6e440c337e6b78f027cc2d4>)

Abstract:

The objective of the present study was to elucidate the significance of a muscle-glycogen-reducing finishing diet containing a high ratio of rapeseed and grass meal on fat colour and pork colour compared with a control diet. Pork colour was determined as the extent of blooming of *M. longissimus dorsi* (LD) and *M. semimembranosus* (SM) after 1, 2, 4, 8 and 15 days of aging, while fat colour was measured on back fat and stripped bacon the day after slaughter. The muscle-glycogen-reducing diet significantly decreased the glycogen content measured 1 min after slaughter in LD. This was reflected as decrease in early post-mortem temperature, as well as a tendency to higher initial pH in both muscles. Moreover ultimate pH was significantly higher in LD from strategically fed pigs compared to the control group and the same tendency was found in SM. Independent of muscle and time of aging, the colour of bloomed pork from pigs fed the control diet had higher chroma and L*, a* and b* values compared with pork from the pigs fed the muscle-glycogen-reducing diet with the effect being most pronounced in LD. This can be explained by the slightly higher pH_{45 min} in the muscles from the pigs fed the muscle-glycogen-reducing finishing diet, which sustain the metmyoglobin reductase activity and the oxygen consumption potential in the muscle and hereby minimise the degree of blooming. The more pronounced influence of the experimental diet on the degree of blooming in LD compared to SM may be explained by the lower T_{45 min} in LD, which minimise denaturation of the enzymatic processes. This clearly shows that the diet composition can be used to control the extent of blooming in pork. Finally, despite the high content of grass meal in the muscle-glycogen-reducing finishing diet, this diet had negligible influence on the colour of the back fat and stripped bacon fat.

Keywords: Pork; Fat colour; Meat colour; Diet; Aging

Gale Brightwell, Jackie Boerema, John Mills, Eilidh Mowat, David Pulford, Identifying the bacterial community on the surface of Intralox(TM) belting in a meat boning room by culture-dependent and culture-independent 16S rDNA sequence analysis, *International Journal of Food Microbiology*,

Volume 109, Issues 1-2, 25 May 2006, Pages 47-53, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.01.008.

(<http://www.sciencedirect.com/science/article/B6T7K-4J9N0J4-2/2/80b9be78699e5a91380e6c741fd964ed>)

Abstract:

We examined the bacterial community present on an Intralox(TM) conveyor belt system in an operating lamb boning room by sequencing the 16S ribosomal DNA (rDNA) of bacteria extracted in the presence or absence of cultivation. RFLP patterns for 16S rDNA clone library and cultures were generated using HaeIII and MspI restriction endonucleases. 16S rDNA amplicons produced 8 distinct RFLP pattern groups. RFLP groups I-IV were represented in the clone library and RFLP groups I and V-VIII were represented amongst the cultured isolates. Partial DNA sequences from each RFLP group revealed that all group I, II and VIII representatives were *Pseudomonas* spp., group III were *Sphingomonas* spp., group IV clones were most similar to an uncultured alpha proteobacterium, group V was similar to a *Serratia* spp., group VI with an *Alcaligenes* spp., and group VII with *Microbacterium* spp. *Sphingomonads* were numerically dominant in the culture-independent clone library and along with the group IV alpha proteobacterium were not represented amongst the cultured isolates. *Serratia*, *Alcaligenes* and *Microbacterium* spp. were only represented with cultured isolates. *Pseudomonads* were detected by both culture-dependent (84% of isolates) and culture-independent (12.5% of clones) methods and their presence at high frequency does pose the risk of product spoilage if transferred onto meat stored under aerobic conditions. The detection of sphingomonads in large numbers by the culture-independent method demands further analysis because sphingomonads may represent a new source of meat spoilage that has not been previously recognised in the meat processing environment. The 16S rDNA collections generated by both methods were important at representing the diversity of the bacterial population associated with an Intralox(TM) conveyor belt system.

Keywords: Bacteria; 16S cloning; Diversity

M. Aminul Islam, Annet E. Heuvelink, Kaiser A. Talukder, Enne de Boer, Immunoconcentration of Shiga toxin-producing *Escherichia coli* O157 from animal faeces and raw meats by using Dynabeads anti-*E. coli* O157 and the VIDAS system, *International Journal of Food Microbiology*, Volume 109, Issues 1-2, 25 May 2006, Pages 151-156, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.01.010.

(<http://www.sciencedirect.com/science/article/B6T7K-4JB9MMH-3/2/75fb06cdfd114920275d8f4cc858ede2>)

Abstract:

To identify the reservoirs and routes of transmission of Shiga toxin-producing *Escherichia coli* (STEC) O157, sensitive detection and isolation methods are necessary. The sensitivity of traditional culture methods can be improved significantly by the inclusion of an immunoconcentration step, resulting in less false-negatives. In this report, we evaluated the results of two commercially available test systems: Dynabeads anti-*E. coli* O157 and the Vitek Immunodiagnostic Assay System (VIDAS) Immuno-Concentration *E. coli* O157 (ICE) kit. Additionally, we compared two selective isolation media for STEC O157. Statistical analysis of the results obtained for animal faecal samples (n = 637) examined by both immunoconcentration methods showed that by the manual Dynabeads anti-*E. coli* O157 procedure systematically more samples were identified as positive than by the VIDAS ICE. In case of meat samples (n = 360), no difference between the results of the two methods was found. In addition to being accurate, the Dynabeads anti-*E. coli* O157 method is a less expensive method than the VIDAS ICE. But, the Dynabeads method is laborious and there is a risk of cross-contamination. The VIDAS ICE procedure on the other hand is fully automated with a standardised performance; fast and safe for the user. Irrespective of the type of sample (faeces or meat) and the immunoconcentration technique applied (Dynabeads anti-*E. coli* O157 or VIDAS ICE) more samples were found positive

after plating onto CHROMagar O157 with cefixime (0.025 mg l⁻¹) and tellurite (1.25 mg l⁻¹) than after plating onto sorbitol-MacConkey agar with cefixime (0.05 mg l⁻¹) and tellurite (2.5 mg l⁻¹). However, only in case of meat samples examined by the VIDAS ICE the difference between the isolation media was not statistically significant.

Keywords: Immunoconcentration; *Escherichia coli* O157; Dynabeads; VIDAS

Olivier Audebert, Veronique Deiss, Sylvie Rousset, Hedonism as a predictor of attitudes of young French women towards meat, *Appetite*, Volume 46, Issue 3, May 2006, Pages 239-247, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.01.005.

(<http://www.sciencedirect.com/science/article/B6WB2-4JHMF9S-1/2/95615bbc986ab1fb3aca36bdb2b586d>)

Abstract:

Iron-deficient young women who are at risk of anaemia should be advised to eat red meat, a good food source of iron. However, red meat is known to elicit negative attitudes among young women, which could lead to low meat consumption. Several factors can contribute to meat attitudes. We therefore hypothesised that a good predictor of attitudes towards meat could be a positive affective component, for example, the pleasure of eating meat. In our study, 77 women with a mean age of 30.5 were surveyed. They were first asked about four hedonism variables (overall, eating, red meat and white meat hedonism) and ethical and nutritional concerns. Secondly, they were asked to express their attitudes of like/dislike towards meat by way of meat pictures, odours and taste. Red meat hedonism was first highly correlated with a liking of raw red and white meat pictures ($0.41 \leq r \leq 0.68$), followed by a liking of cooked red and white meat pictures ($0.27 \leq r \leq 0.62$). To a lesser extent, red meat hedonism was correlated with a liking of meat odours ($0.29 \leq r \leq 0.38$) and beef taste ($r=0.32$). Finally, red meat hedonism was the best predictor for most of the likings for red and white meat images. Thus, red meat images were pleasant for people who already like meat and did not encourage meat consumption among low meat-eating women.

Keywords: Red and white meat; Hedonism; Attitude; Pictures; Odour; Taste

Enda J. Cummins, Kevin P. McDonnell, Shane M. Ward, Dispersion modelling and measurement of emissions from the co-combustion of meat and bone meal with peat in a fluidised bed, *Bioresource Technology*, Volume 97, Issue 7, May 2006, Pages 903-913, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.04.027.

(<http://www.sciencedirect.com/science/article/B6V24-4GD4SD8-4/2/14e94264192898930d2e479ecc6a56ab>)

Abstract:

Due to the ban on meat and bone meal (MBM) as an animal feed, combustion with energy recovery has been considered a viable alternative usage for the mounting stocks of MBM. The effects of the co-combustion of MBM and peat on flue gas emissions and fluidisation were studied using a bubbling fluidised bed (BFB) test facility (20 kW). The dispersion of emissions such as nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), hydrogen chloride (HCl) and particulates was investigated for a proposed site and compared to the relevant national and international regulations. Concentrations of NO₂, CO and HCl were less than 10% of legislative and guideline thresholds while ground level concentrations of SO₂ were also below relevant EU and world guidelines. The results indicate the potential for using MBM as a co-fuel with peat in a BFB while maintaining high air quality standards.

Keywords: Dispersion; MBM; Peat; Co-combustion; Fluidised bed

A. Soriano, B. Cruz, L. Gomez, C. Mariscal, A. Garcia Ruiz, Proteolysis, physicochemical characteristics and free fatty acid composition of dry sausages made with deer (*Cervus elaphus*) or wild boar (*Sus scrofa*) meat: A preliminary study, *Food Chemistry*, Volume 96, Issue 2, May 2006, Pages 173-184, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.02.019.

(<http://www.sciencedirect.com/science/article/B6T6R-4FV41Y0-3/2/2b8b27f41e80c230ad044a323b3c4ea1>)

Abstract:

In order to contribute to typifying delicatessen made with game meat, the proteolysis, physicochemical characteristic and free fatty acid composition were determined in 10 commercial dry sausages, chorizos and saucissons, made with deer or wild boar meat. The aw and pH values were similar for all the samples; however, the results for dry matter, protein nitrogen, fat, ash, sodium chloride, phosphorus, and sodium nitrite content showed great variation among the samples tested. The myofibrillar protein content was higher than the sarcoplasmic protein content in all samples analysed. The electrophoretic profiles of sarcoplasmic and myofibrillar proteins were different among samples. Principal components analysis, run on the relative density of myofibrillar and sarcoplasmic proteins, separated the chorizo and saucisson samples. Chorizo samples were a homogeneous group in the analysis of myofibrillar proteins, which indicated similar proteolysis effects for all samples. The majority acids were oleic, palmitic, linoleic and stearic in all samples. Chorizos differed from saucissons in the greater quantity ($P < 0.05$) of polyunsaturated fatty acids. **Keywords:** Dry sausages; Deer; Wild boar; Physicochemical composition; Proteolysis; Free fatty acids

I.O. Abdullahi, V.J. Umoh, J.B. Ameh, M. Galadima, Some hazards associated with the production of a popular roasted meat (tsire) in Zaria, Nigeria, *Food Control*, Volume 17, Issue 5, May 2006, Pages 348-352, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.11.010.

(<http://www.sciencedirect.com/science/article/B6T6S-4G0M3MR-1/2/92c5bae0a2f81d4a1041cad3175f27e3>)

Abstract:

Some hazards associated with the entire production process of tsire (a local kebab) were identified in three production centres. Microbiological analyses showed tsire to have highest aerobic plate count of $\log_{10} 6.27$; *B. cereus* count was highest at $\log_{10} 3.30$ cfu/g; *Clostridium perfringens* count was highest at $\log_{10} 2.92$ cfu/g; Staphylococcal count was highest at $\log_{10} 3.96$ cfu/g; Coliform count was highest at $\log_{10} 4.08$ cfu/g; yeast and mould count was highest at $\log_{10} 2.49$ cfu/g. The proximate analysis showed tsire to averagely have 11.87% moisture, 31.77% protein, 23.16% fat and 2.43% salt. The critical appraisal of the production process indicated potential hazards in the raw meat, environmental contamination as well as post-process handling contamination from humans and the environment. The nature of microorganisms associated with tsire production as shown by this study calls for worry from the public health standpoint. In the light of this, efforts should be made by public health services with regard to improving its production in order to reduce the associated hazards.

Keywords: HACCP; Contamination; Aerobic plates count; Staphylococcal count; Coliform count; Proximate analysis

Mahnaz Taremi, Mohammad Mehdi Soltan Dallal, Latif Gachkar, Sanaz MoezArdalan, Koorosh Zolfagharian, Mohammad Reza Zali, Prevalence and antimicrobial resistance of *Campylobacter* isolated from retail raw chicken and beef meat, Tehran, Iran, *International Journal of Food Microbiology*, Volume 108, Issue 3, 1 May 2006, Pages 401-403, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.12.010.

(<http://www.sciencedirect.com/science/article/B6T7K-4J8CY1S-4/2/7de08d2b9dd7821303db44c3bf71f094>)

Abstract:

Campylobacter spp. is a leading cause of human diarrhea. The common source of infection is contaminated food, particularly poultry. The veterinary use of antimicrobial drugs has been suggested to be largely responsible for resistance in human isolates of this zoonotic pathogen. From April to October 2004, 241 samples of chicken and beef meat for sale in retail outlets in

Tehran (Iran) were analyzed for the presence of *Campylobacter*. Totally, 88 (36.5%) *Campylobacter* strains were isolated. *Campylobacter* was isolated from a significantly larger number of chicken (63%) than beef (10%) meat ($P < 0.0001$). Susceptibilities of 72 strains were determined for eight antimicrobial drugs using the disk diffusion assay. Resistance to nalidixic acid was the most common finding (75%), followed by resistance to ciprofloxacin (69.4%), tetracycline (45.8%), amoxicillin (11.1%), streptomycin (4.2%), chloramphenicol (2.8%) and gentamicin (1.4%). None of the isolates was resistant to erythromycin. Multidrug resistance was seen in 75% of the *Campylobacter* strains.

Keywords: *Campylobacter*; Antimicrobial resistance; Prevalence; Meat; Iran

S.Y. Hsu, Lung-Yueh Sun, Comparisons on 10 non-meat protein fat substitutes for low-fat Kung-wans, *Journal of Food Engineering*, Volume 74, Issue 1, May 2006, Pages 47-53, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.02.022.

(<http://www.sciencedirect.com/science/article/B6T8J-4FTS2PG-2/2/bb382e57c7b25f62e1cc44ff18b632a9>)

Abstract:

Non-meat proteins were used to replace pork fat in developing low-fat Kung-wans; an emulsified meatball. A one-way randomized complete block design was adopted for comparing two controls and 10 non-meat treatments. Results indicated that products made of whey protein concentrate had a higher cooking loss and moisture content and was less intense in yellowness than the other products. Products made of soybean products were adhesive, viscous and/or brittle, but were low in sensory acceptance on odor and taste. Products made of sodium caseinate or egg white powder were brittle but were not attractive in color/appearance. Products made of gelatin were hard, chewy and gummy, but were low in sensory acceptance on texture and color/appearance. Products made of skimmed milk powder were not hard, chewy, adhesive, gummy or viscous, but were superior in sensory acceptance on color/appearance, odor, taste and texture to the other products and were the best in overall acceptance.

Keywords: Low-fat emulsified meatball; Kung-wan; Non-meat proteins; Fat substitutes

P. Kalac, Biologically active polyamines in beef, pork and meat products: A review, *Meat Science*, Volume 73, Issue 1, May 2006, Pages 1-11, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4HVF12D-2/2/df0c088b58e210985a8d6876ab20e0ae>)

Abstract:

Dietary polyamines (PAs) putrescine (PUT), spermidine (SPD) and spermine (SPM) participate in an array of roles in human metabolism. Nevertheless, under some physiological conditions they can be undesirable. Meat and meat products are among important sources of PAs in human nutrition, mainly of SPM. The usual contents of PUT, SPD and SPM in fresh beef and pork are <2 , <5 and 20-40 mg kg⁻¹, respectively. Current information on changes of PAs during meat storage corresponds with PUT formation by bacterial activity mainly of pseudomonads and Enterobacteriaceae. However, data on SPD and SPM changes during meat chill-storage have been inconsistent. Culinary processing of meat probably does not change SPD and SPM levels. PUT can be formed in different meat products in relation to the microbial population of the raw materials used and the hygienic level of manufacturing process. SPD and SPM contents seem to remain stable during processing of non-fermented meat products or decrease during dry-cured ham ripening. PUT contents increase commonly to 60-140 mg kg⁻¹ in dry spontaneously fermented sausages, however, contents up to several hundreds mg kg⁻¹ are not extraordinary. Starter cultures are usually able to decrease PUT formation considerably. SPD and SPM contents in dry fermented sausages are comparable with levels typical for fresh meat. Data on SPD and

SPM changes during ripening and storage are inconsistent. A decrease of the both polyamines during a storage period has been usually reported.

Keywords: Dietary polyamines; Putrescine; Spermidine; Spermine; Meat; Beef; Pork; Meat products; Review

A. Schmid, M. Collomb, R. Sieber, G. Bee, Conjugated linoleic acid in meat and meat products: A review, *Meat Science*, Volume 73, Issue 1, May 2006, Pages 29-41, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4HR72P1-1/2/c2f73c6684d86eea62753803bb88d2f8>)

Abstract:

Conjugated linoleic acid (CLA) consists of a group of geometric and positional isomers of linoleic acid to which anticarcinogenic, antidiabetic, and antiatherogenic effects, as well as effects on immune system, bone metabolism, and body composition are attributed. CLA is found predominantly in milk and meat of ruminants due to the importance of rumen micro-organism in the formation of CLA and its precursors. This review attempts to give an overview of the available data on intramuscular CLA concentrations in meat and meat products originating from different animal species. The factors influencing these concentrations are discussed and the estimated human daily intakes as well as the percentage provided by meat are reported.

Keywords: Conjugated linoleic acid; CLA; Meat; Meat products; Diet

C. Ovilo, A. Fernandez, M.C. Rodriguez, M. Nieto, L. Silio, Association of MC4R gene variants with growth, fatness, carcass composition and meat and fat quality traits in heavy pigs, *Meat Science*, Volume 73, Issue 1, May 2006, Pages 42-47, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4HTCW71-2/2/5683d9d7860da2ac352b244697c18966>)

Abstract:

The melanocortin receptor 4 (MC4R) gene is implicated in the regulation of feeding behaviour and body weight in humans and mice. A missense mutation (Asp298Asn) located in a highly conserved region of this gene has clearly been associated with backfat depth, feed intake and growth rate in different porcine lines. In this work the complete coding region of the gene was sequenced in samples from six pigs of a commercial hybrid line and two polymorphisms were detected at positions 709 (C/T) and 1426 (G/A). The last one corresponds to the missense mutation, and has been genotyped in 333 animals with phenotypic records and 68 out of their 81 parents. An association study of these genotypes with several performance and quality traits was performed within the statistical animal model framework. The results confirmed the effect of the missense mutation on growth and fat deposition traits (live weight at 140d and backfat depth), and supported new effects on carcass composition (loin and shoulder weights) and traits related to fat and meat quality (profile of fatty acids; muscle Minolta L*, a* and Ho colour parameters). A transmission-disequilibrium test provided no evidence of spurious association due to population stratification.

Keywords: MC4R; Heavy pigs; Carcass composition; Quality traits

Eleftherios H. Drosinos, Marios Mataragas, Aikaterini Kampani, Dimitrios Kritikos, Ioannis Metaxopoulos, Inhibitory effect of organic acid salts on spoilage flora in culture medium and cured cooked meat products under commercial manufacturing conditions, *Meat Science*, Volume 73, Issue 1, May 2006, Pages 75-81, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4HWXB08-1/2/5b38817caa20b0d37a8ff3b1390763f5>)

Abstract:

Lactobacillus curvatus, isolated from a spoiled vacuum-packaged 'pariza' type meat product, was used to inoculate modified MRS broth containing sodium lactate, sodium acetate and potassium sorbate in different concentrations, alone or in inter se combinations. Two commercial preparations (MIX 1 and MIX 2) were also used containing combinations of the above antimicrobials. Results from the preservatives addition to the culture medium showed highest antimicrobial activity in the case of the sodium lactate (2%, 3% or 4%), sodium acetate (0.5%) and potassium sorbate (0.15%) combination. Results from the preservatives addition to two types of thermally processed meats showed that sodium lactate and the combination of sodium lactate, sodium acetate and potassium sorbate were the most effective; extending the products shelf life an additional 10 days. Finally, MIX 1 and MIX 2 suppressed the lactic acid bacteria (LAB) growth in the culture medium but not in the final product.

Keywords: Organic acid salts; Sodium or potassium lactate; Lactobacillus curvatus; Shelf life; Spoilage

B. Oliete, J.A. Carballo, A. Varela, T. Moreno, L. Monserrat, L. Sanchez, Effect of weaning status and storage time under vacuum upon physical characteristics of meat of the Rubia Gallega breed, Meat Science, Volume 73, Issue 1, May 2006, Pages 102-108, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4HX47PY-1/2/46b0ca11215931ea93c67ac560bdd369>)

Abstract:

Seven to nine months old calves are the typical production of Rubia Gallega, which is the most important beef breed in Spain. A study about the influence of weaning status and vacuum storage time on veal quality characteristics is needed. The muscle longissimus thoracis from 22 non-weaned (NW) and 21 weaned (W) calves at 1 day post-slaughter, and vacuum packaged for 7 and 14 days were analysed. NW showed higher yellowness and hue values than W but lower pigment concentration. The differences disappeared at longer storage times. The redness, yellowness, hue and chroma increased with aging, but the pigment concentration, expressible juice and toughness decreased with aging. Principal component analysis showed that colour variables were the most determinant characteristics in quality variation. The canonical discriminant analysis separated the samples in three groups: 1 day post-slaughter W, 1 day post-slaughter NW, and vacuum packaged W and NW.

Keywords: Storage time; Vacuum; Meat quality; Calf; Colour; Water holding capacity; Texture

G.A. Teye, P.R. Sheard, F.M. Whittington, G.R. Nute, A. Stewart, J.D. Wood, Influence of dietary oils and protein level on pork quality. 1. Effects on muscle fatty acid composition, carcass, meat and eating quality, Meat Science, Volume 73, Issue 1, May 2006, Pages 157-165, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4J2TSVY-3/2/61fc0ab514ce911492755ac05f4c02b3>)

Abstract:

This study evaluated the effects of three dietary oils - palm kernel (PKO), palm (PO) and soyabean (SBO) - and two protein levels - high (HP) and low (LP) in a 3 x 2 factorial design involving 60 pigs on growth performance, muscle fatty acid composition and content, carcass, meat and eating qualities. Oil type did not have a significant effect on growth and carcass quality. PKO significantly reduced the polyunsaturated (PUFA) to saturated (SFA) fatty acid (P:S) ratio in longissimus muscle ($P < 0.001$). PKO increased the concentrations of lauric (12:0), myristic (14:0), palmitic (16:0) and stearic (18:0) fatty acids and decreased linoleic acid (18:2). The LP diet increased intramuscular fat (IMF) from 1.7 g/100 g muscle in HP to 2.9 g/100 g ($P < 0.001$), increased tenderness by 0.6 units ($P < 0.01$) and juiciness by 0.5 units ($P < 0.01$) on the 1-8 scale, but at the expense of lower daily weight gain ($P < 0.01$), lower feed conversion efficiency ($P < 0.01$), reduced

P:S ratio ($P < 0.001$) and increased lipid oxidation ($P < 0.01$). The results suggest that PKO and PO could be used in tropical developing countries as cheaper alternatives to SBO for the production of good quality and healthy pork, but their limits of inclusion need to be determined.
Keywords: Palm oil; Palm kernel oil; Low protein diet; Fatty acid composition; Pork quality

, Paper by Zamora et al. (2005), Serine peptidase inhibitors, the best predictor of beef ageing amongst a large set of quantitative variables, *Meat Science*, 71, 730-742, *Meat Science*, Volume 73, Issue 1, May 2006, Page 185, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.013.
(<http://www.sciencedirect.com/science/article/B6T9G-4J3WGM9-1/2/0a1ab85802aca3dfb30810fb28f0d7ec>)

, Zamora et al. (2005). Serine peptidase inhibitors, the best predictor of beef ageing amongst a large set of quantitative variables, *Meat Science*, 71, 730-742, *Meat Science*, Volume 73, Issue 1, May 2006, Pages 186-187, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.11.014.
(<http://www.sciencedirect.com/science/article/B6T9G-4J2M5MH-1/2/36199e402638759624374886d69fbc64>)

David E. Swayne, Microassay for measuring thermal inactivation of H5N1 high pathogenicity avian influenza virus in naturally infected chicken meat, *International Journal of Food Microbiology*, Volume 108, Issue 2, 25 April 2006, Pages 268-271, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.08.032.
(<http://www.sciencedirect.com/science/article/B6T7K-4J8D8T4-4/2/e4bb5e9e4ff638a6f7c014a613d3b4fc>)

Abstract:

A precise, reproducible microassay was developed to measure thermal inactivation of high pathogenicity avian influenza (HPAI) virus in chicken meat. Small pieces of breast or thigh meat (0.05 g) from chickens infected with *A/chicken/Pennsylvania/1370/1983* (H5N2) (PA/83) or *A/chicken/Korea/ES/2003* (H5N1) (Korea/03) HPAI viruses were tested for inactivation in the heating block of a thermocycler. Korea/03 infected thigh and breast meat had higher virus concentrations (106.8 and 105.6 mean embryo infectious doses [EID₅₀]/g, respectively) compared to PA/83 infected thigh and breast meat (102.8 and 102.3 EID₅₀/g, respectively). The samples were ran through a ramp-up cycle from 25 to 70 [degree sign]C, and meat samples were removed and examined for virus infectivity at 30, 40, 50, 60 and 70 [degree sign]C, and after treatment for 1, 5, 10, 30 and 60 s at 70 [degree sign]C. The reduction in virus infectivity titers was dependent on virus concentration and no HPAI virus was isolated after 1 s of treatment at 70 [degree sign]C. A change in coloration from pink-tan to white was associated with a loss in recovery of infectious virus. The microassay provided a predictable and reproducible method to measure thermal inactivation of HPAI virus in chicken meat.

Keywords: Avian influenza; Chicken; H5N1; Meat; Thermal inactivation

Ian C. Gilby, Meat sharing among the Gombe chimpanzees: harassment and reciprocal exchange, *Animal Behaviour*, Volume 71, Issue 4, April 2006, Pages 953-963, ISSN 0003-3472, DOI: 10.1016/j.anbehav.2005.09.009.
(<http://www.sciencedirect.com/science/article/B6W9W-4JBGJ80-2/2/7a84d22794451f8f65b9ef5c7d2ed00b>)

Abstract:

Sharing food with nonkin is detrimental to a food donor's fitness, unless it is matched by compensatory benefits. I evaluated two explanations for nonkin meat sharing among wild chimpanzees, *Pan troglodytes schweinfurthii*. Reciprocal exchange proposes that a possessor relinquishes food in exchange for past or future sharing or for items of a different currency (e.g. grooming, alliances or copulations). The second hypothesis is the sharing-under-

pressure/harassment model, which proposes that an individual shares to avoid the costs of defending a food item against persistent beggars. At Gombe National Park, Tanzania, I collected dyadic grooming and association data during focal follows of adult male chimpanzees. I videotaped meat-eating bouts, subsequently extracting detailed begging and sharing data. There was mixed support for the reciprocal exchange hypothesis. Sharing with males was not influenced by overall association and grooming rates. Female sexual receptivity did not affect the probability of sharing, nor did sharing increase the probability of mating. Meat possessors shared larger amounts, and were more likely to share actively with frequent female grooming partners. However, this pattern may have resulted from increased harassment by these individuals. In contrast, the sharing-under-pressure hypothesis was consistently supported: the possessor's feeding rate decreased with the number of beggars, the probability of sharing increased with the occurrence and duration of harassment, and harassment decreased following sharing events. I conclude that the pattern of meat sharing among the Gombe chimpanzees is largely explained by the sharing-under-pressure hypothesis, while the significance of reciprocal exchange remains unclear.

Sueli Regina Baggio, Neura Bragagnolo, The effect of heat treatment on the cholesterol oxides, cholesterol, total lipid and fatty acid contents of processed meat products, *Food Chemistry*, Volume 95, Issue 4, April 2006, Pages 611-619, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.01.037.

(<http://www.sciencedirect.com/science/article/B6T6R-4FXV78P-1/2/17f132d8a4e5e8e6d9911332ce592bf4>)

Abstract:

The effects of heat treatment on the formation of cholesterol oxides and on alterations of fatty acid composition were investigated in processed meat products. Meatballs (beef), hamburger (beef and Chester), sausage (pork, chicken and Chester) and frankfurter (mixed meat, chicken and Chester) were analysed. There was no cholesterol oxide formation caused by heat treatment of the samples analysed. The fatty acid compositions, calculated as g/100 g sample, showed alterations only between the raw and grilled beef hamburger. Only the cholesterol levels were significantly changed when comparing the raw and grilled pork sausages and the raw and grilled Chester hamburger, the values being lower in the grilled samples. Also, the total lipid contents of grilled beef hamburgers were lower than the values.

Keywords: Cholesterol oxides; Cholesterol; Fatty acid; Effect of heat; Processed meat products

T. Iwasaki, K. Noshiroya, N. Saitoh, K. Okano, K. Yamamoto, Studies of the effect of hydrostatic pressure pretreatment on thermal gelation of chicken myofibrils and pork meat patty, *Food Chemistry*, Volume 95, Issue 3, April 2006, Pages 474-483, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.01.024.

(<http://www.sciencedirect.com/science/article/B6T6R-4FMHSVM-2/2/22fd58ccc29d6fb28939efa5c732eb73>)

Abstract:

The structures and characteristics of pressure-heat-induced gels of chicken myofibrils and pork patty were investigated. The M-line and Z-line in the chicken myofibril in 0.2 M NaCl were disrupted, and both of the thin and thick filaments were dissociated by pressure treatment. The microstructure of pressure-heat-induced chicken myofibrillar gel was composed of three-dimensional fine strands. Pressurization, at 200 MPa, prior to heating, increased the apparent elasticities of chicken myofibrillar gel and pork patty; however, pressure treatment above 200 MPa decreased it. The apparent elasticity of the pressure-treated (200 MPa) thermal myofibrillar gel was three times higher, and that of pork patty was twice higher than those of the unpressurized ones. The rheological properties of the low salt (1% NaCl) pork sausage can be improved by pressure treatment at 200 MPa prior to heating.

Keywords: Pressure treatment; Muscle; Thermal gelation; Chicken myofibril; Pork patty

Elin Kubberod, Gunvor Irene Dingstad, Oydis Ueland, Einar Risvik, The effect of animality on disgust response at the prospect of meat preparation--An experimental approach from Norway, Food Quality and Preference, Volume 17, Issues 3-4, Seventh Sensometrics Meeting, Davis, USA, 28-30 July 2004, April-June 2006, Pages 199-208, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2005.04.004.

(<http://www.sciencedirect.com/science/article/B6T6T-4GCX081-1/2/beb50638b27dc0373494540ae06a1dad>)

Abstract:

This paper presents an experimental design approach to measure the effect of disgust elicitors related to the symbolic concept of 'animality' on consumers' disgust at the prospect of meat preparation. Three factors of animality were operationalised and tested; Meat Typicality, Animal Nature Typicality, and Personification. The consumer sample consisted of 119 adolescents and 117 adults from Norway (118 females and 118 males). The study employed a full factorial design (23) with these three disgust-eliciting factors as design variables. L-PLSR was performed on the data as well as a more traditional approach for hypothesis testing (ANOVA). The manipulations demonstrated for each factor that the more the meat stimuli could be animalised the more disgust they provoked.

Keywords: Animality; Disgust response; Meat preparation; Females; Disgust sensitivity; L-PLSR

Sigrid R. Andersen, Peter Saadbye, Naseer M. Shukri, Hanne Rosenquist, Niels L. Nielsen, Jeppe Boel, Antimicrobial resistance among *Campylobacter jejuni* isolated from raw poultry meat at retail level in Denmark, International Journal of Food Microbiology, Volume 107, Issue 3, 1 April 2006, Pages 250-255, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.04.029.

(<http://www.sciencedirect.com/science/article/B6T7K-4J0XV3S-1/2/57abf57d003c4bd9a8005300eecbb1e7>)

Abstract:

Campylobacter jejuni isolated from raw poultry meat collected at retail shops in Denmark in the period 1996-2003 were tested for susceptibility to seven antimicrobial agents. The food samples consisted of raw chicken meat and other raw poultry meat of domestic or imported origin. The highest levels of resistance among *C. jejuni* were observed for tetracycline, nalidixic acid and ciprofloxacin, whereas macrolide resistance was rarely detected. *C. jejuni* originating from other poultry meat (mainly duck and turkey meat) exhibited the highest occurrences of antimicrobial resistance monitored; approximately one third of the isolates were tetracycline resistant (N = 100). Among chicken meat isolates, the occurrence of tetracycline resistance was significantly higher ($P < 0.005$) in *C. jejuni* isolated from imported chicken meat (N = 88) than in *C. jejuni* from Danish chicken meat (N = 367). The same tendency was observed for chloramphenicol, nalidixic acid and ciprofloxacin ($P < 0.05$). The trends in resistance in the period 1996-2003 among *C. jejuni* isolates from chicken meat indicate a decrease in the occurrence of resistance towards fluoroquinolones. This may be due to reduced application of fluoroquinolones for food animals. Monitoring of the occurrence of antimicrobial resistance in *C. jejuni* isolated from raw uncooked poultry has been performed on a yearly basis since 1996, thus providing useful insight into consumer exposure to antimicrobial-resistant *C. jejuni*.

Keywords: *Campylobacter jejuni*; Poultry meat; Antimicrobial resistance; Food

M.B. Mielnik, E. Olsen, G. Vogt, D. Adeline, G. Skrede, Grape seed extract as antioxidant in cooked, cold stored turkey meat, LWT - Food Science and Technology, Volume 39, Issue 3, April 2006, Pages 191-198, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.02.003.

(<http://www.sciencedirect.com/science/article/B6WMV-4FR3P17-3/2/725c8c678f9db1147116c4d8579d2f8f>)

Abstract:

Efficiency of four concentrations of grape seed extract (0.0, 0.4, 0.8, and 1.6 g/kg) in retarding oxidative rancidity was tested with cooked turkey breast meat. Development in lipid oxidation during 13 days of refrigerated storage was evaluated by means of thiobarbituric acid-reactive substances (TBARS) and volatile compound formation. Hexanal, pentanal, octanal, 2-octenal, 1-octen-3-ol, 2-octen-1-ol, and 1-penten-3-ol showed high correlations ($r > 0.95$) with TBARS values and could, therefore, serve as markers for the oxidation process in the cooked turkey breast meat. Supplementation of grape seed extract prior to cooking significantly improved oxidative stability of minced turkey meat during heat treatment and storage. The ability of grape seed extract to prevent lipid oxidation was concentration-dependent. Vacuum-packaging considerably improved oxidative stability of meat regardless of the low concentration of grape seed extract used. It appears that grape seed extract could be very effective in inhibiting lipid oxidation of cooked turkey meat during chill-storage.

Keywords: Turkey meat; Grape seed extract; Cold storage; Lipid oxidation; Volatile compounds

F. Napolitano, M. Caroprese, A. Girolami, R. Marino, A. Muscio, A. Sevi, Effects of early maternal separation of lambs and rearing with minimal and maximal human contact on meat quality, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 635-640, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4HHWWGH-1/2/914cfbec6328588832681120ed699e2a>)

Abstract:

The present study aims to assess the effect of gentling on behaviour and meat quality of lambs. Thirty-two Comisana lambs were divided into four groups of eight animals: ER (ewe reared), AR (artificially reared) and the corresponding gentled groups ERG and ARG. The provision of human contacts stimulated gentled subjects to explore, whereas the proportion of idling subjects was reduced ($P < 0.10$). At increasing age the number of subjects contacting the person increased in the gentled groups ($P < 0.05$). Lambs left with their dams showed higher warm and cold carcass yields compared to artificially reared animals, although animals benefiting from both maternal care and gentling, had the highest dressing percentage ($P < 0.05$). Values of pH declined more rapidly in meat from gentled animals than from ungentled subjects ($P < 0.05$), b^* and h values were higher in ARG than in AR group ($P < 0.05$), whereas Warner-Bratzler shear force and hardness tended to be lower in gentled lambs ($P < 0.15$). We conclude that human-animal relationship can play an important role in affecting welfare, productive performances and meat quality of lambs, in particular when young subjects are prematurely separated from mothers.

Keywords: Lambs; Artificial rearing; Gentling; Behaviour; Meat quality

Lamberto Lambertini, Giorgio Vignola, Anna Badiani, Giuliano Zaghini, Andrea Formigoni, The effect of journey time and stocking density during transport on carcass and meat quality in rabbits, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 641-646, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4HHP5BJ-2/2/22a1a34023e1c3dbab5cfb2d3551daca>)

Abstract:

Four hundred and fifty hybrid commercial rabbits (half males and half females) at the end of their productive cycle (82 days old) were transported in cages (98 x 52 x 24 cm, length x width x height) at high or low density (75.5 or 49.0 kg/m² - 15 or 10 animals per cage) on an uncovered truck for 1, 2 or 4 h. Live weight before and after transport as well as slaughter data were recorded for each rabbit. A subset of 180 carcasses were evaluated for meat quality on the basis of meat pH, colour (CIELab system), cooking loss, drip loss and shear force. As a representative of the whole carcass muscle/bone ratio, the left hind leg was separated, dissected and its meat analysed in order to determine its water, protein, ash and lipid content. It was found that a longer journey significantly

increases the live weight losses (3.3% vs. 2.0% vs. 1.6% for 4, 2 or 1 h, respectively; $P < 0.001$), as a result not only of urine and fecal losses, but also of a decrease in carcass weight ($P < 0.01$) during transport. Ultimate pH (pHu) was higher and pH drop lower in rabbits transported for 4 h compared to those transported for 2 h ($P < 0.05$). Moreover, the meat from animals that had undergone the longest journey was more purple-red ($P < 0.05$), darker ($P < 0.0001$), and firmer when raw and showed less cooking loss than meat from those that underwent shorter journeys. Transport density did not influence any of the considered parameters and there was no interaction between transport time and density.

Keywords: Rabbit; Slaughtering data; Meat quality; Transport time; Density

Maha N. Hajmeer, Dean O. Cliver, James L. Marsden, Central nervous system tissue detection in meat from advanced meat recovery systems, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 656-659, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4HHP5BJ-4/2/5ada10398f8f34aeab32a1b43bf64a1c>)

Abstract:

Three hundred meat samples, recovered from beef neck- and breast-bones using a conventional advanced meat recovery (AMR) system, the de-sinewed minced meat (DMM10) technology, and hand-boning, were collected and tested for presence of central nervous system tissue (CNST) in meat using an ELISA-based test. Samples were collected at two processing facilities (Est. A and B). Sternum meat was the non-CNST reference (control) - it is distant from brain and spinal cord locations on a carcass, with low likelihood of contamination with CNST. Neckbone meat was recovered from bones obtained from carcasses where the spinal cord was removed manually, Est. B, or using a Jarvis circular hydraulic cord remover saw, Est. A. All samples from AMR, DMM, and hand methods showed lower calculated levels of 'risk material' than the stated limit of detection (0.1%) of ELISA kit. There was no apparent difference among these, and use of the Jarvis saw had no perceptible advantage.

Keywords: Advanced meat recovery systems; Beef; ELISA method; Neural tissue

E.S. Toohey, D.L. Hopkins, Eating quality of commercially processed hot boned sheep meat, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 660-665, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4HHP5BJ-3/2/019ad3afa33d9e009a831011a6f55dc5>)

Abstract:

The aim of this work was to establish consumer perceptions of the eating quality of commercially processed hot boned sheep meat. The eating quality scores for tenderness, flavour, juiciness, and overall liking of grilled m. longissimus thoracis et lumborum (LL) were derived from untrained consumers. The animals used in this experiment were sourced from three different properties and were of various ages, breed, and sex, and had been on various quality pastures. All carcasses were subjected to immobilisation, spinal discharge and high voltage electrical stimulation and boned within 2 h of slaughter. All LL samples were frozen after boning according to the system applied at the abattoir and samples kept for consumer assessment and measurement of meat quality. The results showed, on average carcasses entered rigor at high temperatures with a pH of 5.95 at 29.3 [degree sign]C. With an average sarcomere length of 1.68 [μ m], some shortening was evident and there was a significant difference between lots in sarcomere length ($P < 0.05$). A large percentage (82%) of samples had a pH greater than 5.8 at the time of freezing. All samples taken for shear force analysis exceeded a recommended threshold for acceptable table meat of 49 N and there was no significant difference between lots ($P > 0.05$). Only 13.5% of the samples met the 'good everyday' requirement following sensory assessment and there were significant differences between lots for eating quality traits ($P < 0.05$). This work clearly shows that the

application of effective electrical stimulation is not sufficient to ensure that hot boned sheep meat will be suitable as a table meat. These findings highlight the need for the inclusion of other intervention techniques.

Keywords: Eating quality; Hot boned; Electrical stimulation; Sheep meat

Christina E. Adamsen, Jens K.S. Moller, Kristoffer Laursen, Karsten Olsen, Leif H. Skibsted, Zn-porphyrin formation in cured meat products: Effect of added salt and nitrite, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 672-679, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4HK03GT-1/2/8ebe31da316aca9155d95da53135f173>)

Abstract:

Zn-porphyrin (Zn-pp) was quantified by fluorescence spectroscopy in the cured and dry cured meat products: Parma ham, Iberian ham, dry-cured ham with added nitrite, cooked ham with added nitrite, raw ham meat, raw bacon and Karree-Speck. The highest amount of Zn-pp was found in dry-cured Parma ham and Iberian ham, while the use of nitrite as curing agent was found to inhibit completely the formation of Zn-pp in meat products. A positive correlation between both Zn content and Fe content and the logarithmic transformed Zn-pp content (measured as fluorescence intensity *I_{fl}*) was found for the different cured and dry cured meat products, with correlation coefficients of 0.79 ($p < 0.001$) and 0.71 ($p < 0.01$), respectively. Log *I_{fl}* correlates best with the Zn content, indicating that the formation of Zn-pp is proportional to the Zn content. A model system with vacuum packed pork in brine with different added levels of sodium chloride with or without nitrite and Zn acetate was investigated in order to further elucidate the mechanism of Zn-pp formation. Zn-pp increased with time (up to 42 days investigated) in non-cured meat and for meat cured solely with NaCl lower than 9%. Addition of nitrite or Zn(II) in the curing brine was found to inhibit formation of Zn-pp confirming the observations from the various cured meat products. It is suggested that a chloride anion assisted dissociation of iron from myoglobin could be rate-determining for Zn-pp formation in meat products.

Keywords: Dry cured meat products; Colour; Zn-protoporphyrin; Nitrite content; Salt content

G. Otto, R. Roehe, H. Looft, L. Thoelking, M. Henning, G.S. Plastow, E. Kalm, Drip loss of case-ready meat and of premium cuts and their associations with earlier measured sample drip loss, meat quality and carcass traits in pigs, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 680-687, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4HMFJJ6-1/2/d8020161de4ab9294dede3a74df297f8>)

Abstract:

Drip loss of 374 samples taken from porcine *M. longissimus dorsi* and *M. semimembranosus* was measured by using the 'bag method' (BM), EZ-DripLoss (EZ-DL) from premium cuts (PC) and in retail tray (case-ready meat; CRM). This provided a comparison between these methods and their relationships to other meat quality and carcass traits. Samples were prepared at 24 h post-mortem (pm) and were measured 24 and 48 h after preparation (at 48 and 72 h pm) using the BM and after 48 h (at 72 h pm) with the EZ-DL and PC. Drip loss of meat kept in retail trays was measured after 7 days (CRM7) and daily within a week (CRM1-7). Average drip loss was 1.80% and 3.10% using the BM after 24 and 48 h, respectively. EZ-DL and CRM7 showed higher drip losses of 4.71% and 4.00%. Daily loss of CRM1-7 showed a concavely shaped curve and increased from 1.57% to 5.64% after 7 days. High correlations were obtained between drip loss of CRM7 and BM ($r = 0.88$) or the EZ-DL ($r = 0.91$). The development of drip loss in case-ready meat fitted by linear-quadratic regression ($y = 0.439 + 1.245x - 0.072x^2$) showed that high drip loss measured earlier by bag and EZ-DripLoss methods was highly associated with a high intercept ($r = 0.63-0.72$), a high linear increase ($r = 0.77-0.81$), but larger decrease in increments ($r = -0.82$ to -0.86) during weekly stored meat in retail trays as supplied at consumer level. Because the positive linear

regression coefficient was substantially higher than the negative quadratic regression coefficient, the development of drip loss is mainly dependent on the initial drip loss. Therefore, animals with high drip loss within 72 h post-mortem also showed undesirable high drip loss curves over the entire retail period. Relationships between drip loss and other meat quality traits were similar for BM, EZ-DL and CRM7. Of these the correlation between pH₂₄ and drip loss was highest with $r = -0.54$, -0.49 and -0.47 for BM, EZ-DL and CRMH7, respectively. Interestingly, a correlation of $r = -0.35$ between blood pH value and CRML7 was obtained. Carcass traits such as loin, ham, shoulder, belly weight or loin eye area showed only marginal correlations to drip loss. In conclusion, EZ-DL was the most appropriate method to predict drip loss of case-ready meat in retail trays and its development during a 7 day storage period.

Keywords: Drip loss; Meat quality; Premium cuts; Case-ready meat; Growing pigs; Blood pH

P. Fortomaris, G. Arsenos, M. Georgiadis, G. Banos, C. Stamataris, D. Zygoiannis, Effect of meat appearance on consumer preferences for pork chops in Greece and Cyprus, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 688-696, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4HK03GT-2/2/eabd2fcda8acbfd3c03040b523b1e42c>)

Abstract:

The effect of meat appearance on consumers' preferences for pork chops was assessed using images manipulated for appearance characteristics. Data were collected from 412 consumers in Greece and Cyprus. Consumers were asked for their preference for pork chops from a book of computer-modified images and then completed a questionnaire of socio-demographic information, including eating and purchasing behaviour. Consumers under the age of 35 years showed preferences for dark red, lean pork, while consumers aged 35 years and older preferred either dark or light red pork. Gender appeared to be an important selection factor as men showed an increased preference for dark red pork while women preferred the light red. Consumers who stated that they like pork for its taste (91%) preferred either dark or light red pork chops while those who like pork for reasons other than taste preferred dark red, lean pork. Urban consumers preferred light red, fatty pork chops while the rural consumers preferred the dark red pork chops.

Keywords: Consumers; Preferences; Pork chops; Colour; Fat cover; Marbling; Drip; Greece; Cyprus

A. Cerdeno, C. Vieira, E. Serrano, P. Lavin, A.R. Mantecon, Effects of feeding strategy during a short finishing period on performance, carcass and meat quality in previously-grazed young bulls, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 719-726, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4HMFJJ6-2/2/c9173e92a41287de69e9932e27f3ffa5>)

Abstract:

Twenty-one Brown Swiss x Limousin young bulls reared on pasture were housed for a short finishing period (60 days). CA group (concentrate-ad libitum group) received concentrate and straw ad libitum for the whole finishing period. CR group (concentrate-restricted group) received 4 kg of concentrate/animal per day and ad libitum alfalfa hay throughout the 60 days. CRA group (concentrate-restricted/ad libitum group) received the same diet as CR group for the first 30 days and the same diet as CA group for the last 30 days. CA and CRA groups presented higher fatness values. Myoglobin concentration in muscle was highest in CA group ($P < 0.05$) and carotene content in subcutaneous fat was highest in CR group ($P < 0.01$), while Warner-Bratzler shear force and sensory traits were unaffected ($P > 0.05$). It is concluded that, in this type of young animal, 4 kg concentrate plus ad libitum alfalfa hay for a 60-day finishing period, despite lower fatness,

provides carcasses and meat with acceptable quality characteristics, similar to those obtained from ad libitum fed animals for the same period.

Keywords: Bulls; Finishing; Performance traits; Carcass quality; Beef quality

M. Raccach, H.R. Tilley, Thermal inactivation of the frozen thawed traditional meat starter culture, *Pediococcus pentosaceus*, in a meat model system, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 751-756, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4HNSBCY-3/2/a9f9a6238cb9e9566ea680602d7df0ac>)

Abstract:

The equation, $y(t) = y(0)ekt$, was fitted ($R = 0.9281, 0.9220$ and 0.9117 , respectively) to thermal inactivation data (55, 60 and 65 [degree sign]C) of the traditional meat starter culture *Pediococcus pentosaceus* (107 cfu/ml) in a meat model system. The population reduction constant ('k') increased (about 2.5- and 3-fold) with an increase in the treatment temperature (from 55 to 60 [degree sign]C and from 60 to 65 [degree sign]C, respectively). The Q_{10} (55-65 [degree sign]C) for 'k' was 7.63. Thermal treatments of 19.1, 9.0 and 3.1 min (55, 60 and 65 [degree sign]C, respectively) reduced the population of *P. pentosaceus* by 2.0 logs. The value of 'k' and the duration of the thermal treatment played an important role in the extent of the inactivation of the culture. The 'zero inactivation' temperature (T_0) for *P. pentosaceus* was 49.9 [degree sign]C. About 5 logs of the culture would be destroyed at 63 and 68 [degree sign]C within about 15.5 and 6.5 min, respectively.

Keywords: *Pediococcus pentosaceus*; Lactic acid bacteria; Thermal inactivation; Meat model

G.A. Mari'a, T. Buil, G. Liste, M. Villarroel, C. Sanudo, J.L. Olleta, Effects of transport time and season on aspects of rabbit meat quality, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 773-777, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4HR76RS-1/2/d93b1d22b6c26170ff2ab4cf9be461e2>)

Abstract:

The aim of this study was to determine whether transport times of up to 7 h can have a significant effect on instrumental meat quality traits in rabbits. Spain has very hot summers and cold winters; therefore, we performed replicates in two seasons. To evaluate the effect of transport time and season on rabbit meat quality, we assessed four meat quality parameters: pH, water holding capacity (WHC), texture (compression and Warner-Bratzler analyses), and colour (CIEL*a*b*). We also considered the effect of the position of the animals on the transport vehicle. After slaughter, we analysed steaks of *Longissimus dorsi* from all transported animals ($n = 216$). Average pH at 24 h and WHC did not differ significantly between transport time treatments. Position on the vehicle did not influence the measures of meat quality. Transport time had a significant effect on all the meat texture parameters measured by compression, but did not affect shear force or toughness. Transport time influenced a^* but not L^* or b^* . Transport time had much less of an effect on meat quality than time of year; therefore the effect of season appeared to be independent of transport time. Position on the vehicle had no effect on meat quality. Based on our results, we conclude that the transport process can affect instrumental meat quality.

Keywords: Rabbit; Meat quality; Transport time; pH; Colour; Texture

A. Saadoun, M.C. Cabrera, P. Castellucio, Fatty acids, cholesterol and protein content of nutria (*Myocastor coypus*) meat from an intensive production system in Uruguay, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 778-784, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.10.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4HVW8MT-1/2/f48a7c7209e4c93cd30d35ba14b11a25>)

Abstract:

This study describes the total lipids, protein and fatty acids in the meat, liver, brain and adipose tissue of five male and five female nutria (*Myocastor coypus*). The animals were reared on a specialized farm in Uruguay. Total lipid content was between 1.41% and 1.84% in males and females. Total cholesterol content was between 70.1 mg and 72.7 mg/100 g of wet tissue. The protein content was between 19.56% and 22.34% in males and females. No significant differences ($P > 0.05$) were detected between males and females for total lipid, cholesterol or protein. Total, saturated, monounsaturated and polyunsaturated fatty acid values were higher ($P < 0.001$) in female than in male thigh muscle. Pectoral muscle had more ($P < 0.05$) saturated and monounsaturated fatty acids in females than in males. Subcutaneous adipose tissue from females had the highest ($P < 0.01$) total, saturated and monounsaturated but not polyunsaturated fatty acids while abdominal adipose tissue from males had more polyunsaturated fatty acids.

Keywords: Nutria meat; Fatty acid composition; Cholesterol; Proteins; *Myocastor coypus*

F. Perlo, P. Bonato, G. Teira, R. Fabre, S. Kueider, Physicochemical and sensory properties of chicken nuggets with washed mechanically deboned chicken meat: Research note, *Meat Science*, Volume 72, Issue 4, April 2006, Pages 785-788, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4HG68B2-6/2/8046097793e7b875f826311dfec78f4b>)

Abstract:

The effects of different proportions (0%, 10%, 20%, 30%, 40%) of washed mechanically deboned chicken meat (WM) as a substitute for hand deboned chicken meat, on the physicochemical and sensory characteristics of chicken nuggets were evaluated. The addition of WM increased fat content, but it was only significant ($P < 0.05$) when 40% of WM was added, whereas the protein content was significantly ($P < 0.05$) reduced as from 20%. Significant differences ($P < 0.05$) were found in L^* , a^* and b^* values with different proportions of WM, however, these differences were evidently not discerned as shown by the no significant differences ($P > 0.05$) in ΔE^* color scores. The addition of WM did not affect ($P > 0.05$) sensory attributes of chicken nuggets. From a technical viewpoint, up to 40% WM could be incorporated into nugget formulation instead of hand deboned chicken meat without affecting sensory attributes of the product. Minor changes in composition were observed but they were probably not detrimental to the product.

Keywords: Washed mechanically deboned chicken meat; Restructured meat; Sensory properties; Physicochemical characteristics

Fidel Toldra, The role of muscle enzymes in dry-cured meat products with different drying conditions, *Trends in Food Science & Technology*, Volume 17, Issue 4, EFFoST Warsaw 2004, April 2006, Pages 164-168, ISSN 0924-2244, DOI: 10.1016/j.tifs.2005.08.007.

(<http://www.sciencedirect.com/science/article/B6VHY-4H7T0KP-1/2/f8e070e06e8f0d11fde940904aff0785>)

Abstract:

Several muscle proteases (cathepsins, calpains, peptidases and aminopeptidases) and lipases (lysosomal acid lipase, acid phospholipase and adipose tissue lipase) are involved in important biochemical mechanisms taking place during the processing of dry-cured meat products which are directly related to the final quality. These enzymes are affected by the conditions typically found in the processing of dry-cured meat products, being dehydration one of the most important factors. This work is presenting the effect of different drying conditions, typical in the processing of dry-cured meat products, on the activity of muscle proteases and lipases as well as its relevance for the final product quality.

W.H. Hendriks, Y.H. Cottam, D.V. Thomas, The effect of storage on the nutritional quality of meat and bone meal, *Animal Feed Science and Technology*, Volume 127, Issues 1-2, 30 March 2006, Pages 151-160, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.08.012.

(<http://www.sciencedirect.com/science/article/B6T42-4HBSGY0-1/2/2779635419c5c486fff9c91bef90a632>)

Abstract:

The effect of storage on the nutritional quality of meat and bone meal was investigated. Three meat and bone meal samples were stored for 1, 2, 3, 6 and 9 months, with or without the addition of the antioxidants (butylatedhydroxytoluene and butylatedhydroxyanisole). Gross composition, thiobarbituric acid reactive substances (TBARS), gross amino acid content and the coefficient of the ileal apparent digestibility (CIAD) of amino acids was determined at each time point. The concentration of TBARS increased sharply during the first 2 months of storage thereafter TBARS decreased until 9 months. The addition of antioxidants to the meat and bone meal significantly decreased the TBARS compared to the unsupplemented samples. There was a significant ($P < 0.05$) effect of time on the dry matter, crude protein, crude fat, cysteine, histidine and methionine content. There was no significant ($P > 0.05$) effect of antioxidant addition or the interaction between time and antioxidant addition on the gross content of nutrients. A significant quadratic trend over time was obtained for the dry matter content while no significant linear or quadratic regression was obtained for the other components. There was no significant ($P > 0.05$) effect of time, antioxidant addition or the interaction between time and antioxidant addition on the CIAD of any of the amino acids with the exception of methionine and cysteine for which a significant ($P < 0.05$) effect of time was found. The CIAD of methionine decreased linearly over time while no significant trend was found for cysteine. Storage of meat and bone meal at ambient temperatures, although resulting in oxidation of the fat, does not add to the variation in the CIAD of amino acids normally observed.

Keywords: Meat and bone meal; Nutritional quality; Storage; Amino acid digestibility; Antioxidant

Patrizia Messi, Elisa Guerrieri, Simona de Niederhausern, Carla Sabia, Moreno Bondi, Vancomycin-resistant enterococci (VRE) in meat and environmental samples, *International Journal of Food Microbiology*, Volume 107, Issue 2, 15 March 2006, Pages 218-222, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.08.026.

(<http://www.sciencedirect.com/science/article/B6T7K-4HHH4SM-1/2/950c9ca8ca4601cc10039b133c54c9ce>)

Abstract:

We investigated the spread of vancomycin-resistant enterococci (VRE) in strains from meat and environmental samples and the location of glycopeptide-resistance determinants in VanA isolates. VRE and VSE (vancomycin-sensitive enterococci) resistance patterns to six antimicrobials were also evaluated.

A total of 59 meat isolates (35%) and 119 environmental isolates (26.5%) were glycopeptide resistant enterococci. In particular, 10.7% meat isolates belonged to the VanA, 8.3% to VanB and 16% to VanC phenotypes. Environmental samples presented 0.7% VanA, 14.5% VanB, and 11.4% VanC strains. Evident differences were not observed among the resistance patterns of VRE and VSE isolates. Neither an important difference was observed comparing the resistance patterns in enterococci from meat and environment. In particular a low incidence of [beta]-lactamic resistant strains was found, whereas high rates of resistance were observed for streptomycin (85.7% and 92.8%), kanamycin (79.7% and 96%) and gentamycin (85.1% and 91.7%). An intermediate rate of resistant bacteria emerged for erythromycin (35.1% and 10.5%).

All VanA isolates independent of origin had more plasmids with different molecular weights. PCR amplification of the 732 bp fragment in plasmids from the VanA strains confirmed affiliation to the vanA gene cluster and the extrachromosomal location of the glycopeptide-resistance determinants. Our study suggests that food and environment play a potential role as reservoirs of

resistance determinants, prompting the need to undertake epidemiological and molecular studies to evaluate the mobility of these genes.

Keywords: Meat; Environment; Enterococci; VRE; VanA

An.T.T. Vo, Engeline van Duijkeren, Ad C. Fluit, Max E.O.C. Heck, Anjo Verbruggen, Henny M.E. Maas, Wim Gaastra, Distribution of Salmonella enterica Serovars from humans, livestock and meat in Vietnam and the Dominance of Salmonella Typhimurium Phage Type 90, Veterinary Microbiology, Volume 113, Issues 1-2, 10 March 2006, Pages 153-158, ISSN 0378-1135, DOI: 10.1016/j.vetmic.2005.10.034.

(<http://www.sciencedirect.com/science/article/B6TD6-4HRMV1H-2/2/3a4ebc1031f8eb00d4044db63f148e2e>)

Abstract:

Epidemiologically unrelated non-typhoid Salmonella isolates from humans (n = 56) and animal origin (n = 241, from faeces, carcasses and meat) in Vietnam were investigated. Salmonella Typhimurium, S. Anatum, S. Weltevreden, S. Emek, and S. Rissen were the most prevalent serovars. S. Typhimurium phage type 90 was predominant among S. Typhimurium isolates. The serotype and phage type distribution of the Salmonella isolates was different from that in Europe and America. Many sero- and phage types found in humans were also found in cattle, pigs, and poultry suggesting that food producing animals are an important source of human non-typhoid Salmonella infection in Vietnam.

Keywords: Salmonella; Human; Animal; Meat; Serotype; Phage type 90; Vietnam

Neema Mrema, Sisai Mpuchane, Berhanu A. Gashe, Prevalence of Salmonella in raw minced meat, raw fresh sausages and raw burger patties from retail outlets in Gaborone, Botswana, Food Control, Volume 17, Issue 3, March 2006, Pages 207-212, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.09.019.

(<http://www.sciencedirect.com/science/article/B6T6S-4F1GYWY-1/2/8bab246750a1f4c656289549fc724064>)

Abstract:

The prevalence of Salmonella in raw minced meat, raw burger patties and raw fresh sausages was determined by analysing 122 minced meat, 120 sausages and 58 burger patties obtained from retail outlets in Gaborone, Botswana. The prevalence rate was 20%. The most prevalent serogroups were B, followed by C and E/G. The Salmonella enterica serovars isolated were S. Typhi, S. Enteritidis, S. Anatum, S. Reading, S. Melagridis, S. Typhimurium, S. Paratyphi B, S. Newport, S. Bovis-morbificans, S. Braenderup, S. Infantis, S. Tennessee and S. Montevideo. The presence of S. Typhi and Paratyphi in meat products indicate human origin and therefore poor personal hygiene during handling of the meat products. Multidrug resistance patterns involving sulphatriad, sulphafurazole, tetracycline and cotrimoxazole were observed. Isolates in serogroups B and C were resistant to a greater number of antibiotics than isolates from other serogroups.

Keywords: Salmonellae; Meat; Sausages; Burger patties; Antimicrobial resistance

Caroline Bogs, Paola Battilani, Rolf Geisen, Development of a molecular detection and differentiation system for ochratoxin A producing Penicillium species and its application to analyse the occurrence of Penicillium nordicum in cured meats, International Journal of Food Microbiology, Volume 107, Issue 1, 1 March 2006, Pages 39-47, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.08.010.

(<http://www.sciencedirect.com/science/article/B6T7K-4HHP371-1/2/cb26be7f9a2865ef3c67dc1e8d3b3e43>)

Abstract:

A PCR method for differentiation and detection of the two known ochratoxin A producing Penicillium species, Penicillium verrucosum and Penicillium nordicum has been developed. It is

based upon two genes of the ochratoxin A biosynthetic pathway, namely the ochratoxin A polyketide synthase gene (otapksPN) and a non-ribosomal peptide synthetase gene (otanpsPN) from *P. nordicum*. Both ochratoxin A producing *Penicillia* differ characteristically in the PCR result, making a taxonomic differentiation possible. *P. verrucosum* gives consistently only a positive reaction with the primers for the otanpsPN gene, whereas *P. nordicum* is positive for both genes. The PCR reaction is negative with all of other food related fungal species tested. This PCR system has been used to analyse 62 *Penicillium* strains isolated from cured meat products or ripening rooms, the natural habitat of *P. nordicum*. Among the 62 analysed strains 11 (18%) were positive with all specific PCR reactions. All 11 strains were able to produce ochratoxin A. In a RAPD analysis performed in parallel all 11 strains showed a pattern characteristic of *P. nordicum*, indicating the congruence of all data. None of the other strains isolated from cured meat produced ochratoxin A; most of them (30 out of 62) had a RAPD pattern characteristic for *Penicillium nalgiovense*. Interestingly some of the *P. nalgiovense* strains showed weak PCR product bands with varying length after electrophoresis. This was true for both primer pairs. None of these *P. nalgiovense* strains however produced detectable amounts of ochratoxin A. A more detailed analysis revealed that *P. nalgiovense* carries similar but non-transcribed sequences to the ochratoxin A biosynthetic genes of *P. nordicum*.

Keywords: *Penicillium nordicum*; Ochratoxin A; Cured meats; *Penicillium nalgiovense*; PCR; Biosynthetic genes

M.J. Andrade, M. Rodriguez, B. Sanchez, E. Aranda, J.J. Cordoba, DNA typing methods for differentiation of yeasts related to dry-cured meat products, *International Journal of Food Microbiology*, Volume 107, Issue 1, 1 March 2006, Pages 48-58, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.08.011.

(<http://www.sciencedirect.com/science/article/B6T7K-4HF5K81-1/2/e799d93c401be42c33eff72fc3743f0c>)

Abstract:

RFLP analysis of the ITS and 18S rDNA, RAPD-PCR using mini- and microsatellite primers and RFLP analysis of mitochondrial DNA were examined to discriminate yeasts related to dry-cured meat products at species and strain level. Seven species and 35 strains of yeasts usually found in dry-cured meat products were tested. RFLP analysis of the ITS1-5.8S rDNA-ITS2 and 18S rDNA did not allow the separation at species level of all of the species tested. RAPD with a M13 primer was found to be useful for differentiation of *Rhodotorula mucilaginosa*, *Candida zeylanoides*, *Yarrowia lipolytica*, *Debaryomyces hansenii* and *Saccharomyces cerevisiae*. However, no differences were observed between *Debaryomyces polymorphus* and *Pichia carsonii*. RAPD analysis with microsatellite primers (GACA)₄, (GTG)₅ and (GAC)₅ enabled discrimination at species and strain level. However, the degree of discrimination by means of RAPD-PCR depends highly on the primers used. Thus, the PCR fingerprinting with primer (GACA)₄ enabled a higher level of discrimination than primers (GAC)₅ and (GTG)₅. The RFLP analysis of mtDNA allowed the discrimination at the species and strain level except for *R. mucilaginosa*, where no polymorphisms were observed in the strains tested. RAPD analysis with primer (GACA)₄ and the restriction analysis of mtDNA used in the present work are useful for the differentiation at species and strain level of yeasts related to dry-cured meat products.

Keywords: Yeast; RAPD-PCR; mtDNA RFLP; ITS; Dry-cured meat products

Maria Cristina Milinsk, Roseli das Gracas Padre, Carmino Hayashi, Claudio Celestino de Oliveira, Jesui Vergilio Visentainer, Nilson Evelazio de Souza, Makoto Matsushita, Effects of feed protein and lipid contents on fatty acid profile of snail (*Helix aspersa maxima*) meat, *Journal of Food Composition and Analysis*, Volume 19, Issues 2-3, March-May 2006, Pages 212-216, ISSN 0889-1575, DOI: 10.1016/j.jfca.2004.09.011.

(<http://www.sciencedirect.com/science/article/B6WJH-4HS1D2C-B/2/ff4026686580750cd1cea69bba4a3234>)

Abstract:

The purpose of the present work is to verify the influence of different feed protein and lipid contents on the proximate composition on the fatty acid profile of snail meat (*Helix aspersa maxima*). The predominant fatty acids were palmitic (16:0), stearic (18:0), oleic (18:1 n-9), linoleic (18:2 n-6), mead (20:3 n-9), and arachidonic (20:4 n-6) acids. The reason of interest is that snail meat has n-6 and n-3 fatty acids with a chain length of 22 carbons (as 22:4 n6, 22:5 n6 and 22:5 n3). The results of this work revealed that snail meat (*H. aspersa maxima*) is a protein source with low lipid content that has with essential fatty acids in its composition (linoleic and linolenic acids) and polyunsaturated fatty acids with more than 20 C atoms, indicating that this food can be used for patient nutrition irrespective of total lipid content.

Keywords: Snail; *Helix aspersa maxima*; Fatty acid; Crude protein

Rajendran Thomas, A.S.R. Anjaneyulu, N. Kondaiah, Quality and shelf life evaluation of emulsion and restructured buffalo meat nuggets at cold storage (4 +/- 1 [degree sign]C), *Meat Science*, Volume 72, Issue 3, March 2006, Pages 373-379, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4HNS6MB-1/2/6e779a75eec23be4989f07ca221f4eba>)

Abstract:

The study was aimed at comparing the physico-chemical characteristics and texture profile of emulsion and restructured buffalo meat nuggets (BMN) and assessing their shelf life at refrigeration temperature (4 +/- 1 [degree sign]C). The stability of restructured batter was significantly lower than that of the emulsion form. Emulsion nuggets (EN) had significantly higher product yield, fat content and calories while restructured nuggets (RN) had significantly higher moisture and protein contents. Texture profile analysis revealed that RN had significantly higher cohesiveness, gumminess, chewiness and shear force values. Differences in TBARS values for emulsion and restructured nuggets were not significant at any particular storage time. Throughout storage, counts for mesophilic, psychrotrophic and coliforms did not exceed log₁₀ 3.09 and 3.44 cfu/g, log₁₀ 2.23 and 2.11 cfu/g, log₁₀ 1.30 and 1.30 cfu/g for emulsion and restructured buffalo meat nuggets, respectively. In spite of a higher overall acceptance for EN initially, panelists rated them considerably lower compared to RN during subsequent storage. Buffalo meat nuggets were acceptable for at least 20 days in cold storage (4 +/- 1 [degree sign]C) under aerobic conditions in polypropylene bags.

Keywords: Buffalo meat; Emulsion nuggets; Restructured nuggets; Texture profile analysis; Shelf life; Sensory evaluation

Sharifudin Md. Shaarani, Kevin P. Nott, Laurance D. Hall, Combination of NMR and MRI quantitation of moisture and structure changes for convection cooking of fresh chicken meat, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 398-403, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4HNSBCY-1/2/d689971acdfaecde7d36fa829c009920>)

Abstract:

This study demonstrates that a combination of bulk NMR and magnetic resonance imaging measurements of the T₂-values of water protons can be used to determine the heat-induced changes in the structure and moisture content of fresh chicken meat which had been cooked in a convection oven at 200 [degree sign]C for a range of times. The gravimetric moisture content was also determined for both the raw and cooked meat. Multi-exponential fitting of the bulk NMR T₂ relaxation time data demonstrated three distinct water populations T₂₁ (39-43 ms), T₂₂ (82-99

ms) and T23 (2-3 ms) for raw meat which changed to 18-31 ms (T21), 61-208 ms (T22) and 3-7 ms (T23) after the meat had been cooked. The T1 and T2 values obtained by MRI for cooked meat decreased progressively with increased heating time. There are highly significant correlations between the T2 values from MRI and the T21 values from bulk NMR measurements of cooked meat ($r = 0.986$; $p < 0.01$), and also between the normalised M0 values from MRI and the gravimetric moisture content ($r = 0.953$; $p < 0.01$).

Keywords: NMR; MRI; Chicken meat; Convection cooking

R. Marino, M. Albenzio, A. Girolami, A. Muscio, A. Sevi, A. Braghieri, Effect of forage to concentrate ratio on growth performance, and on carcass and meat quality of Podolian young bulls, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 415-424, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.08.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4H6XM85-2/2/6c38b12eaedcd8d29e77f601e5758ed3>)

Abstract:

The effect of forage to concentrate ratio: 60-40 [high concentrate group (HC) and 70-30 [low concentrate group (LC)] on growth, slaughtering performance and meat quality were evaluated in twenty organically farmed Podolian young bulls. Meat quality characteristics were measured on three different muscles [Longissimus dorsi (LD), Semimembranosus (SM) Semitendinosus (ST)], vacuum-packaged and chilled stored at 2-4[degree sign]C for 15 days. The animals in the HC group had higher weight gain than those in the LC group ($P < 0.05$). Slaughter data were not influenced by ration composition. The higher forage to concentrate ratio produced an improvement in fatty acid composition of the three muscles, with a higher polyunsaturated to saturated ratio ($P < 0.001$). Vitamin E and malondialdehyde (MDA) contents were not affected by the feeding treatment. Panel scores for tenderness and flavour ($P < 0.01$) and Warner-Bratzler Shear force ($P < 0.001$) were significantly affected by muscle, the LD muscle being the most tender and the richest in flavour but they not affected by dietary treatment.

Keywords: Forage to concentrate ratio; Podolian cattle; Meat fatty acid composition; Organic farming; Meat quality

Noelia Aldai, Brendan E. Murray, Mamen Olivan, Antonio Martinez, Declan J. Troy, Koldo Osoro, Ana I. Najera, The influence of breed and mh-genotype on carcass conformation, meat physico-chemical characteristics, and the fatty acid profile of muscle from yearling bulls, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 486-495, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.08.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4HCMSWW-1/2/fe8a2f1a772050d7ce89b90acff56498>)

Abstract:

The influence of breed and mh-genotype on carcass conformation, meat physico-chemical characteristics and the fatty acid profile of muscle were studied. Samples from 16 yearling bulls from 'Asturiana de los Valles' (AV, $n = 12$) and 'Asturiana de la Montana' (AM, $n = 4$) were collected. AV animals were classified into three groups according to the presence of the gene causing double-muscling (AV double-muscled (mh/mh), $n = 4$; AV heterozygous (mh/+), $n = 4$; AV normal (+/+), $n = 4$). Double-muscled animals displayed better carcass traits, lower total fat (comprised of subcutaneous (SC), intermuscular (IT) and intramuscular (IM) deposits), higher lean, moisture and drip loss, and lighter meat than AV normal animals. Heterozygous animals showed intermediate characteristics. AM animals, being a more rustic and smaller breed, showed lower conformation, higher total fat (SC, IT and IM), lower moisture and darker meat. According to the intramuscular fatty acid profile, mh/mh animals showed a lower proportion of SFA and MUFA, and a higher proportion of PUFA with an equal proportion of CLA in total fatty acid content. The

P/S ratio increased with increasing number of mh alleles (or double-muscling character), while no differences between animal groups were found for the n - 6/n - 3 ratio.

Keywords: Beef; Breed; Genotype; Muscular hypertrophy; Carcass quality; Meat quality; Colour; Fatty acids

Andrzej Maj, Jolanta Oprzadek, Edward Dymnicki, Lech Zwierzchowski, Association of the polymorphism in the 5'-noncoding region of the bovine growth hormone receptor gene with meat production traits in Polish Black-and-White cattle, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 539-544, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4HG68B2-3/2/afc0898ce15a1c3d4fe959b3a5bcbcee>)

Abstract:

Single and combined effects of polymorphisms in the 5'-noncoding region of the bovine growth hormone receptor (GHR) gene on the traits related to meat production were examined in Polish Black-and-White (BW; Friesian) cattle. Four single nucleotide polymorphisms (SNPs) located in the P1 promoter region were analysed. One-hundred and fifty young bulls were included in the study. The traits analysed were daily weight gain, feed intake and conversion, and carcass parameters. Individual SNPs had no effect on growth rates, feed consumption and conversion but showed marked effect on carcass composition traits. The (-/-) genotype at RFLP-AluI appeared favorable for weight of carcass, carcass dressing percentage, and weight of lean in valuable cuts. Animals with the RFLP-Nsil (+/+) genotype seemed better for most of the carcass parameters. In addition, statistically significant associations were found between combined GHR genotypes and feed consumption, carcass weight and dimensions.

Keywords: Growth hormone receptor; Gene polymorphism; Cattle; Meat production traits

M. Font i Furnols, R. San Julian, L. Guerrero, C. Sanudo, M.M. Campo, J.L. Olleta, M.A. Oliver, V. Caneque, I. Alvarez, M.T. Diaz, W. Branscheid, M. Wicke, G.R. Nute, F. Montossi, Acceptability of lamb meat from different producing systems and ageing time to German, Spanish and British consumers, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 545-554, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.09.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4HGD7FB-2/2/f2687bc347726c1d6561e97c1c0b7813>)

Abstract:

In the present study German (DE), Spanish (ES) and British (UK) consumers' acceptance of lamb from their own country compared to lamb from Uruguay (UY) was evaluated. Two-hundred consumers in each country evaluated tenderness, flavour and overall acceptability of four types of lamb, two from UY (light and heavy lambs aged 20 d) and 2 local (with two ageing times, 7 and 20 d). In each country 1.5 cm-thick slices of lamb were evaluated by previously selected consumers in controlled conditions. DE and UK consumers showed significantly ($P < 0.05$) different acceptability scores between samples, the lamb from heavier animals and aged 20 d being the most appreciated. On the other hand the majority of the ES consumers significantly ($P < 0.05$) preferred the meat from lighter lambs. Production systems, cultural aspects and consumption habits seem to affect the acceptability of the lamb to the consumers.

Keywords: Lamb; Consumers; Ageing; Production systems

C.-T. Li, Myofibrillar protein extracts from spent hen meat to improve whole muscle processed meats, *Meat Science*, Volume 72, Issue 3, March 2006, Pages 581-583, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.08.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4H6PKXN-2/2/946679795be774702a0542702f000a26>)

Abstract:

Myofibrillar protein (MP) from spent hen meat was used as an ingredient for chicken breasts and pork hams. Cooking loss (CL) and texture of both products were evaluated. Salt-soluble MP was extracted following centrifugation. A brine with 6% MP or a brine without MP were injected into meat to 20% of the original meat weight. CL was reduced in pork hams treated with 6% MP ($P < 0.05$). Chicken breasts with 6% MP had greater hardness and gumminess than those without MP ($P < 0.05$). Pork hams with 6% MP had greater hardness, gumminess and chewiness than those without MP ($P < 0.05$). It was concluded MP from spent hen meat may be used to improve the functional properties of whole-muscle meat products.

Keywords: Spent hen; Myofibrillar protein; Protein functionality; TPA analysis

Thomas N. Sherratt, David M. Wilkinson, Roderick S. Bain, Why fruits rot, seeds mold and meat spoils: A reappraisal, *Ecological Modelling*, Volume 192, Issues 3-4, 25 February 2006, Pages 618-626, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2005.07.030.

(<http://www.sciencedirect.com/science/article/B6VBS-4H6PKWX-2/2/9e697050e19cc18cc4228ba6a7e85255>)

Abstract:

It has been argued that micro-organisms may gain a selective advantage by rendering fruit, seeds and meat as objectionable to larger animals as possible, thereby increasing the likelihood that the micro-organisms retain the resource. Here, we demonstrate that if spoiling carries a cost then not even group selection can enable a spoiling strategy to persist. In the absence of such a cost, then spoilers will be able to persist even without the actions of a larger animal, yet spread from rarity only under a limited set of conditions. We therefore question whether this verbally attractive theory is tenable, and offer alternative explanations for why rotting fruit, seeds and meat tend to be repellent to larger animals.

Keywords: Microbial competition; Spoiling; Group selection; Free riders

Frederic Leroy, Jurgen Verluypen, Luc De Vuyst, Functional meat starter cultures for improved sausage fermentation, *International Journal of Food Microbiology*, Volume 106, Issue 3, 15 February 2006, Pages 270-285, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.06.027.

(<http://www.sciencedirect.com/science/article/B6T7K-4H87794-5/2/12ab5999ea35e8888c0f853fbd6845f8>)

Abstract:

Starter cultures that initiate rapid acidification of the raw meat batter and that lead to a desirable sensory quality of the end-product are used for the production of fermented sausages. Recently, the use of new, functional starter cultures with an industrially or nutritionally important functionality is being explored. Functional starter cultures offer an additional functionality compared to classical starter cultures and represent a way of improving and optimising the sausage fermentation process and achieving tastier, safer, and healthier products. Examples include microorganisms that generate aroma compounds, health-promoting molecules, bacteriocins or other antimicrobials, contribute to cured meat colour, possess probiotic qualities, or lack negative properties such as the production of biogenic amines and toxic compounds. The vast quantity of artisan fermented sausages from different origins represents a treasure chest of biodiversity that can be exploited to create such functional starter cultures.

Keywords: Fermented sausage; Meat; Starter cultures; Lactic acid bacteria; Staphylococcus; Kocuria; Moulds; Yeasts; Flavour; Aroma; Food safety; Bacteriocins; Probiotics; Biogenic amines; Conjugated linoleic acid; Vitamins

Joanna Koort, Tom Coenye, Peter Vandamme, Johanna Bjorkroth, *Streptococcus parauberis* associated with modified atmosphere packaged broiler meat products and air samples from a poultry meat processing plant, *International Journal of Food Microbiology*, Volume 106, Issue 3, 15 February 2006, Pages 318-323, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.09.008.

(<http://www.sciencedirect.com/science/article/B6T7K-4HGM711-3/2/b7a578195e9e86248bd1e1c70e250cc4>)

Abstract:

Lactic acid bacteria (LAB) isolated from marinated or non-marinated, modified atmosphere packaged (MAP) broiler leg products and air samples of a large-scale broiler meat processing plant were identified and analyzed for their phenotypic properties. Previously, these strains had been found to be coccal LAB. However, the use of a 16 and 23S rRNA gene RFLP database had not resulted in species identification because none of the typically meat-associated LAB type strains had clustered together with these strains in the numerical analysis of the RFLP patterns. To establish the taxonomic position of these isolates, 16S rRNA gene sequence analysis, numerical analysis of ribopatterns, and DNA-DNA hybridization experiments were done. The 16S rRNA gene sequences of three isolates possessed the highest similarities (over 99%) with the sequence of *S. parauberis* type strain. However, in the numerical analysis of HindIII ribopatterns, the type strain did not cluster together with these isolates. Reassociation values between *S. parauberis* type or reference strain and the strains studied varied from 82 to 97%, confirming that these strains belong to *S. parauberis*. Unexpectedly, most of the broiler meat-originating strains studied for their phenotypical properties did not utilize lactose at all and the same strains fermented also galactose very weakly, properties considered atypical for *S. parauberis*. This is, to our knowledge, the first report of lactose negative *S. parauberis* strains and also the first report associating *S. parauberis* with broiler slaughter and meat products.

Keywords: *Sreptococcus parauberis*; MAP; Broiler meat; Lactose

Isidora Alexandropoulou, Michael Komaitis, Maria Kapsokefalou, Effects of iron, ascorbate, meat and casein on the antioxidant capacity of green tea under conditions of in vitro digestion, Food Chemistry, Volume 94, Issue 3, February 2006, Pages 359-365, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.11.023.

(<http://www.sciencedirect.com/science/article/B6T6R-4FFGJGM-3/2/b17b0080dd2f4d44a676600ccff1593d>)

Abstract:

The hypothesis that interactions of dietary polyphenols with dietary iron occur during digestion and result in a decrease of the post-absorptive antioxidant properties of polyphenols was investigated. The hypothesis was tested in vitro, under conditions that simulate gastrointestinal digestion. Mixtures of green tea, iron, and three dietary factors that modify the form of iron in the lumen, namely ascorbic acid, meat or casein, were subjected to an in vitro gastrointestinal digestion. Antioxidant capacity (FRAP assay), iron concentration (ferrozine assay) and polyphenol concentration (Folin-Ciocalteu assay) were measured in the in vitro digests. The presence of iron decreased the antioxidant capacity and the polyphenol concentration of green tea digests. The presence of ascorbic acid increased, while meat and casein decreased the antioxidant capacity of green tea. The factorial analysis of the data suggests that protein and iron interact with green tea polyphenols during the in vitro digestion and decrease their antioxidant capacity. These results support the aforementioned hypothesis.

Keywords: Antioxidant; Green tea; Iron; In vitro; Polyphenols

E. Carney, S.B. O'Brien, J.J. Sheridan, D.A. McDowell, I.S. Blair, G. Duffy, Prevalence and level of *Escherichia coli* O157 on beef trimmings, carcasses and boned head meat at a beef slaughter plant, Food Microbiology, Volume 23, Issue 1, February 2006, Pages 52-59, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.12.001.

(<http://www.sciencedirect.com/science/article/B6WFP-4GFTY93-4/2/be3330b55cfc8f2c5470ab92ecf9cbda>)

Abstract:

This study investigated the prevalence and level of *Escherichia coli* O157 on samples of beef trimmings (n=1351), beef carcasses (n=132) and bovine head meat (n=132) in a beef slaughter plant in Ireland. The survey also included an assessment of the prevalence of virulence genes in the *E. coli* O157 isolates obtained. Samples were examined for the presence of *E. coli* O157 by direct plating on SMAC-CT and by enrichment/immunomagnetic separation (IMS) with plating of recovered immunobeads onto SMAC-CT agar. Presumptive *E. coli* O157 isolates were confirmed by PCR targeting a range of genes i.e. *vt1*, *vt2*, *eaeA*, *hlyA*, *fliCh7* and portions of the *rfb* (O-antigen encoding) region of *E. coli* O157. Enterobacteriaceae on head meat samples were estimated by direct plating onto Violet Red Bile Glucose agar. *E. coli* O157 was recovered from 2.4% (32/1351) of beef trimmings samples, at concentrations ranging from <0.70-1.61 log₁₀ cfu g⁻¹. Of the 32 positive isolates, 31 contained the *eaeA* and *hlyA* genes while 30/32 contained the *fliCh7* gene and 31/32 contained *vt1* or *vt2*, or both *vt* genes. *E. coli* O157 was recovered from 3.0% (4/132) of carcass samples, at concentrations ranging from <0.70-1.41 log₁₀ cfu g⁻¹. All of the carcass isolates contained the *eaeA*, *hlyA* and *fliCh7* genes. *E. coli* O157 was recovered from 3.0% (3/100) of head meat samples, at concentrations of 0.7-1.0 log₁₀ cfu g⁻¹. All of the head meat isolates contained the *eaeA*, *hlyA*, *fliCh7* and *vt2* genes. No head meat isolates contained the *vt1* gene.

Head meat samples (n=100) contained Enterobacteriaceae, at concentrations ranging from 0.70-3.0 log₁₀ cfu g⁻¹.

Overall, the qualitative and quantitative data obtained for *E. coli* O157 on beef trimming samples in this study could be employed as part of a quantitative risk assessment model.

Keywords: *Escherichia coli* O157:h7; Beef trimmings; Enumeration; Head meat; Enterobacteriaceae

Masami T. Takeuchi, Miriam Edlefsen, Sandra M. McCurdy, Virginia N. Hillers, Development and Validation of Stages-of-Change Questions to Assess Consumers' Readiness to Use a Food Thermometer When Cooking Small Cuts of Meat, *Journal of the American Dietetic Association*, Volume 106, Issue 2, February 2006, Pages 262-266, ISSN 0002-8223, DOI: 10.1016/j.jada.2005.10.036.

(<http://www.sciencedirect.com/science/article/B758G-4J4HD07-K/2/9c8a7f34ef53139562622c36fd7d3bce>)

Abstract:

Consumers' readiness to use a food thermometer when cooking small cuts of meat was assessed using Prochaska's Transtheoretical Model of Behavior Change. Face, content, and concurrent validity were assessed by peer review, cognitive interviews, and mail surveys. The self-administered mail survey was sent to two groups of Washington and Idaho residents: 1,000 randomly selected consumers (41% return rate), and 231 employees and volunteers of Cooperative Extension involved in food and nutrition education (60% return rate). Two-stage classification questions were compared with a behavior question about thermometer use, and validated using Cronbach's if-item-deleted option for [alpha]. Concurrent validity was assessed using cross-tabulation [chi]² test. The detailed classification question more accurately classified respondents in both Consumer and Extension groups. Cronbach's [alpha] of the detailed question with the behavior question showed a consistency level of [alpha]=.73 compared to [alpha]=.35 for the simple question format. As expected, Consumer and Extension groups differed significantly in their stages of change (P<0.0001), verifying concurrent validity. We recommend use of the detailed classification question when staging persons related to food thermometer use. The process used for development and testing can be used to refine instruments for use in other types of interventions.

L.C. Hoffman, Sensory and physical characteristics of enhanced vs. non-enhanced meat from mature cows, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 195-202, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4GXVGH-2/2/d988760c4c0394c9ecf886813d19d314>)

Abstract:

Semitendinosus and longissimus muscles were removed from both sides of 10 mature Simmental cows ranging from 10 to 13 yrs. After aging for 7 days, one side was injected with a commercial salt mixture to a pumped gain of 15%; the other side served as control. Muscles were aged for a further 7 days before analysis. Injection significantly increased meat pH by 0.3 units in longissimus samples and reduced shear force values from about 50 N in control samples to 37 N for longissimus samples and 42 N for semitendinosus samples. Injection also increased juiciness and tenderness scores by approximately 1 unit when assessed by a trained sensory panel using 1-8 scales. Beef flavour, however, was more atypical in injected samples, which were also more salty. Injected samples were also pinker during storage and after cooking.

Keywords: Meat quality; Toughness; Juiciness; Colour; Sensory; Mature cows; Injected meat

A. Sekar, K. Dushyanthan, K.T. Radhakrishnan, R. Narendra Babu, Effect of modified atmosphere packaging on structural and physical changes in buffalo meat, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 211-215, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4GYNYGV-1/2/9ba155d309f21dfb607ebc72c1024a84>)

Abstract:

The effect of modified atmosphere packaging of buffalo meat on the structural parameters viz., fibre diameter, sarcomere length and myofibrillar fragmentation index and physical parameters viz., pH, drip loss and colour scores were studied. The buffalo meat was packed under aerobic, vacuum and modified atmosphere (80% oxygen + 20% carbon dioxide) and stored at 4 +/- 1 [degree sign]C upto 21 days. The results obtained revealed that vacuum-packed buffalo meat had the lowest fibre diameter and myofibrillar fragmentation index and the highest sarcomere length, vacuum thus appears to enhance ageing. Buffalo meat packed in modified atmosphere had a low drip loss and a desirable colour. The modified atmosphere packed and vacuum-packed buffalo meat was acceptable for upto 14 days at 4 +/- 1 [degree sign]C.

Keywords: Modified atmosphere packaging; Vacuum packaging; Fibre diameter; Sarcomere length; Myofibrillar fragmentation index; Vacuum packaging; Drip loss

S. Banon, R. Vila, A. Price, E. Ferrandini, M.D. Garrido, Effects of goat milk or milk replacer diet on meat quality and fat composition of suckling goat kids, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 216-221, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4H4V75D-2/2/be5f17a452193fe86fbb0c799bb5faa7>)

Abstract:

The effects of a diet with goat milk 'GM' or milk replacer 'MR' on the meat quality and fat composition of suckling Murciano-Granadina kids were studied. MR consisted of powdered skimmed milk, coconut oil and fat, and cereal products and by-products. Raw meat quality (moisture, protein, lipids, ash, collagen, cholesterol, haem pigments, CIELab colour, pH and water retention capacity), fatty acid 'FA' composition and eating quality of cooked meat (odour, flavour and texture) were determined. Diet had only a slight effect on raw meat quality but had a pronounced effect on fatty acid composition and eating quality of cooked meat. MR diet increased the water/protein proportion in the muscle. The saturated/unsaturated FA ratio in GM and MR fat was 0.94 and 2.27, respectively. The major FA in GM and MR fat were C16:0 and C18:1, respectively. Short-chain C4-C12 hardly accumulated in the adipose tissue of suckling kid,

increasing the relative percentages of C14-C20. This effect was more pronounced in MR fat, due to the fact that MR contained more short-chain fatty acids than GM. MR diet gave cooked meat a more intense characteristic goat meat odour and flavour, more tenderness and more juiciness than the natural suckling diet. This fact could be related to differences in meat and fat composition.

L.A. Lopez Tomas, J.A. Ordonez, G. Garcia de Fernando, The p-nitroaniline test to asses the bacterial microbiota of raw ground meat aerobically stored, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 222-228, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.005. (<http://www.sciencedirect.com/science/article/B6T9G-4H27CCD-2/2/4452064c9513a89463d14bd965593d9a>)

Abstract:

The previously developed p-nitroaniline test for assessing the microbial load of meat surfaces has been now adapted to determine the microbial quality of raw ground meat.

A good correlation ($r = 0.91$) between bacterial count determined by the pour plate method and the p-nitroaniline test was obtained. The sensitivity of the new method was of the order of magnitude of 104 cfu/g. This method allows the assay of ground meat in approximately 2.5 h, it does not require expensive equipment and the results can be interpreted both spectrophotometrically and visually.

Additionally, it has been proven that the method is useful in estimating the microbial quality of raw meat irrespective of the species of Gram-negative psychrotrophic bacteria prevailing in the meat during refrigerated storage.

Keywords: Ground meat; Microbiological quality; Aminopeptidase activity; p-nitroaniline test

G. Demirel, H. Ozpinar, B. Nazli, O. Keser, Fatty acids of lamb meat from two breeds fed different forage: concentrate ratio, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 229-235, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.006. (<http://www.sciencedirect.com/science/article/B6T9G-4GYH828-3/2/bb4df8ae3a1af135c1f9ac65ded35c76>)

Abstract:

Lambs from two Turkish breeds, Kivircik a meat breed and Sakiz a breed used for milk and meat production, were fed a diet containing commercial concentrate and hay in the ratios of either 75:25 or 25:75. The effects on fatty acid composition were studied. After weaning (at about 8 weeks) a total of 40 male lambs (20 Kivircik, 20 Sakiz) were divided into four groups of 10 animals and fed either commercial concentrate or grass hay-based diets. The lambs were group fed indoors for 60 days. The mean intramuscular total fatty acid content of longissimus dorsi for Sakiz was lower than that for Kivircik lamb. Increasing the dried grass percentage in the ration decreased the final live weight of the lambs but intramuscular total fatty acid content increased (2088 vs. 1791 mg/kg muscle, $p < 0.001$). All n - 3 polyunsaturated fatty acids were higher in muscle from lamb fed dried grass-based diets than from lambs fed concentrate-based diets whereas all n - 6 were higher in the latter. Polyunsaturated:saturated ratios were higher in the latter animals; 0.26 compared with 0.16 in the lambs fed grass hay. Concentrate groups displayed a higher n - 6/n - 3 ratio in the same muscle, 7.11 compared with 1.28 in the lambs fed grass. Muscle from Kivircik lambs had higher concentrations of C18:2 n - 6 and its metabolite C20:4 n - 6 ($p < 0.001$) and also C18:3 n - 3.

Keywords: Lamb meat; Breed; Fatty acids; Forage: concentrate ratio

Irene Cilla, Juan Altarriba, Lluís Guerrero, Marina Gispert, Luis Martinez, Carlos Moreno, Jose Antonio Beltran, Maria Dolors Guardia, Alejandro Diestre, Jacint Arnau, Pedro Roncales, Effect of different Duroc line sires on carcass composition, meat quality and dry-cured ham acceptability, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 252-260, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4H3JHG3-1/2/d82041a45c6fa3f1874c810a9131412b>)

Abstract:

Carcasses of 399 malignant hyperthermia gene free pigs from crosses sired by three types of Duroc (Virgen de la Fuente, DU1; Diputacion de Teruel, DU2; DanBred, DU3) were analyzed for carcass and meat quality. Carcass leanness and fat parameters were measured at the last rib and at the space between the 3rd and 4th last ribs counting from the last one. Weights, pH, electrical conductivity, colour and intramuscular fat were also measured. A sample of 133 legs per cross were processed by dry-curing. The ham portion including Biceps femoris, Semimembranosus and Semitendinosus muscles was evaluated for instrumental texture and colour, biochemical and sensory analyses and acceptability (trained panel and consumers). DU3 carcasses were well conformed but lean. DU1 carcasses had a lower conformation but higher marbling. DU2 carcasses were intermediate. Dry-cured hams from DU1-sired pigs had a higher overall acceptability, although fat content influenced a consumers group negatively. Leaner DU3 hams had the lowest acceptability.

Keywords: Carcass quality; Meat quality; Pork; Crossbreeding; Duroc; Dry-cured ham; Acceptability

L. Orru, F. Napolitano, G. Catillo, B. Moioli, Meat molecular traceability: How to choose the best set of microsatellites?, *Meat Science*, Volume 72, Issue 2, February 2006, Pages 312-317, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4H7TD46-1/2/1d0377d971efd1b1f26fdc53048ae2c4>)

Abstract:

To set up routine assays for molecular meat traceability along the food chain, the availability of a simple and low cost test for the identification of cattle carcasses is required. For this purpose, we evaluated 13 microsatellites for their ability in the identification of animals belonging to four Italian cattle breeds. Here we propose a criterion for a microsatellite-based test with the best reliability when reducing the number of loci to be analysed. The method is based on the observation that in the same loci breeds can show differences in frequencies and number of fixed alleles. This non-uniform distribution of alleles between breeds results in differences in the informative content of the same loci in different breeds. Taking into account these differences, it is possible to perform tests for the allocation of samples to specific animals utilizing a small number of microsatellites. The proposed approach allows cost reduction and ease in performing the analyses.

Keywords: Traceability; Genetics; Cattle breeds

Chen Qihe, He Guoqing, Jiao Yingchun, Ni Hui, Effects of elastase from a Bacillus strain on the tenderization of beef meat, *Food Chemistry*, Volume 98, Issue 4, 2006, Pages 624-629, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.06.043.

(<http://www.sciencedirect.com/science/article/B6T6R-4H2FY9V-2/2/47bd5985ce1c1da34e03f63ecfc52290>)

Abstract:

The tenderization effect of a new elastase from Bacillus sp. EL31410 was investigated on beef meat. Meat tenderization was done by dipping the meat cut in a solution containing proteolytic enzymes after freeze-dehydration. It was found that a marination time of 4 h was enough for enzyme adsorption. The samples were treated for 4 h in different enzyme solutions and then was stored at 4 [degree sign]C for 24, 48, 72 h, and subjected to texture measurement, sensory evaluations, biochemical analysis and histological observations. A marked decrease in hardness, by texture measurements, was observed in the meats with papain and elastase and higher sensory scores for tenderness were observed in the meats treated with enzymes than in the control. The papain-treated beef meat received the highest score for tenderness, but the scores

given for juiciness and taste were lower than that of the control. Rapid increases of fragmentation of myofibrils from the enzyme-treated meat were observed in the first 24 h of storage, especially for papain-treated meat. Meantime, elastin of myofibrillar structure was selectively degraded by elastase compared with the control when stored at 4 [degree sign]C for 48 h as shown by electron microscopy. These findings suggest that *Bacillus elastase* (EL31410) is a promising substitute for papain as a favourable meat tenderizer.

Keywords: Meat tenderization; Papain; Elastase; Freeze-dehydration; Myofibrils; Intramuscular connective tissue

Nitipong Jittrepotch, Hideki Ushio, Toshiaki Ohshima, Oxidative stabilities of triacylglycerol and phospholipid fractions of cooked Japanese sardine meat during low temperature storage, *Food Chemistry*, Volume 99, Issue 2, 2006, Pages 360-367, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.08.002.

(<http://www.sciencedirect.com/science/article/B6T6R-4H4T13G-3/2/500e38f4e05f0872197bbea2149dece4>)

Abstract:

Changes in triacylglycerols (TAG) and phospholipids (PL) compositions of cooked Japanese sardine meats as such or with prior addition of ethylene diaminetetracetic acid (EDTA) or a combination of nitrite and ascorbate were evaluated during chilled storage using gas chromatography and selected ion monitoring gas chromatography/mass spectrometry. The TAG molecular species compositions remained unchanged, while certain species of PL molecular species changed during storage at 2 [degree sign]C for 14 days. The PL containing polyunsaturated fatty acids were highly susceptible to autoxidation. The PL fractions play an important role in oxidative rancidity and development of off-flavor in cooked sardine meat, while TAG fraction plays a minor role in the oxidative deterioration of the meat. Changes in peroxide and thiobarbituric acid values were also monitored. Added EDTA was not effective in controlling the decomposition of lipid hydroperoxide throughout the storage period. However, a combination of NaNO₂ and ascorbate not only suppressed the formation but also the decomposition of the primary oxidation products.

Keywords: Triacylglycerols; Phospholipids; Off-flavor; Japanese sardine; Oxidation

Tiina Rajamaki, Hanna-Leena Alakomi, Tiina Ritvanen, Eija Skytta, Maria Smolander, Raija Ahvenainen, Application of an electronic nose for quality assessment of modified atmosphere packaged poultry meat, *Food Control*, Volume 17, Issue 1, January 2006, Pages 5-13, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.08.002.

(<http://www.sciencedirect.com/science/article/B6T6S-4DS7Y3B-1/2/c5157763eacce2a606cef7fc2ffcaf01>)

Abstract:

The applicability of an electronic nose for the quality control of modified atmosphere (MA) packaged broiler chicken cuts was evaluated in different temperature regimes. The electronic nose results were compared with those obtained by microbiological, sensory and headspace GC analyses. The electronic nose could clearly distinguish broiler chicken packages with deteriorated quality from fresh packages either earlier than or at the same time as the sensory quality deteriorated. Concerning the microbiological quality, the counts of Enterobacteriaceae and hydrogen sulphide-producing bacteria were most consistent with the electronic nose results. The results indicated that the electronic nose was capable of detecting even early signals of spoilage in MA packed poultry meat.

Keywords: Electronic nose; Poultry; Headspace

Seran Temelli[combining dot above], Canan Dokuzlu, Mehmet Kurtulus Cem Sen, Determination of microbiological contamination sources during frozen snail meat processing stages, *Food*

Control, Volume 17, Issue 1, January 2006, Pages 22-29, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.08.004.

(<http://www.sciencedirect.com/science/article/B6T6S-4DTJS1X-1/2/4048591098e0459a15a97ec9bdb0279d>)

Abstract:

This study has been conducted to determine the major contamination sources during frozen snail meat processing. Seventeen different control points and/or sample types (live snail, and snail meats after steaming, after shell removal, after first boiling, after gutting, after second boiling, after packaging and as frozen snail meat; air samples from gutting room, boiling room and packaging room; samples from gutting counter tops, package surfaces, scissors used during processing, forks used during processing, personnel hands, and potable water) have been examined for the enumeration of total aerobic mesophilic bacteria, coliforms, *Escherichia coli*, Enterobacteriaceae, coagulase positive staphylococci, *Salmonella* spp., *Listeria* spp., and yeast and molds. From the control points examined, raw material and environmental air were found as the primary contamination sources. Personnel hands and equipment used were determined as the secondary contamination sources. Second boiling and freezing stages during processing were determined to reduce the overall contamination rate, and therefore had positive effects on the microbiological quality of the final product. Programs approving the acceptance of snails only with low initial microbial counts to the plant, giving emphasis to processing in proper hygiene conditions with sufficient sanitary applications is strongly recommended.

Keywords: *Helix pomatia*; Snail; Microbiological contamination

Annett Raschke, Sandra Strich, Stephanie Huppke, Markus Neugebauer, Eugen Geuther, Wolf Bertling, Birgit Walders, Christian Reiser, Juergen Hess, Induction and detection of long-lasting peptide-specific antibody responses in pigs and beef cattle: a powerful technology for tracing meat processing chains from stock farmers to sales counters, Food Control, Volume 17, Issue 1, January 2006, Pages 65-74, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.09.004.

(<http://www.sciencedirect.com/science/article/B6T6S-4DS6V3W-1/2/fdc8802dace12b32fb38055430f7255c>)

Abstract:

A novel identification technology for livestock based on the principles of peptide-keyhole limpet hemocyanin immunisation is described allowing traceability of labelled animals and derived meat products throughout the complete production chain. Strong and long-lasting anti-peptide-immunoglobulin G responses were induced in pigs and beef cattle via immunisations with different peptide-KLH derivatives. Subsequently, anti-peptide antibodies are reproducibly detectable in serum and meat of pigs and cattle by means of ELISA. In respect of origin verification and compliance marking in quality meat programs, especially for pigs, the bioactive labelling technology meets all necessary requirements for greater transparency in the meat production chain.

Keywords: Livestock; Meat labelling; Antibody

I. Costabeber, J. Sifuentes dos Santos, A.A. Odorissi Xavier, J. Weber, F. Leal Leaes, S. Bogusz Junior, T. Emanuelli, Levels of polychlorinated biphenyls (PCBs) in meat and meat products from the state of Rio Grande do Sul, Brazil, Food and Chemical Toxicology, Volume 44, Issue 1, January 2006, Pages 1-7, ISSN 0278-6915, DOI: 10.1016/j.fct.2005.01.005.

(<http://www.sciencedirect.com/science/article/B6T6P-4H98T8M-1/2/718f83dac7f503e4ddecabc9266221c2>)

Abstract:

The levels of six polychlorinated biphenyl congeners (PCBs) were evaluated in 55 samples of meat (bovine and pork) and meat products (sausage, hot dog sausage, bologna sausage, canned export meat and salami) from 11 cities of the state of Rio Grande do Sul, Brazil, between July and

August 2002. PCB congeners were found (in fat basis) in the following rank 52 (5.18 ng/g) > 180 (1.69 ng/g) > 10 (1.35 ng/g) > 28 (1.19 ng/g) > 153 (0.47 ng/g) > 138 (0.43 ng/g), with a [summation operator]PCB amounting to 10.30 ng/g. Meat products had higher PCB levels than meat. PCB levels in samples followed the rank: mixed meat products > pork meat > bovine meat. These results indicate the presence of PCBs in food samples from Rio Grande do Sul, Brazil, but the levels found were well below the maximum level established for animal food products in Brazil (3000 ng/g fat). Only one sample exceeded the maximum level established by the European Community (200 ng/g fat). This is the first paper describing background concentrations of PCBs in meat and meat products from Brazil.

Keywords: Polychlorinated biphenyls; Meat; Meat products; Levels; Residues

Michael J. Broadway, Donald D. Stull, Meat processing and Garden City, KS: Boom and bust, *Journal of Rural Studies*, Volume 22, Issue 1, January 2006, Pages 55-66, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2005.06.001.

(<http://www.sciencedirect.com/science/article/B6VD9-4GX64SK-1/2/98aeb7991265d72f34f1525b2d4a1c26>)

Abstract:

In December 1980, the world's largest beef processing plant opened 10 miles west of Garden City, KS. Three years later another beef plant opened on Garden City's eastern edge. Full employment in the surrounding region meant that most of the 4000 workers needed to run these plants had to come from elsewhere--and they did. Garden City grew by one-third from 1980 to 1985, and it became a modern boomtown. Garden City suffered many of the social problems associated with the energy boomtowns of the Rocky Mountain West described by earlier researchers. But unlike the jobs created in those earlier boomtowns, meatpacking paid poorly and provided few benefits. On Christmas night in 2000, a fire destroyed one of the beef plants, putting 2300 people out of work. Four years after the fire, the plant remains closed and the town's economy is in decline. This paper describes the social and economic consequences for a boomtown when a major engine of its economy goes bust.

C.B. Li, Y.J. Chen, X.L. Xu, M. Huang, T.J. Hu, G.H. Zhou, Effects of low-voltage electrical stimulation and rapid chilling on meat quality characteristics of Chinese Yellow crossbred bulls, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 9-17, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.035.

(<http://www.sciencedirect.com/science/article/B6T9G-4H27CCD-1/2/276983c0e17d784d2fb704e06ddf9895>)

Abstract:

In this study, the effects of low-voltage electrical stimulation (LVES) and rapid chilling (RC) treatments on the quality characteristics of beef carcasses were evaluated, including the rate of pH and temperature decline, evaporative loss of carcasses, purge loss, cooking loss, and shear force values of *m. longissimus* steaks. Each carcass of 28 Chinese Yellow crossbred (Simmental x Yanbian) bulls was subjected to one of the four treatments, i.e., electrical stimulation and conventional chilling (ES/NR), electrical stimulation and rapid chilling (ES/RC), no electrical stimulation and rapid chilling (NE/RC), or no electrical stimulation and conventional chilling (NE/NR). Carcass pH and temperature were measured at 1, 3, 5, 7, 9, 11, and 24 h post-mortem. After that, a 2.5-cm-thick *m. longissimus* steak was taken from the right side of each carcass and used for analyses of purge loss, cooking loss and Warner-Bratzler shear force (WBSF). The results showed that LVES accelerated the rate of carcass pH decline ($P < 0.05$) and rapid chilling increased the rate of carcass temperature decline ($P < 0.05$). There was no significant difference found for the mean carcass evaporative losses from all treatments ($P > 0.05$). Mean purge losses for *m. longissimus* steaks from rapidly chilled carcasses were lower ($P < 0.05$) than those from conventionally chilled carcasses. Electrical stimulation had no impact on *m. longissimus* steak

purge losses ($P > 0.05$). Rapid chilling significantly decreased ($P < 0.05$) the cooking loss of m. longissimus steaks from electrically stimulated carcasses whilst it increased the cooking loss of m. longissimus steaks from carcasses without stimulation ($P < 0.05$). LIVES increased ($P < 0.05$) cooking loss of m. longissimus steaks from conventionally chilled carcasses, but had no effect under the procedure of pre-rigor rapid chilling ($P > 0.05$). The lowest mean shear force value was found for the ES/NR-treated m. longissimus steaks, whilst the highest one for the NE/RC-treated carcasses ($P < 0.05$). Regression analyses indicated that carcass pH at 1 h post-mortem was the most useful predictor for beef shear force. Abattoirs processing Chinese Yellow bulls could optimize meat quality by using low-voltage stimulation together with pre-rigor rapid chilling.
Keywords: Low-voltage electrical stimulation; Rapid chilling; Beef quality; Chinese yellow cattle

S. Lee, C. Faustman, D. Djordjevic, H. Faraji, E.A. Decker, Effect of antioxidants on stabilization of meat products fortified with n - 3 fatty acids, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 18-24, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.022.
(<http://www.sciencedirect.com/science/article/B6T9G-4GV987B-1/2/60c9cfc44ae2018403a6d1b721eb932d>)

Abstract:

The effects of an n - 3 oil emulsion, with and without added antioxidants, on lipid oxidation in n - 3 polyunsaturated fatty acid (PUFA)-fortified meat products were studied. An emulsion of n - 3 PUFAs was prepared (25% algal oil, 2.5% whey protein isolates, 10 mM sodium citrate, 0.2% potassium sorbate, 500 ppm of 70% mixed tocopherols, 100 [μ]M EDTA, pH 3, pasteurized at 75 [degree sign]C for 30 min) and incorporated into fresh ground turkey, and fresh pork sausage (20% fat) to achieve a concentration of 500 mg n - 3 PUFA/110 g meat. An antioxidant combination containing rosemary (0.2% w/w; radical quencher), citrate (0.5% w/w; sequestrant) and erythorbate (1 g/kg product; reductant) was prepared and incorporated into ground turkey patties (5 cm dia, 1.5 cm thick) or fresh pork sausages (5 cm dia, 1.5 cm thick). Meat products were stored at 4 [degree sign]C or -18 [degree sign]C and analyzed for color (L^* , a^* , b^* values), lipid oxidation (TBARS and lipid hydroperoxides) and n - 3 PUFA profile. a^* Values of refrigerated ground turkey patties decreased with storage, and an antioxidant combination effect was observed after 4 days ($P < 0.05$). For fresh pork sausages at 4 [degree sign]C, control + antioxidant (CON + ANTI), and n - 3 + antioxidant (n - 3 + ANTI) groups showed greater a^* values than controls (CON) indicating that the antioxidant combination stabilized meat color. TBARS and lipid hydroperoxides of both n - 3 PUFA-enhanced meat products increased with storage ($P < 0.05$); there were no significant changes in TBARS or lipid hydroperoxides for treatments containing the antioxidant combination ($P < 0.05$). The actual level of n - 3 PUFA incorporation in both meat products was greater than 87%; n - 3 PUFA concentrations did not change within any treatment during storage ($P > 0.05$). These results provide support for including antioxidant protection in n - 3 PUFA fortified meat products.

Keywords: n - 3 PUFAs; Fortification; Meat color; Antioxidant combination; Lipid oxidation

Juan C. Nieto-Lozano, Juan I. Reguera-Useros, Maria del C. Pelaez-Martinez, Arturo Hardisson de la Torre, Effect of a bacteriocin produced by *Pediococcus acidilactici* against *Listeria monocytogenes* and *Clostridium perfringens* on Spanish raw meat, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 57-61, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.004.
(<http://www.sciencedirect.com/science/article/B6T9G-4GR8NB1-3/2/e0b604ec730fa1967bce4d9d981180a6>)

Abstract:

The inhibitory effect of a bacteriocin, produced by *Pediococcus acidilactici*, against *Listeria monocytogenes* and *Clostridium perfringens* on Spanish raw meat surface, was evaluated by in situ assays. Samples were incubated with the bacteriocin and then with a culture of the pathogenic bacteria. The treatment with 500, 1000 or 5000 bacteriocin units/ml (BU/ml) reduced the counts of

L. monocytogenes after storage at 15 [degree sign]C during 72 h by 1, 2 or 3 log cycles and with 1000 or 5000 BU/ml after storage at 4 [degree sign]C during 21 days by 2.5 or 3.5 log cycles, respectively, compared to the control. With *C. perfringens* a bacteriostatic effect could be observed.

Keywords: Raw meat; *Pediococcus acidilactici*; Bacteriocin; *Listeria monocytogenes*; *Clostridium perfringens*

Sara Bover-Cid, M. Jesus Miguelez-Arrizado, L. Luz Latorre Moratalla, M. Carmen Vidal Carou, Freezing of meat raw materials affects tyramine and diamine accumulation in spontaneously fermented sausages, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 62-68, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4GR3437-1/2/0cbc97682076b7ad7d80cf466c0eef65>)

Abstract:

Biogenic amine accumulation was studied in spontaneously fermented sausages (Fuet) manufactured from unfrozen-fresh meat (U-sausages) and frozen-thawed meat (F-sausages). The aim was to investigate whether the frozen storage of raw materials affects the microbial composition and its aminogenic activity during sausage fermentation. Tyramine was the major amine in all sausages. Although the final levels were similar, tyramine accumulated more rapidly in F-sausages, which contained putrescine as the second amine. By contrast, U-sausages accumulated much more cadaverine than putrescine. F-sausages showed a slightly lower pH and free amino acid content as well as higher counts of technological flora (lactic acid and gram positive catalase positive bacteria) and lower counts of enterobacteria. Therefore, to freeze the meat raw materials for few days before sausage manufacture could be a useful practice, especially for the artisan fermented sausages (without starter), because it helps to reduce enterobacteria development and cadaverine production.

Keywords: Tyramine; Cadaverine; Putrescine; Meat fermentation; Enterobacteria; Hygienic quality

R.W. Lawrence, J. Doyle, R. Elliott, I. Loxton, J.P. McMeniman, B.W. Norton, D.J. Reid, R.W. Tume, The efficacy of a vitamin D3 metabolite for improving the myofibrillar tenderness of meat from *Bos indicus* cattle, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 69-78, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4GTW92P-4/2/2728d144d316beeb32332ec65a2ff22e>)

Abstract:

The influence of a once only administration of a metabolite of vitamin D3 (HY [middle dot] D(R)-25-hydroxy vitamin D3) on myofibrillar meat tenderness in Australian Brahman cattle was studied. Ninety-six Brahman steers of three phenotypes (Indo-Brazil, US and US/European) and with two previous hormonal growth promotant (HGP) histories (implanted or not implanted with Compudose(R)) were fed a standard feedlot ration for 70 d. Treatment groups of 24 steers were offered daily 10 g/head HY [middle dot] D(R) (125 mg 25-hydroxyvitamin D3) for 6, 4, or 2 d before slaughter. One other group of 24 steers was given the basal diet without HY [middle dot] D(R). Feed lot performance, blood and muscle samples and carcass quality data were collected at slaughter. Calcium, magnesium, potassium, sodium, iron and Vitamin D3 metabolites were measured in plasma and longissimus dorsi muscle. Warner-Bratzler (WB) shear force (peak force, initial yield) and other objective meat quality measurements were made on the longissimus dorsi muscle of each steer after ageing for 1, 7 and 14 d post-mortem at 0-2 [degree sign]C.

There were no significant effects of HY [middle dot] D(R) supplements on average daily gain (ADG, 1.28-1.45 kg/d) over the experimental period. HY [middle dot] D(R) supplements given 6 d prior to slaughter resulted in significantly higher ($P < 0.05$) initial yield values compared to supplements given 2 d prior to slaughter. Supplementation had no significant effect on meat

colour, ultimate pH, sarcomere length, cooking loss, instron compression or peak force. There was a significant treatment (HY [middle dot] D(R)) by phenotype/HGP interaction for peak force ($P = 0.028$), in which Indo-Brazil steers without previous HGP treatment responded positively (increased tenderness) to HY [middle dot] D(R) supplements at 2 d when compared with Indo-Brazil steers previously given HGP. There were no significant effects of treatment on other phenotypes. HY [middle dot] D(R) supplements did not affect muscle or plasma concentrations of calcium, potassium or sodium, but did significantly decrease plasma magnesium and iron concentrations when given 2 d before slaughter. There were no detectable amounts of 25-hydroxyvitamin D3 in the blood or muscle of any cattle at slaughter.

Keywords: Brahman cattle; 25-hydroxyvitamin D3; Myofibrillar meat tenderness; Muscle calcium; Muscle magnesium; Muscle iron; Plasma calcium; Plasma magnesium

J.A. Correa, L. Faucitano, J.P. Laforest, J. Rivest, M. Marcoux, C. Gariepy, Effects of slaughter weight on carcass composition and meat quality in pigs of two different growth rates, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 91-99, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.006.

(<http://www.sciencedirect.com/science/article/B6T9G-4H2FYB1-1/2/94edd3ddf58cf948de7f2e29c860b03c>)

Abstract:

Three hundred and forty (340) Duroc x (Landrace x Yorkshire) crossbred piglets were allotted to a 2 x 2 x 3 factorial design experiment. The independent variables were the growth rate (fast: around -10 days at 100 kg and slow: around +2 days at 100 kg), based on two different EBV's (estimated breeding value) of the sire-line for age, the sex (barrows and gilts) and the live weight at slaughter (107, 115 and 125 kg). A sub-population of 119 pigs (10 carcasses per treatment) was selected for the carcass and meat quality evaluation trials. As live weight increased there were significant increases in hot carcass weight and dressing percentage ($P < 0.05$). Lean, fat and bone proportions were not affected by weight. Gilts had higher lean proportion ($P < 0.05$) than barrows. Furthermore, carcasses of fast growing pigs were fatter ($P < 0.05$) than those of slower growing ones. Loin muscle pH, drip loss and reflectance values did not vary significantly with any of the treatments. Intramuscular fat was higher in barrows ($P < 0.05$) than in gilts and soluble collagen content decreased with increasing weight ($P < 0.05$). Muscle protein (%) increased ($P < 0.05$) from 107 to 115 kg and gilts had a higher ($P < 0.05$) content than castrates. No evidence was found that increasing slaughter weight detracts from carcass characteristics or meat quality.

Keywords: Slaughter weight; Growth rate; Sex; Carcass quality; Meat quality; Pigs

L. Kristensen, M. Christensen, P. Ertbjerg, Activities of calpastatin, [mu]-calpain and m-calpain are stable during frozen storage of meat, *Meat Science*, Volume 72, Issue 1, January 2006, Pages 116-120, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4GX0CNC-1/2/33347112c4f8ba9275510cd44f4e92ef>)

Abstract:

The stability of [mu]-calpain, m-calpain and calpastatin activity during frozen storage of pork was studied in two experiments. In experiment 1, pork longissimus muscle was stored at either -20 or -80 [degree sign]C, and the samples were assayed at 2-3 weeks interval for calpain activity and calpastatin activity using a m-calpain stock solution stored at 4 [degree sign]C. No effects on calpain activity at either temperature were observed for up to 123 days of storage. Calpastatin activity was stable the first few weeks of storage, where after it decreased up to 143 days of storage independently of meat storage temperature. At day 143, calpastatin activity was also assayed using a newly purified stock solution of m-calpain giving a calpastatin activity equal to the activity measured day 0 using the original m-calpain stock solution. The m-calpain stock solution was unstable during storage at 4 [degree sign]C and the activity decreased in a linear manner and

was highly related to the observed decrease in calpastatin activity during storage. In experiment 2, meat was stored as in experiment 1 and was assayed at 2-3 week intervals for calpastatin activity using a m-calpain stock solution stored at either 4 or -80 [degree sign]C. As in experiment 1, the measured activity of calpastatin decreased during storage using m-calpain stock solution stored at 4 [degree sign]C and this decrease was highly correlated to the decrease in the activity of the m-calpain stock solution. The activity of the m-calpain stock solution stored at -80 [degree sign]C was constant during storage period of 153 days and likewise was the calpastatin activity measured using this stock solution. The relation between measured calpastatin activity and storage time of m-calpain stock solution was tested by adding, to a calpastatin assay, up to 10 [mu]L of a partly inactivated m-calpain solution. A negative relationship was observed between added inactivated m-calpain and measured calpastatin activity which suggests that the inactive m-calpain molecules mask some of the binding sites on calpastatin and thereby prevent some of the active m-calpain molecules from binding to calpastatin. This would underestimate the measured calpastatin activity. In conclusion, the calpains as well as calpastatin are stable during frozen storage of meat, and the observed decreased in calpastatin activity is due to instability of the m-calpain stock solution used in the calpastatin assay.

Keywords: Calpastatin; Calpain; Freezing; Pork

Marta Gil, Jorge A. Ramirez, Marcial Pla, Beatriz Arino, Pilar Hernandez, Mariam Pascual, Agustin Blasco, Luis Guerrero, Gyongyi Hajos, Eموke N. Szerdahelyi, Maria Angels Oliver, Effect of selection for growth rate on the ageing of myofibrils, meat texture properties and the muscle proteolytic potential of m. longissimus in rabbits, Meat Science, Volume 72, Issue 1, January 2006, Pages 121-129, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4GXVGH-1/2/9276669b8d9b7dde75e555e66c05a861>)

Abstract:

The effect of selection for growth rate on the degradation of the myofibrillar proteins and on meat texture properties of rabbit longissimus muscle at two ageing times (1 and 7 days) was studied as well as its effect on the proteolytic potential of the muscle. Two groups of contemporary animals (20 rabbits per group), one selected for growth rate (S) for 14 generations and the other unselected control group (C) were compared. The control group was formed from the offspring of the embryos belonging to the 7th generation and was compared with selected animals belonging to 21st generation. Myofibrillar protein degradation was studied by SDS-PAGE electrophoresis (12.5% and 4-15% polyacrylamide gels) followed by densitometric analysis of the pherograms. Texture properties were evaluated by Warner-Bratzler (WB) test and Texture profile analysis (TPA). The activities of proteolytic enzymes calpains and cathepsins and of their inhibitors were determined in the muscle at 24 h. Densitometric analysis of the pherograms of samples aged 7 days showed an extra 30 kDa band and the disappearance of a band with higher molecular weight than the myosin heavy chain with respect to samples aged 24 h in both groups of rabbits. TPA results showed that cohesiveness was significantly lower in meat at 7 days than at 24 h ($P < 0.0001$), whereas springiness and chewiness presented a clear tendency to be lower at 7 days than at 24 h ($P = 0.0646$ and $P = 0.0764$, respectively). Regarding the genetic type, S animals presented higher hardness and chewiness than C rabbits. Shear firmness (WB test) was significantly ($P < 0.0001$) higher for S group, whereas no significant differences in shear force and area were found. No significant effect ($P > 0.05$) of ageing time was detected using WB test. Selection for growth rate did not affect the activities of proteolytic enzymes or their inhibitors.

Keywords: Myofibrillar protein degradation; Ageing; Texture; Rabbit; Cathepsins; Calpains

Athanasios Krystallis, Ioannis S. Arvanitoyannis, Investigating the concept of meat quality from the consumers' perspective: The case of Greece, Meat Science, Volume 72, Issue 1, January 2006, Pages 164-176, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4GY8B0G-2/2/34559d08a65f482db0a1b5089c60e192>)

Abstract:

Recent unfortunate food incidents increased consumers' concern about food and especially meat quality. The perception that meat is a hazardous commodity to consume resulted in a stabilization of the, so far increasing, meat consumption in Greece, as well as in the EU. The present survey aims to identify the general trends of meat consumption in Greece, define through factor analysis the way consumers perceive the concept of meat quality and explore by means of cluster analysis the existence of specific consumer types in relation to meat quality perceptions, with clear-cut and statistically solid socio-demographic and behavioural profile. The frequency of meat purchasing and consumption is particularly high, while meat is present in the everyday plate of Greeks in almost any expression of their family and social life. Meat preference is mainly evaluated on the basis of pleasure derived from taste, which has to be evaluated according to visual quality cues (e.g., colour, leanness, etc.). Different consumer types with clear-cut profile are found to evaluate meat quality differently, based on different quality dimensions, such as visual quality, labels and brand name, nutritional value and microbial or chemical safety.

Keywords: Meat quality; Safety; Intrinsic and extrinsic cues; Factor and cluster analyses

M. Enser, W.K. Jensen, C. Devine, M. Dikeman, (Eds.), *Encyclopedia of Meat Science*, 3 volumes. Elsevier Academic Press. p. 1472., *Meat Science*, Volume 72, Issue 1, January 2006, Pages 182-183, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.06.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4GWC29B-1/2/8d1dda0c6c5a2c0194d8b75daf6229a3>)

G. Kannan, K.M. Gadiyaram, S. Galipalli, A. Carmichael, B. Kouakou, T.D. Pringle, K.W. McMillin, S. Gelaye, Meat quality in goats as influenced by dietary protein and energy levels, and postmortem aging, *Small Ruminant Research*, Volume 61, Issue 1, January 2006, Pages 45-52, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.01.006.

(<http://www.sciencedirect.com/science/article/B6TC5-4FM0NYK-1/2/45edb41ff381fd17dce5fd9d83866dd0>)

Abstract:

The objectives of this study were to determine effects of different dietary treatments and postmortem aging on meat quality characteristics in goats. Twenty castrated dairy goats (BW = 30.7 +/- 6.80 kg, age 10 months) were subjected to one of four dietary treatments for 82 days (treatment): (i) 2.5 Mcal/kg DM DE and 12% CP, (ii) 2.5 Mcal/kg DM DE and 18% CP, (iii) 2.9 Mcal/kg DM DE and 12% CP, or (iv) 2.9 Mcal/kg DM DE and 18% CP. At the end of the feeding trial, the animals were slaughtered to evaluate meat quality. Longissimus muscle pH and temperature were measured at 0, 3, 6, 9, 12, 15, 18, and 24 h postmortem (time). Sarcomere length (1.65 [μ m]), total collagen (4.17 mg/g), and heated calpastatin (44.7 units) measured at 24 h postmortem were not influenced by treatment ($P > 0.05$). Warner-Bratzler shear force values, collagen solubility, and cooking losses of loin/rib chops (2.5 cm thick) aged for 1, 3, or 6 days postmortem were not influenced by treatment ($P > 0.05$) or aging time ($P > 0.05$). Postmortem sampling time affected muscle pH and temperature decline ($P < 0.01$), but there was no effect of treatment. There was a trend toward a treatment x time interaction ($P < 0.06$) in muscle pH. Temperature and pH declines followed cubic ($P < 0.01$) and linear ($P < 0.01$) trends, respectively. Average muscle temperature declined rapidly and reached 14.5 +/- 2.0 [degree sign]C at 3 h postmortem, while the pH was still high (6.60 +/- 0.087). In conclusion, diet did not influence meat quality characteristics, and shear force values of chevon did not decrease due to postmortem aging. Rapid heat dissipation from goat carcasses during too rapid chilling may have caused cold shortening of muscles resulting in meat that did not respond to aging.

Keywords: Goats; Diet; Calpastatin; pH decline; Meat quality; Postmortem aging

D. Biagini, C. Lazzaroni, Carcass dissection and commercial meat yield in Piemontese and Belgian Blue double-muscled young bulls, *Livestock Production Science*, Volume 98, Issue 3, 30 December 2005, Pages 199-204, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.05.007.

(<http://www.sciencedirect.com/science/article/B6T9B-4GGWGM3-1/2/66bcfc8cf39da816b83ef1a882332224>)

Abstract:

To study the differences in meat yield in hypertrophied cattle, a commercial dissection trial was carried out on 48 carcasses obtained from 24 Piemontese (P: 12 reared with a restricted feeding, P-R, and 12 fed ad libitum, P-L), and 24 Belgian Blue (B: 12 reared with a restricted feeding, BB-R, and 12 fed ad libitum, BB-L) young bulls. The animals were reared under the same environmental condition and slaughtered at the same age and fattening degree. During commercial dissection, the weights of the retail cuts were recorded. Three fore-quarter meat cuts were heavier in P than in BB, while nine meat cuts (two from fore-quarter and seven from hind-quarter), hind-quarter meat and prime quality meat were heavier in BB than in P. Fat weight was higher in BB than in P, whereas meat production as a percentage of carcass side weight was higher in P than in BB. Only one hind-quarter meat cut was heavier in the ad libitum (L) than in the restricted (R) group, whereas meat yield was higher in R than in L. In comparing the meat yield in carcass sides of P-R, P-L, BB-R and BB-L fed young bulls, four meat cuts (one from fore-quarter and three from hind-quarter), hind-quarter, prime quality and 3rd quality meat were heavier in BB-L ($P \leq 0.05$), while one shoulder cut and fore-quarter were heavier in P-R group.

Keywords: Muscular hypertrophy; Feeding systems; Meat cuts; Bone weight; Fat weight

Fukiko Ueda, Reiko Anahara, Fumiya Yamada, Mariko Mochizuki, Yoshitsugu Ochiai, Ryo Hondo, Discrimination of *Listeria monocytogenes* contaminated commercial Japanese meats, *International Journal of Food Microbiology*, Volume 105, Issue 3, 15 December 2005, Pages 455-462, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.04.022.

(<http://www.sciencedirect.com/science/article/B6T7K-4GTW8XF-2/2/abb551ff039e12543082a1fe023d79ae>)

Abstract:

Discrimination was attempted on 14 *Listeria monocytogenes* strains isolated from commercially available Japanese pork and chicken. Examination of the isolates was performed by restriction fragment length polymorphism (RFLP) analysis of the chromosomal DNA and amplified products and comparison of the nucleotide sequences of the amplified products. A polymorphism region containing the repeated sequences in the *iap* gene was amplified by the polymerase chain reaction (PCR). The genetic analyses could discriminate the 14 isolates in combination with traditional serotyping, and some strains isolated from different meats were confirmed to have a genetically close relationship. Genetic analyses used in the present study would be useful for the elucidation of the pathogen tracks from contaminated sources to humans and of the ecological niche in the food environment.

Keywords: *Listeria monocytogenes*; Meats; RFLP; Sequencing

M.E. Cayre, O. Garro, G. Vignolo, Effect of storage temperature and gas permeability of packaging film on the growth of lactic acid bacteria and *Brochothrix thermosphacta* in cooked meat emulsions, *Food Microbiology*, Volume 22, Issue 6, December 2005, Pages 505-512, ISSN 0740-0020, DOI: 10.1016/j.fm.2005.01.003.

(<http://www.sciencedirect.com/science/article/B6WFP-4G241FT-3/2/689eb235c65b4fd6d7f3ffb371a78380>)

Abstract:

The effect of gas permeability of packaging film on the growth of lactic acid bacteria and *Brochothrix thermosphacta* in cooked meat emulsions stored at 0, 8 and 15 [degree sign]C was

investigated. The estimated parameters from Gompertz equation for the assayed temperature-oxygen permeability combinations showed LAB development to be significantly greater than those of *B. thermosphacta*. The influence of the two sources of variation (oxygen permeability of packaging film and temperature) on the growth parameters of LAB and *B. thermosphacta* was analysed showing a significant effect ($P < 0.001$) of the temperature on both bacterial population while the film permeability had only a significant influence ($P < 0.001$) on *B. thermosphacta* growth. Under the conditions of this study the packaging film influenced the maximum counts and growth rates of both organisms. Since the inhibition of *B. thermosphacta* occurred when the meat product was vacuum-packaged in films possessing high oxygen permeability and the effect of pH was found not to be associated with the growth inhibition, accumulation of hydrogen peroxide produced by LAB may possibly be one of the main factors responsible for *B. thermosphacta* inhibition. Shelf-life of vacuum-packaged cooked meat emulsions in high oxygen transmission rate films will be guaranteed and a temperature abuse will not result in an increase of spoilage by LAB.

Keywords: Cooked sausages; Lactic acid bacteria; *B. thermosphacta*; Predictive microbiology; Temperature effect; Gas permeability effect

Davide Barbanti, Marina Pasquini, Influence of cooking conditions on cooking loss and tenderness of raw and marinated chicken breast meat, *LWT - Food Science and Technology*, Volume 38, Issue 8, December 2005, Pages 895-901, ISSN 0023-6438, DOI: 10.1016/j.lwt.2004.08.017.

(<http://www.sciencedirect.com/science/article/B6WMV-4F1GYVN-1/2/95386b23e0589d71e1cca8fd9d181d2a>)

Abstract:

The influence of different cooking treatments on tenderness and cooking loss, as main quality characteristics of chicken breast meat, was investigated. Industrial skinless chicken breast meat samples were designated as raw and marinated and cooked in the oven by hot air and hot air-steam mixture at 130, 150 and 170 [degree sign]C, for 4, 8 and 12 min. Cooking losses were evaluated by weight changes before and after cooking, and tenderness changes were determined on cooked samples by measuring shear force using instrumental texture analysis. Results showed that marination, followed by air-steam cooking is the best combination to obtain the most tender chicken breast slices. The time and temperature of cooking showed similar effects on cooking loss and tenderness: short cooking time (4 min) and temperatures of 130-150 [degree sign]C resulted in lower cooking losses and best meat tenderness, in both not marinated and marinated meat. Statistically significant correlations between tenderness and cooking loss indicated that the cooking loss correlated better with cooking time than with cooking temperature. An opposite phenomenon was observed for meat tenderness.

Keywords: Chicken breast; Cooking loss; Texture analysis; Tenderness

Kanok-Orn Intarapichet, Bussayarat Maikhunthod, Genotype and gender differences in carnosine extracts and antioxidant activities of chicken breast and thigh meats, *Meat Science*, Volume 71, Issue 4, December 2005, Pages 634-642, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.011.

(<http://www.sciencedirect.com/science/article/B6T9G-4GJM3YB-1/2/6074121f9a6385e8bebe45fc5386d9f2>)

Abstract:

The aim of this work was to investigate the effects of genotypes and gender of chickens on carnosine contents and their antioxidant activities. The carnosine content of fresh meat from Thai indigenous and hybrid native chickens differed between breeds ($p < 0.01$) and genders ($p < 0.01$). Regardless of these differences, breast meat contained 2-4-fold higher carnosine than thigh meat. After water and heat extraction at 80 [degree sign]C and ultrafiltration, the carnosine content of meat extracts had the same distribution as in fresh meat. No relationship between total iron and carnosine content on antioxidant activity of the extract was detected. However, when compared in the extracts on the basis of mM carnosine in oxidation system, the extracts of chicken meat

showed greater antioxidant activity than pure carnosine ($p < 0.05$). Furthermore, at equal concentrations, thigh meat extract had higher effective inhibiting ability than breast extract.

Keywords: Thai indigenous chicken; Chicken meat; Carnosine; Antioxidant

U. Kuchenmeister, G. Kuhn, K. Ender, Preslaughter handling of pigs and the effect on heart rate, meat quality, including tenderness, and sarcoplasmic reticulum Ca^{2+} transport, *Meat Science*, Volume 71, Issue 4, December 2005, Pages 690-695, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4GM46BS-1/2/ee980b242447fc533ba9f6342a0ccf88>)

Abstract:

It is known that stress applied to pigs can be of influence on meat quality combined with disturbed regulation of the intracellular Ca^{2+} concentration. However, the effect on meat tenderness is not sufficiently known.

In an experiment with pigs two kinds of stress (immobilisation by a nose snare (nose) and the use of an electrical goad (goad)) for 5 min just before slaughter were used and the results compared with minimum stress pigs (control). To quantify the level of stress, the heart rate during stress application was determined and it was found that the stress effect was highest in the goad pigs and surprisingly decreasing during the use of a nose snare. The meat quality did not differ between nose and control pigs, but was inferior in the goad group. Also, the goad stress significantly reduced the Ca^{2+} transport of the sarcoplasmic reticulum.

The principal hypothesis, that a disturbed Ca^{2+} transport will affect the tenderness by activating the calpain system, could not be verified. Tenderness did not differ between experimental groups using 24 h post-mortem samples, neither was there a difference in tenderness after storing the meat samples for 6 days.

Keywords: Pig; Stress; Meat quality; Tenderness; Sarcoplasmic reticulum; Ca^{2+} transport

M.S. Updike, H.N. Zerby, J.C. Sawdy, M.S. Lilburn, G. Kaletunc, M.P. Wick, Turkey breast meat functionality differences among turkeys selected for body weight and/or breast yield, *Meat Science*, Volume 71, Issue 4, December 2005, Pages 706-712, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.014.

(<http://www.sciencedirect.com/science/article/B6T9G-4GJVBFJ-1/2/16ae9575854f05ad0a57e6726d55d953>)

Abstract:

Functional meat characteristics were studied in three turkey lines, (1) RBC2: representing 1960s commercial turkeys, (2) F-line: a line selected for body weight (BW) and (3) C-line: a fast growing commercial line with enhanced breast muscle yield. The RBC2s Warner-Bratzler shear force values for the Pectoralis major (PM) were lower than the F- and C-lines' values ($P < 0.05$). The WHC of the breast muscle from the C-line was lower compared with the RBC2 line ($P < 0.05$), with the F-line being intermediate between, though not different from either the RBC2 or C-lines. A trend was observed, as the thermally induced meat gels from the RBC2 line PM had the highest storage modulus (G'), the F-line was intermediate and the C-line had the lowest storage modulus ($P = 0.09$). These results suggest that selection for increased growth and breast muscle yield may be associated with decreased meat functionality in modern commercial turkeys.

Keywords: Turkey; Pectoralis; Water holding capacity; Storage modulus

R. Fortina, S. Barbera, C. Lussiana, A. Mimosi, S. Tassone, A. Rossi, E. Zanardi, Performances and meat quality of two Italian pig breeds fed diets for commercial hybrids, *Meat Science*, Volume 71, Issue 4, December 2005, Pages 713-718, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4GTW92P-2/2/d723ec14d7196cc347a64e4ff0605eea>)

Abstract:

The effects of specific diets for commercial hybrids were investigated on 6 Casertana and 11 Mora Romagnola, two endangered Italian pig breeds. Average daily gain (ADG), feed conversion index (FCI), dressing percentage and meat and fat quality of animals bred under similar environmental and nutritional conditions were compared to define their optimal slaughtering weight. Animals were fed the same diets assuming that requirements of Mora Romagnola and Casertana did not differ, and changed every 30 kg of weight gain. ADG and FCI were calculated every 15 days.

Weight gains, divided into 5 groups based on live weight (LW) of animals ([less-than-or-equals, slant]60 kg, 60 < kg [less-than-or-equals, slant] 90, 90 < kg [less-than-or-equals, slant] 120, 120 < kg [less-than-or-equals, slant] 160, >160 kg), showed higher values for Casertana than Mora Romagnola, particularly from 121 to 160 kg LW (687 g/d). Average FCI from 50 to 160 kg LW was similar in both breeds (4.2). After 403 days of trial, animals were slaughtered at about 195 kg LW. Carcass measurements showed that Casertana had higher dressing percentage and lean cuts than Mora Romagnola. Both breeds showed extraordinary high ultimate pH values of M. longissimus thoracis (5.96 and 6.15 for Casertana and Mora Romagnola, respectively) M. semimembranosus (6.37 and 6.30), showing an incomplete post mortem glycolysis. Colour of M. longissimus thoracis did not differ between breeds and was particularly dark. Chemical analysis of Casertana meat showed lower percentage of water and fat; the total amount of fatty acids (SFA, MUFA and PUFA) and the SFA/UFA ratio did not show significant differences between breeds.

Results showed that from a growth point of view the optimal slaughtering weight of Casertana and Mora Romagnola should not exceed 160 kg LW. Both breeds had an uncommon reactivity to stress probably due to interactions of genetic, nutritional and management factors.

Keywords: Casertana; Mora Romagnola; Pig breed; Performances; Meat quality

M. Overland, N.P. Kjos, E. Olsen, A. Skrede, Changes in fatty acid composition and improved sensory quality of backfat and meat of pigs fed bacterial protein meal, *Meat Science*, Volume 71, Issue 4, December 2005, Pages 719-729, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4GSBFRG-1/2/a229d9e2a659828ae82451731b9dff45>)

Abstract:

A total of 48 pigs (11.4 and 107.2 kg initial and final weight) were used to evaluate increasing dietary levels of bacterial protein meal (BPM) produced on natural gas (0, 50, 100, or 150 g kg⁻¹) on fatty acid composition, sensory properties, and susceptibility of pork to lipid oxidation. Increasing levels of BPM to diets increased the content of C16:1 fatty acids in backfat and muscle and total monounsaturated fatty acids in muscle, but decreased the content of polyunsaturated fatty acids and iodine value in backfat and muscle. Pigs fed diets containing BPM had reduced thiobarbituric acid reactive substances (TBARS) value in backfat and muscle, reduced intensity of odor and rancid odor and taste in pork after short-time storage, and reduced off-odor and off-taste after intermediate-time storage. To conclude, adding BPM to diets for pigs changed the fatty acid profile, improved the oxidative stability, and sensory quality of pork.

Keywords: Bacterial protein meal; Fatty acid composition; Sensory quality; TBARS; Rancidity; Pork

P.R. Sheard, A. Tali, Erratum to 'Injection of salt, tripolyphosphate and bicarbonate marinade solutions to improve the yield and tenderness of cooked pork loin' [*Meat Science* 68(2) (2004) 305-311], *Meat Science*, Volume 71, Issue 4, December 2005, Pages 753-754, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.07.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4H27CCD-3/2/868b4307fcc57469c564f9b1bccdc8d6>)

John Sumner, Tom Ross, Ian Jenson, Andrew Pointon, A risk microbiological profile of the Australian red meat industry: Risk ratings of hazard-product pairings, *International Journal of Food Microbiology*, Volume 105, Issue 2, 25 November 2005, Pages 221-232, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.03.016.

(<http://www.sciencedirect.com/science/article/B6T7K-4GVGT95-1/2/3a3e80c0853e7635b1399e51e6613f9e>)

Abstract:

A risk profile of microbial hazards across the supply continuum for the beef, sheep and goat meat industries was developed using both a qualitative tool and a semi-quantitative, spreadsheet tool, Risk Ranger. The latter is useful for highlighting factors contributing to food safety risk and for ranking the risk of various product/pathogen combinations. In the present profile the qualitative tool was used as a preliminary screen for a wide range of hazard-product pairings while Risk Ranger was used to rank in order of population health risk pairings for which quantitative data were available and for assessing the effect of hypothetical scenarios. 'High' risk hazard-product pairings identified were meals contaminated with *Clostridium perfringens* provided by caterers which have not implemented HACCP; kebabs cross-contaminated by *Salmonella* present in drip trays or served undercooked; meals served in the home cross-contaminated with *Salmonella*. 'Medium' risk hazard-product pairings identified were ready-to-eat meats contaminated with *Listeria monocytogenes* and which have extended shelf life; Uncooked Comminuted Fermented Meat (UCFM)/Salami contaminated with Enterohaemorrhagic *E. coli* (EHEC) and *Salmonella*; undercooked hamburgers contaminated with EHEC; kebabs contaminated by *Salmonella* under normal production or following final 'flash' heating. Identified 'low' risk hazard-product pairings included cooked, ready-to-eat sausages contaminated with *Salmonella*; UCFM/Salami contaminated with *L. monocytogenes*; well-cooked hamburgers contaminated with EHEC. The risk profile provides information of value to Australia's risk managers in the regulatory, processing and R&D sectors of the meat and meat processing industry for the purposes of identifying food safety risks in the industry and for prioritising risk management actions.

Keywords: Meat industry; Risk profile; Qualitative and semi-quantitative risk ratings; 'What-if' scenarios

M.A. Keyzer, M.D. Merbis, I.F.P.W. Pavel, C.F.A. van Wesenbeeck, Diet shifts towards meat and the effects on cereal use: can we feed the animals in 2030?, *Ecological Economics*, Volume 55, Issue 2, 1 November 2005, Pages 187-202, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2004.12.002.

(<http://www.sciencedirect.com/science/article/B6VDY-4FN76SB-2/2/094b2125c50107143bca20f185213fb0>)

Abstract:

The paper argues that current international projections of meat and feed demand may underestimate future consumption patterns, for mainly two reasons: demand projections are based on income extrapolation with an assumed demand elasticity and feed requirements per unit of meat are taken to be fixed. Instead, we propose a structural specification that includes a dietary shift towards meat as per capita income increases, and we account for a shift from traditional to cereal intensive feeding technologies. Our finding is that under the commonly assumed growth rates of per capita income, world cereal feed demand will be significantly higher in the coming 30 years than is currently projected by international organizations, even if we allow for price effects. Compared to other factors that are generally expected to affect the future world food situation, the quantitative impact of the increased cereal feed demand greatly exceeds that of GMOs and climate change in the coming three decades.

Keywords: Food consumption pattern; Meat demand; Dietary change; Cereal feed demand; Land use

Muhammet Irfan Aksu, Mukerrem Kaya, Herbert Wood Ockerman, Effect of modified atmosphere packaging, storage period, and storage temperature on the residual nitrate of sliced-pastirma, dry meat product, produced from fresh meat and frozen/thawed meat, Food Chemistry, Volume 93, Issue 2, November 2005, Pages 237-242, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.09.018.

(<http://www.sciencedirect.com/science/article/B6T6R-4F02M1T-7/2/76d08b8b67fa3120a8551a5ff617f831>)

Abstract:

The amount of nitrite in sliced-pastirma made, from fresh or frozen (which was stored at -18 [degree sign]C for 240 days and then thawed at 10 [degree sign]C for 24 h) *M. Longissimus dorsi* muscle was determined. Sliced-pastirma samples were stored in modified atmosphere packages (50% N₂ + 50% CO₂) at 4 and 10 [degree sign]C for 150 days, and the amount of residual nitrite was measured after 0, 30, 60, 90, and 150 days of storage. The residual nitrite of pastirma samples made with frozen/thawed meat was higher than that of the pastirma made from fresh meat at both 0 day and at the end of the storage (150 days). The storage temperature ($p < 0.01$), storage period ($p < 0.01$) and the storage period x the storage temperature interaction ($p < 0.01$) had significant effects on the amount of the residual nitrite.

Keywords: Pastirma; Residual nitrite; Modified atmosphere; Storage; Cured meat product

Jin-Soo Kim, Fereidoon Shahidi, Min-Soo Heu, Tenderization of meat by salt-fermented sauce from shrimp processing by-products, Food Chemistry, Volume 93, Issue 2, November 2005, Pages 243-249, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.09.022.

(<http://www.sciencedirect.com/science/article/B6T6R-4F14YV8-C/2/2f54fe25450bf57af60edf81548c0cc2>)

Abstract:

The suitability of using salt-fermented shrimp sauce prepared from processing by-product (head, shell, and tail) of southern rough shrimp (*Trachypena curvirostris*) as a meat tenderizer was investigated. Pork neck portions were soaked in 10% saline (saline-treated meat), and in 10% salinity shrimp sauce (sauce-treated meat) for 3 min. The soaked samples were drained, left to stand at 20 +/- 2 [degree sign]C for 3 h and then stored at 4 [degree sign]C for 5 days. During storage, sauce-treated samples were significantly different ($p < 0.05$) in decrease of moisture contents (75.2-74.0%, after 3 days) and pH (5.9-5.8, after 4 days), but showed an increase ($p < 0.05$) in their volatile base nitrogen (VBN, 16.1-18.9 mg/100 g, after 2 days). The colour of sauce-treated pork was scarlet for up to 3 days of storage, but after that it was similar to that of untreated and saline-treated pork (L value of approximately 50). The hardness and water-holding capacity (WHC) of sauce-treated pork decreased more than those of saline treatment. SDS-polyacrylamide gel electrophoresis (SDS-PAGE) patterns of sauce-treated pork indicated depolarization of myosin heavy chain (MHC) and complete disappearance of Z line and muscle fiber using electron microscopy. Sensory score (4.5, 1 day of storage) for tenderness was significantly higher ($p < 0.05$) than that right after the treatment. Thus, salt-fermented sauce from shrimp processing by-products can be used as a meat tenderizer.

Keywords: Shrimp sauce; Shrimp by-products; Sensory properties; Meat tenderization; Water holding capacity

Fernanda Girardi, Rejane M. Cardozo, Vera L.F. de Souza, Gentil V. de Moraes, Clovis R. dos Santos, Jesui V. Visentainer, Ricardo F. Zara, Nilson E. de Souza, Proximate composition and fatty acid profile of semi confined young capybara (*Hydrochoerus hydrochaeris hydrochaeris* L. 1766) meat, Journal of Food Composition and Analysis, Volume 18, Issue 7, November 2005, Pages 647-654, ISSN 0889-1575, DOI: 10.1016/j.jfca.2004.06.004.

(<http://www.sciencedirect.com/science/article/B6WJH-4FFX96B-2/2/3778d6318d57097f235bc218e742d113>)

Abstract:

The purpose of the study was to evaluate the effects of management with and without pond on the chemical composition and fatty acids profile of the commercial loin and ham cuts of capybara (*Hydrochoerus hydrochaeris hydrochaeris* L. 1766) meat. Eighteen animals were used (12 males and 6 females) in the experiment and slaughtered at 9 months of age with a live weight of 20 kg. The animals were randomly distributed in the following treatments: nine animals were in a picket with pond, nine animals in a picket without pond. The animals were maintained in a semi confinement system during 4 months and were fed grass in the trough (*Carex riparia*, *Panicum grumosum*, sugar-cane, leaves from the banana plant, elephant grass, corn, pelletized diets for rabbits 'ad libitum'), mineral salt and pasture with *Cynodon dactylon*. Lipids contents presented differences ($P < 0.05$) with values ranging from 1.81% to 2.26% for loin and 3.93% to 4.74% for ham, with and without pond management, respectively. The cholesterol contents were similar for loin and ham, but different ($P < 0.05$) for with (45.7 mg/100 g) and without pond (52.1 mg/100 g) management. By maintaining the natural habits of capybaras (with pond), the cuts presented lipids with lower saturated fatty acids contents, higher monounsaturated and polyunsaturated fatty acids contents and lower cholesterol contents. However, the management without pond does not significantly damage the quality of the meat, and therefore can be used by producers that do not possess water resources.

Keywords: Capybara; *Hydrochoerus hydrochaeris hydrochaeris* L.; Proximate composition; Fatty acid; Cholesterol; Pond

N. Marin-Huachaca, H. Delincee, J. Mancini-Filho, A.L.C.H. Villavicencio, Use of the DNA Comet Assay to detect beef meat treated by ionizing radiation, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 446-450, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4GBFP6K-2/2/de1a57e2c05b4bc6aea4b91487894ef7>)

Abstract:

The DNA Comet Assay has been described as a rapid and inexpensive screening test to identify radiation treatment of food. In this work, this method was applied to detect the treatment of beef meat pieces either by gamma rays or electron beam. The dose levels were 2.5, 4.5, and 7.0 kGy for chilled samples, and 2.5, 4.5, 7.0 and 8.5 kGy for frozen samples. The analyses were made over periods of 15 and 30 days after irradiation for the chilled and frozen samples, respectively. The effects of gamma rays and electron beam on DNA migration in the test were similar. The DNA Comet Assay, under neutral conditions, made it easy to discriminate between irradiated and non-irradiated beef.

Keywords: DNA Comet Assay; Irradiation detection; Beef meat; Gamma rays; Electron beam

Rodolfo Bernabeu, Antonio Tendero, Preference structure for lamb meat consumers. A Spanish case study, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 464-470, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.027.

(<http://www.sciencedirect.com/science/article/B6T9G-4GDKB42-3/2/d6e7e5b7d8c08cb3af3a9a5eb2cce2b1>)

Abstract:

There is a current tendency in the European Union member countries to cut down on meat consumption. This tendency is not due as much to the traditional income-price factor, but to other attributes whose influence is gaining relative importance. Some of them are: quality, image, health, food safety and changes in people's taste. In addition, the relative importance of different attributes valued by the consumer must be weighed in order to develop marketing strategies which increase lamb meat consumption. In order to determine these preferences, 400 consumers were asked to

evaluate different attributes (price, certification, origin, and commercial type) of lamb meat. Results obtained by means of conjoint analysis techniques show that regular consumers as well as occasional ones show a preference for lamb meat type. In this sense, a market share simulation of preferred (suckling and 'ternasco') types proved that regular consumers generally prefer suckling lamb to 'ternasco' lamb when both are from Castilla-La Mancha.

Keywords: Meat; Lamb; Consumer behaviour; Conjoint analysis; Simulation

F. Monson, C. Sanudo, I. Sierra, Influence of breed and ageing time on the sensory meat quality and consumer acceptability in intensively reared beef, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 471-479, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4GDSF6H-1/2/9552c424a3ad5be030bc2f37b27dad3f>)

Abstract:

The meat market is very concerned about the influence of ageing on beef quality. However, not many studies have analysed the possible influence of the intrinsic factors (individual, age, sex, body condition, breed, etc.), on the development of the ageing process. The purpose of this study was to assess the influence of breed on the sensory characteristics of the meat throughout the ageing time, using a trained sensory panel and a consumer test. Forty entire males of four breeds, which represented different biotypes (dairy: 10 Spanish Holstein; dual purpose: 10 Brown Swiss; meat type: 10 Limousin; high muscularity: 10 Blonde d'Aquitaine) were analysed. Animals were weaned at seven months on average (except Holstein calves, which were weaned earlier), and fed intensively. Each breed was slaughtered at its usual commercial live weight, according to the market requirements. The m. Longissimus thoracis et lumborum (between T6 and L6) was cut, vacuum packaged and aged for 1, 3, 7, 14, 21 and 35 days. Cooked samples were evaluated by 8 panellists and 200 consumers. Breed had a significant influence on tenderness ($p < 0.001$) and on the quantity of residue after chewing for panellists ($p < 0.01$), but there was a significant interaction between breed and ageing time for tenderness. Long ageing times (more than seven days) tend to reduce differences among breeds in textural characteristics. Ageing had a very important effect on tenderness ($p < 0.01$) and also on some odour and flavour characteristics evaluated by the panel. Taking into account the results obtained in the consumer test, the consumption of the Limousin meat may be recommended at shorter ageing times, meanwhile Blonde d'Aquitaine, Holstein and Old Brown Swiss meats would need a longer ageing period to obtain an optimum acceptance by the consumer.

Keywords: Sensory panel; Odour; Texture; Tenderness and flavour

V. Ortiz-Somovilla, F. Espana-Espana, E.J. De Pedro-Sanz, A.J. Gaitan-Jurado, Meat mixture detection in Iberian pork sausages, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 490-497, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4GDSF6H-3/2/a6bcd8f249cfa23ee954777a85b94f00>)

Abstract:

Five homogenized meat mixture treatments of Iberian (I) and/or Standard (S) pork were set up. Each treatment was analyzed by NIRS as a fresh product ($N = 75$) and as dry-cured sausage ($N = 75$). Spectra acquisition was carried out using DA 7000 equipment (Perten Instruments), obtaining a total of 750 spectra. Several absorption peaks and bands were selected as the most representative for homogenized dry-cured and fresh sausages. Discriminant analysis and mixture prediction equations were carried out based on the spectral data gathered. The best results using discriminant models were for fresh products, with 98.3% (calibration) and 60% (validation) correct classification. For dry-cured sausages 91.7% (calibration) and 80% (validation) of the samples were correctly classified. Models developed using mixture prediction equations showed $SECV = 4.7$, $r^2 = 0.98$ (calibration) and 73.3% of validation set were correctly classified for the fresh

product. These values for dry-cured sausages were SECV = 5.9, $r^2 = 0.99$ (calibration) and 93.3% correctly classified for validation.

Keywords: NIRS; Qualitative analyses; Iberian pork; Meat mixture; Sausages

C.O. Gill, Safety and storage stability of horse meat for human consumption, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 506-513, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.030.

(<http://www.sciencedirect.com/science/article/B6T9G-4GDBTPG-1/2/5edf697bde0ab83011cc4114843edcfa>)

Abstract:

Most horse meat is consumed by humans and/or animals in the region where it is produced. However, horse meat for human consumption is exported in large quantities from the Americas and in lesser quantities from Eastern Europe, to Western Europe and Japan where it is often eaten raw. Horse meat prepared to a good hygienic condition should not be prone to early microbial spoilage, but contamination of the meat with *Salmonella* and *Yersinia enterocolitica* may be relatively common, and infection of the meat with *Trichinella* may occur occasionally. Those organisms from horse meat could cause disease when the raw meat is eaten. Moreover, accumulation of cadmium in horse liver and kidney may render those tissues unsafe for human consumption.

Keywords: Horse meat; Microbial spoilage; *Salmonella*; *Yersinia enterocolitica*; *Trichinella*; Cadmium

A. Teixeira, S. Batista, R. Delfa, V. Cadavez, Lamb meat quality of two breeds with protected origin designation. Influence of breed, sex and live weight, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 530-536, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.036.

(<http://www.sciencedirect.com/science/article/B6T9G-4GNTG0D-1/2/ecf4356341e76508a174775e2fb4f85a>)

Abstract:

Lamb meat quality of two Portuguese products was examined. The influences of slaughter weight, sex and breed on eating quality were evaluated. Data were obtained from 72 lambs of two different breeds with protected designation origin. In accord with the normal slaughter weight in the region three classes were considered: A: 9-14 kg live weight; B: 14-19 kg live weight and C: 19-24 kg live weight. pH of *M. longissimus thoracis et lumborum* muscle (MTL) was measured 1 h and 24 h after slaughter. Meat colour was estimated in the *M. longissimus thoracis et lumborum* muscle (MTL) muscle on the 12th rib using the $L^* a^* b^*$ system. Shear force was evaluated 72 h after slaughter. Sensorial analysis was assessed by a trained taste panel of 12 members. The pH values found could be considered within the normal pH range, between 5.5 and 5.9. When the pH measurement was made 24 h after slaughter, the heavy lambs had significant higher value than the light lambs. In relation to colour variables, live weight, sex and breed had no effect on the red index (a^*). Lightness (L) decreased with increasing live weight and the light lambs had higher yellow index (b^*) than the heavier lambs. Shear force increased with live weight and the Bragançano breed had a greater mean shear force than the Mirandesa (7.8 vs. 6.8 kg/cm²). The heavy carcasses had more flavour intensity than the light ones. Mirandesa lambs had significantly lower values for toughness, stringy and odour intensity than Bragançana lambs.

Keywords: Lamb; Meat quality; Instrumental measurement; Sensory analysis

D. Sacco, M.A. Brescia, A. Buccolieri, A. Caputi Jambrenghi, Geographical origin and breed discrimination of Apulian lamb meat samples by means of analytical and spectroscopic determinations, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 542-548, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.038.

(<http://www.sciencedirect.com/science/article/B6T9G-4GHBPRM-3/2/bd2940f5b9451eb31c811f613292b27f>)

Abstract:

With the aim of finding parameters capable of characterizing meat according to geographical origin, twenty-five lamb meat samples from three areas located in Apulia (Southern Italy) were analysed for moisture, ash, fat and protein content, stable isotope ratios ($^{15}\text{N}/^{14}\text{N}$ and $^{13}\text{C}/^{12}\text{C}$), major elements (Ca, Mg, Na, K) and trace metals (Zn, Cu, Fe, Cr). ^1H high resolution magic angle spinning (HR-MAS) NMR spectra were also obtained for all the samples. The advantages of the ^1H HR-MAS NMR technique are that sample preparation is easy, since the spectrum is obtained directly on the minced solid sample, and that information is acquired for a large number of metabolites (amino acids, fatty acids, sugars, etc.).

The application of multivariate statistical analysis to two data sets containing tissue composition results together with the metals contents and ^1H HR-MAS NMR spectral data together with isotope ratios, respectively, provided in both cases a satisfactory origin differentiation of lamb meat samples.

Keywords: Lamb meat; Characterization; ^1H HR-MAS NMR; Stable isotope ratios; Principal component analysis

N. Aktas, A. Gurses, Moisture adsorption properties and adsorption isosteric heat of dehydrated slices of Pastirma (Turkish dry meat product), *Meat Science*, Volume 71, Issue 3, November 2005, Pages 571-576, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.042.

(<http://www.sciencedirect.com/science/article/B6T9G-4GKW7GC-1/2/08756c085c640804bb13b03ff249015f>)

Abstract:

Moisture sorption characteristics of dehydrated pastirma were investigated at 15 [degree sign]C, 20 [degree sign]C and 30 [degree sign]C over a water activity (a_w) range of 0.2-0.9. Sigmoidal (type-II) adsorption isotherms were observed for pastirma. The experimental sorption data obtained were applied to the Halsey, Harkins-Jura, Smith, BET, Henderson, Freundlich and GAB isotherm equations to test fitness of these equations to pastirma. The order of the best fit of sorption data obtained for pastirma at 15 [degree sign]C, 20 [degree sign]C and 30 [degree sign]C in all the range of a_w studied (0.2-0.9) was Harkins-Jura > Halsey > BET > Smith > Freundlich > GAB > Henderson, respectively. In the range a_w 0.2-0.55, BET model has a better fit than in the range a_w 0.2-0.9. Isosteric heats of adsorption were evaluated by applying the Clausius-Clapeyron equation to experimental isotherms and decreased with increasing moisture content.

Keywords: Pastirma; Adsorption isotherm; Isosteric heat

Jose Alberto Carrodeguas, Carmen Burgos, Carlos Moreno, Ana Cristina Sanchez, Sonia Ventanas, Luis Tarrafeta, Jose Antonio Barcelona, Maria Otilia Lopez, Rosa Oria, Pascual Lopez-Buesa, Incidence in diverse pig populations of an IGF2 mutation with potential influence on meat quality and quantity: An assay based on real time PCR (RT-PCR), *Meat Science*, Volume 71, Issue 3, November 2005, Pages 577-582, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4GMJ9F9-2/2/873370049f385834d332cd74bd6b0ea1>)

Abstract:

IGF2, insulin-like growth factor 2, is implicated in myogenesis and lean meat content. A mutation in a single base (A for G substitution) of the gene for IGF2 (position 3072 in intron 3) has been recently described as the cause of a major QTL effect on muscle growth in pigs [Van Laere, A. S, Nguyen, M., Braunschweig, M., Nezer, C., Collete, C., & Moreau, L. et al. (2003). *Nature*, 425, 832-836]. We describe here a rapid assay based on real time PCR (RT-PCR) to detect this mutation. We have evaluated the incidence of the mutation in commercial pig crosses, in three populations of purebred Iberian or Iberian x Duroc crosses, and in cured meat products and wild

boars. The incidence of the mutation varies among these groups. Penetrance of the A mutation is about 80% in the commercial population. Purebred Iberian pigs were all homozygous G/G whereas crosses of Iberian pigs were heterozygous (90%) or homozygous A/A (10%). The implications of this gene for the selection of Iberian pigs are discussed.

Keywords: IGF2; Real time PCR; Iberian pigs; Selection

G. Yoshioka, N. Imaeda, T. Ohtani, K. Hayashi, Effects of cortisol on muscle proteolysis and meat quality in piglets, *Meat Science*, Volume 71, Issue 3, November 2005, Pages 590-593, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4GJM3YB-2/2/7472cea93307a9e488e335c50f767603>)

Abstract:

The present study was conducted to examine the effects of cortisol on muscle proteolysis and meat quality. Male piglets (n = 14) were assigned to one of two treatment groups at 28 days of age. After 7 days adaptation period, each group was fed a commercial diet (86% total digestible nutrients, 21.5% crude protein) or the same commercial diet containing cortisol (120 mg/kg diet) for 7 days from 35 days of age. All piglets were slaughtered at 42 days of age. The serum triiodothyronine (T3) concentration, [mu]- and m-calpain and proteasome activities and the content of easily releasable myofilament, which contains intermediates of the breakdown of myofibrils in the m. longissimus dorsi (LD) at slaughter were measured as parameters of muscle proteolysis. Serum T3 levels and [mu]-calpain activity were increased (P < 0.01), as was the amount of easily releasable myofilament and m-calpain and proteasome activities were higher (P < 0.05) in LD from cortisol-treated piglets than from non-treated controls. At 24 h postmortem, LD of cortisol-treated piglets showed higher (P < 0.01) drip loss and lighter (P < 0.05) color than those of the control. The results clearly show that the administration of cortisol increases serum T3 concentration and muscle proteolysis and reduces productivity and meat quality.

Keywords: Muscle proteolysis; Pale, soft and exudative meat; Stress; Triiodothyronine

J.H. Fike, K.E. Saker, S.F. O'Keefe, N.G. Marriott, D.L. Ward, J.P. Fontenot, H.P. Veit, Effects of Tasco (a seaweed extract) and heat stress on N metabolism and meat fatty acids in wether lambs fed hays containing endophyte-infected fescue, *Small Ruminant Research*, Volume 60, Issue 3, November 2005, Pages 237-245, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2004.12.007.

(<http://www.sciencedirect.com/science/article/B6TC5-4FBN785-2/2/01d67aa1e24fe96163cfeefa0c8d723e>)

Abstract:

Wether lambs (n = 27, average BW = 40 kg) were used to test response to forage treated with Tasco-Forage (an extract of the brown kelp *Ascophyllum nodosum*) prior to conserving, or to direct feeding of the extract (Tasco-EX). Hays made from endophyte (*Neotyphodium coenophialum*)-infested tall fescue (*Festuca arundinacea*)-based pasture received 0 or 3 kg of Tasco/ha prior to harvest. Lambs, blocked by weight, were randomly allotted to three diets: (1) control hay, (2) treated hay, and (3) #1 + Tasco-EX fed at 1% of the diet. Hays were low in CP (<7%) so all lambs were fed soybean meal (12% of the diet) in addition to trace mineralized salt. Diets were fed at 1.5% BW to prevent refusals. Total collections (7 d) were made during periods without or with applied heat stress. After each period, rumen contents were obtained to determine pH, NH₃ and VFA. Lambs were sacrificed post-trial. A subset was used to evaluate sensory traits and muscle fatty acids. Lambs were in negative N balance during the study and Tasco treatments did not affect N metabolism. Fecal N tended (P < 0.10) to increase with short duration heat stress causing a concomitant decrease (P < 0.05) in apparent N digestibility (58.6 versus 56.1%; S.E. = 0.7). Urinary N loss decreased (P < 0.001) with heat stress (8.0 versus 5.9 g/d; S.E. = 0.2), resulting in increased (P < 0.001) N retention (-2.1 versus -0.3 g/d; S.E. = 0.2). Apparent OM digestibility was not affected by heat stress but was greater (P < 0.05) for lambs fed Tasco-EX treatment than

those fed treated hay. Treatment diets decreased ($P < 0.05$) ruminal butyrate. Heat stress increased ($P < 0.05$) acetate and total VFA and decreased ($P < 0.01$) ruminal pH. A tendency ($P < 0.11$) of increased 14:1[omega]5, decreased ($P < 0.05$) 18:0 and total saturated fatty acids in muscle was observed with Tasco diets. Meat sensory characteristics were not affected by treatment. Tasco may alter some aspects of rumen or lipid metabolism but has no effect on N metabolism or meat sensory characteristics of sheep fed restricted, low-quality diets.

Keywords: *Ascophyllum nodosum*; Nitrogen; Digestibility; VFA; Fatty acids; Sheep

Martin Sillence, M.F.W. Te Pas, M.E. Everts and H.P. Haagsman, Editors, *Muscle Development of Livestock Animals: Physiology, Genetics and Meat Quality*, CABI Publishing, Wallingford (2004) ISBN 0851998119 [pound sign]70 (hard)., *The Veterinary Journal*, Volume 170, Issue 3, November 2005, Pages 384-385, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2005.04.012.

(<http://www.sciencedirect.com/science/article/B6WXN-4G7DY48-6/2/84e675ceb9ceff2c74334c2f9c65f2d7>)

Qiongzhen Li, Catherine M. Logue, The growth and survival of *Escherichia coli* O157:H7 on minced bison and pieces of bison meat stored at 5 and 10 [degree sign]C, *Food Microbiology*, Volume 22, Issue 5, October 2005, Pages 415-421, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.09.011.

(<http://www.sciencedirect.com/science/article/B6WFP-4FDJN7C-6/2/15b1578c35daf5ea903a32f00153f5ce>)

Abstract:

This study investigated the growth and survival of *Escherichia coli* O157:H7 on minced and whole pieces of bison meat. Growth curves of native microflora, including *Pseudomonas* spp. and Enterobacteriaceae were also generated. A marked *E. coli* O157:H7 strain was inoculated onto minced and whole pieces of bison meat at an initial level of 1.5 log₁₀ cfu g⁻¹. The inoculated meat was stored at either 5 [degree sign]C for 28 days or 10 [degree sign]C for 21 days. Survival, but no growth, of *E. coli* O157:H7 was observed on both forms of bison meat stored at 5 [degree sign]C, while significant growth of the organism was observed at 10 [degree sign]C. *E. coli* O157:H7 counts on whole pieces were generally higher than counts observed on minced bison meat, and reached their highest population by 14 days, with a total increase of 3.36 log₁₀ cfu g⁻¹ on whole pieces and 2.12 log₁₀ cfu g⁻¹ on minced bison meat stored at 10 [degree sign]C. Under the same storage temperature, *Pseudomonas* spp. and total counts displayed similar growth patterns on both pieces and minced bison meat, while the Enterobacteriaceae showed a slower growth rate. This study showed that the growth of *E. coli* O157:H7 on bison meat is similar to that observed in studies of beef.

Keywords: Bison meat; *Escherichia coli* O157:H7; Growth; Mince; Pieces

K. Shale, J.F.R. Lues, P. Venter, E.M. Buys, The distribution of *Staphylococcus* sp. on bovine meat from abattoir deboning rooms, *Food Microbiology*, Volume 22, Issue 5, October 2005, Pages 433-438, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.09.007.

(<http://www.sciencedirect.com/science/article/B6WFP-4FDJN7C-8/2/71706d7c4d083f4a0804718a17309345>)

Abstract:

In developing countries such as South Africa, *Staphylococcus aureus* has been shown consistently to be one of the most important micro-organisms responsible for food poisoning outbreaks. In this study, the staphylococci in selected South African abattoirs were quantified, identified and further characterized in terms of coagulase types. The highest staphylococci counts (1.7x10⁶ cfu g⁻¹) were observed in the meat from the high throughput (Grade A) abattoir during week 3. The counts exceeded the National Guidelines (10² cfu g⁻¹) without exception and at least 50% surpassed the levels sufficient to produce toxins (10⁵ cfu g⁻¹) determined for *S. aureus*.

Species were dominated by *S. capitis*, *S. xylosus*, *S. auricularis*, *S. aureus* and *S. intermedius*. In terms of the coagulase types of *S. aureus*, type V was the most dominant and type VI the least. It became evident that the hygiene practices implemented by the abattoirs investigated in this study were not effective enough in reducing the contamination levels of the staphylococci from carcasses. It is therefore recommended that the sampled abattoirs revise their manufacturing strategies in order to reduce the levels of staphylococcal contamination which have been shown to be transferred through food handlers, surfaces, equipment and the environment.

Keywords: Staphylococcus; Coagulase typing; Red meat; Deboning

M. Osterlie, J. Lerfall, Lycopene from tomato products added minced meat: Effect on storage quality and colour, Food Research International, Volume 38, Issues 8-9, Third International Congress on Pigments in Food, October-November 2005, Pages 925-929, ISSN 0963-9969, DOI: 10.1016/j.foodres.2004.12.003.

(<http://www.sciencedirect.com/science/article/B6T6V-4GGWG97-1/2/5a0bf2d4acf1e0bf78dfc51cda55ad36>)

Abstract:

Meat farce is a biologically, delicate product subjected to rapid decomposition, microbiological activities, and physiological and chemical changes. Sodium ascorbat as an antioxidant and nitrite are additives used to avoid undesirable effects during storage. Nitrite is a reactive chemical known to participate in numerous reactions. Concern has arisen because of the possibility of n-nitrosamines being formed in cured meat. Increased consumption of tomato products has in recent years been associated with decreased risks of various forms of cancer. Adding lycopene from natural tomato sources to meat farce resulted in a red to brown hue and less rancidity. Due to the acidic tomato products, the pH in meat farces were low, thus the growth of microorganisms were reduced. No effect of lycopene on microbiological stability was recorded. Adding lycopene from tomato products to minced meat could lead to a meat product with increased storage stability, different taste, better colour and with a well, documented health benefit.

Keywords: Lycopene; Meat farce; Tomato products; Natural colour; Natural antioxidant

Morten Sivertsvik, Jens Stoumann Jensen, Solubility and absorption rate of carbon dioxide into non-respiring foods. Part 3: Cooked meat products, Journal of Food Engineering, Volume 70, Issue 4, October 2005, Pages 499-505, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.10.005.

(<http://www.sciencedirect.com/science/article/B6T8J-4F1GYXD-1/2/8bef4b90f7fcf20eb41710b66886d2b0>)

Abstract:

The solubility and diffusion of carbon dioxide into cooked meat products (cooked ham and meat sausage with different pH-levels) was determined at different starting pressures and gas to product volume ratios by monitoring pressure changes over time in a closed chamber at constant temperatures (0, 4, and 8 [degree sign]C). Good correlation of the CO₂ solubility between the packaging parameters (gas to product volume ratio and initial partial pressure) and the meat products water content was found. The solubility of CO₂ followed Henry's law and the initial partial pressure of CO₂ influenced the solubility mostly. Only small variations in the diffusion constants and absorption rates were found within the experimental design. A pH difference of 0.5 in the two meat sausage types did not influence either solubility or diffusion significantly.

Keywords: Cooked ham; Meat sausage; Carbon dioxide; Solubility; Diffusion; Modified atmosphere packaging

J.M. Belenguer, E. Benavent, M.C. Martinez, RutaRep: a computer package to design dispatching routes in the meat industry, Journal of Food Engineering, Volume 70, Issue 3, Operational Research and Food Logistics, October 2005, Pages 435-445, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.02.045.

(<http://www.sciencedirect.com/science/article/B6T8J-4DVW2K6-1/2/2fb958ee5e3305eac72078574fb0f503>)

Abstract:

In this paper we present a computer program that has been developed to design the dispatching routes of a medium-sized meat company in Spain. We have modelled the real problem as a variant of the vehicle routing problem with Time Windows and implemented a number of heuristic algorithms based on the most advanced solution techniques for this problem. These algorithms have been embedded in a computer package that is intended to be used as a decision support system for the distribution manager. The program runs under Windows System and is straightforward to use. We also present some computational experiences based on real instances provided by the company. This experience shows important improvements, in both global distance and customer service.

Keywords: Food distribution; Heuristics; Tabu search; Routing

J. Zochowska, K. Lachowicz, L. Gajowiecki, M. Sobczak, M. Kotowicz, A. Zych, Effects of carcass weight and muscle on texture, structure and myofibre characteristics of wild boar meat, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 244-248, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9Y5CG-2/2/bc33177b0cb6435cedf91591f0ea9c38>)

Abstract:

Texture, histology and muscle fibre characteristic of selected muscles: m. quadriceps femoris (QF), m. biceps femoris (BF), and m. semimembranosus (SM) of wild boars of different carcass weight (20 +/- 2 and 60 +/- 3 kg SD) were compared. Muscle texture (hardness, cohesiveness, springiness, chewiness) was determined with the double penetration test performed with the Instron 1140 apparatus. Structural elements (muscle fibre cross-section area, perimysium and endomysium thickness) and percentage of myofibres of each type: I (slow oxidative), IIA (fast oxidative-glycolytic) and IIB (fast glycolytic) per muscle fibre bundle, were measured in muscle samples using a computer image analysis program. The young wild boar muscles showed significantly lower values for the textural parameters ($p < 0.05$). The muscle fibre cross-sectional areas of the juvenile wild boar muscles were significantly lower and the perimysium and endomysium thinner ($p < 0.05$) than those in the old wild boar meat, while the percentage of type IIB fibres was higher. Of all the wild boar muscles tested, the highest hardness and chewiness values were found in BF which, at the same time, showed the highest fibre cross-sectional area and the thickest perimysium and endomysium. The highest percentage of I and IIA fibre types was typical of BF and SM either in young or in old wild boars with the lowest percentage of type I and the highest percentage of type IIB fibres being found in the QF. The results suggest that a higher hardness of wild boar muscles can be connected with a thicker perimysium and endomysium, fibres of higher cross-sectional area and probably a higher content of red fibres (type I).

Keywords: Wild boars; Carcass weight; Texture; Structure; Muscle fibre types

M.T. Diaz, I. Alvarez, J. De la Fuente, C. Sanudo, M.M. Campo, M.A. Oliver, M. Font i Furnols, F. Montossi, R. San Julian, G.R. Nute, V. Caneque, Fatty acid composition of meat from typical lamb production systems of Spain, United Kingdom, Germany and Uruguay, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 256-263, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.020.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9GP05-1/2/b14ababafe0fb4d1b2533f3e08b93c22>)

Abstract:

The fatty acid composition of commercial lambs from different production systems of Spain, Germany, United Kingdom and of two types of Uruguayan lambs (heavy and light) was studied. Concentrate fed lambs, as Spanish lambs, displayed the highest proportions of linoleic acid

(C18:2), while Uruguayan lambs, reared under extensive grazing conditions, showed the highest proportions of linolenic acid (C18:3), due to the great concentration of this fatty acid in grass. German and British lambs, which were fed grass and concentrate, displayed intermediate proportions of linolenic acid (C18:3). Heavy Uruguayan lambs had higher intramuscular fat content (5.92%) than German (4.25%) and British (4.32%) lambs, and this content was twofold higher than light lambs (Spanish (2.41%) and light Uruguayan (3.05%)). Heavy Uruguayan, German and British lambs had a low polyunsaturated/saturated (P/S) ratio due to their high saturated fatty acid (SFA) content and proportion. Principal component analysis was performed to study the relationship between fatty acids. Spanish lambs were clearly separated from the other types and were situated close to the proportions of short chain and n - 6 fatty acids and n - 6/n - 3 ratio in the data plot for fatty acid proportions. Light Uruguayan lambs were located close to long chain fatty acids, and heavy Uruguayan and British lambs were placed near the antithrombotic potential (ATT), stearic acid (C18:0), SFA and conjugated linoleic acid (CLA) proportions. German lambs were located between Spanish lambs and the other types.

Keywords: Fatty acids; Lamb; Meat origin; Production system

Muhammet Irfan Aksu, Mukerrem Kaya, The effect of [alpha]-tocopherol and butylated hydroxyanisole on the colour properties and lipid oxidation of kavurma, a cooked meat product, Meat Science, Volume 71, Issue 2, October 2005, Pages 277-283, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4GBWJP6-3/2/960489d8d545e2a5d3b28c42d8fb3d4c>)

Abstract:

Kavurma is a cooked meat product and is consumed sliced. The amount of animal fat in kavurma (30-40%) is higher than in other meat products; therefore, lipid oxidation and colour defects are a major problem during storage and in the market place. To preserve the quality characteristics of kavurma in markets antioxidants must be added and the product must be packaged and stored at low temperature. In this study, the effects of [alpha]-tocopherol and butylated hydroxyanisole (BHA) levels on lipid oxidation and colour deterioration of sliced and vacuum-packaged kavurma were investigated. Kavurma was made from beef meat and melted beef fat in 5 groups: No-added antioxidant, 50 mg/kg BHA, 100 mg/kg BHA, 50 mg/kg [alpha]-tocopherol and 100 mg/kg [alpha]-tocopherol. The kavurma produced was sliced (3-4-cm thick) and vacuum packed and stored at 4 [degree sign]C for 300 days, and thiobarbituric acid reactive substance, pH, moisture, lightness, redness and yellowness values of sliced product were determined during storage. The use of antioxidants in kavurma production caused a significant ($P < 0.01$) decrease in the thiobarbituric acid reactive substances (TBARS) values. The lipid oxidative stability effect of the antioxidants was in following order: 100 mg/kg BHA > 100 mg/kg [alpha]-tocopherol > 50 mg/kg BHA = 50 mg/kg [alpha]-tocopherol > no-added antioxidant group. Also, TBARS values did not differ significantly ($P > 0.05$) between 0 and 300 days in the 100 mg/kg BHA and 100 mg/kg [alpha]-tocopherol groups. In addition, the no-added antioxidant group had lower lightness and yellowness values than all the antioxidant groups. Sliced and vacuum-packaged kavurma with added antioxidant showed greater colour and lipid oxidative stability during storage than kavurma to which no antioxidant was added.

Keywords: Kavurma; Cooked meat; Antioxidant; Colour; Shelf-life

K.A. Fabrizio, C.N. Cutter, Application of electrolyzed oxidizing water to reduce *Listeria monocytogenes* on ready-to-eat meats, Meat Science, Volume 71, Issue 2, October 2005, Pages 327-333, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4GBFP6K-1/2/560aec5cba58fca9cb0f4783917ec12a>)

Abstract:

Experiments were conducted to determine the effectiveness of acidic (EOA) or basic electrolyzed oxidizing (EOB) water, alone or in combination, on ready-to-eat (RTE) meats to reduce *Listeria monocytogenes* (LM). Frankfurters or ham surfaces were experimentally inoculated with LM and subjected to dipping or spraying treatments (25 or 4 [degree sign]C for up to 30 min) with EOA, EOB, and other food grade compounds. LM was reduced the greatest when frankfurters were treated with EOA and dipped at 25 [degree sign]C for 15 min. A combination spray application of EOB/EOA also resulted in a slight reduction of LM on frankfurters and ham. However, reductions greater than 1 log CFU/g were not observed for the duration of the study. Even with a prolonged contact time, treatments with EOA or EOB were not enough to meet regulatory requirements for control of LM on RTE meats. As such, additional studies to identify food grade antimicrobials to control the pathogen on RTE meats are warranted.

Keywords: *Listeria monocytogenes*; Ready-to-eat meats; Electrolyzed oxidizing water

Ines Thiem, Matthias Lupke, Hermann Seifert, Extraction of meat juices for isotopic analysis, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 334-341, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4GDKB42-2/2/abff5d9c70e1ad3b13ff98a135ce4c7a>)

Abstract:

So far no standard procedure exists to obtain water of meat for isotopic $^{18}\text{O}/^{16}\text{O}$ -water analysis. Fast extraction via heating the tissues is possible when considering certain boundary conditions. A specially designed vessel was tested with water and was then used for meat juice extraction. The reproducibility ($[\sigma]$) of $[\delta]^{18}\text{O}$ -values was 0.12[per mille sign]. Meat samples of six different species were analysed. Water of pork samples was extracted after open storage. Here, decreases in meat weight correspond to decreases in extract yield and to an increase in the $^{18}\text{O}/^{16}\text{O}$ -ratio. The mean water contents in extracts was almost constant [93.2 +/- 0.05 wt% ($p > 0.05$)]. The technique offers an opportunity to develop an automatic, mobile extraction device and to obtain extracts with no further influences on their quality. This method could also be useful for the determination of meat quality attributes as cooking loss or drip without evaporative losses.

Keywords: Meat juice; Extraction; Oxygen isotope

Y.C. Ryu, B.C. Kim, The relationship between muscle fiber characteristics, postmortem metabolic rate, and meat quality of pig longissimus dorsi muscle, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 351-357, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4GD4STC-2/2/3de1fc2a3a21e9826aea67257aecdb05>)

Abstract:

The aim of this study was to investigate the histochemical parameters of muscle fibers, and to estimate the correlation of muscle fiber characteristic to postmortem metabolic rate and meat quality traits in pigs. A total of 231 crossbred pigs were evaluated. Samples of the longissimus dorsi muscle were taken to evaluate the histochemical characteristics, postmortem metabolic rate and meat quality. Fiber type composition was mainly related to postmortem metabolic rate and meat quality traits among various muscle fiber characteristics. The percentage of type IIb fiber was negatively related to pH45 min ($r = -0.33$) and positively to R-value ($r = 0.32$). Drip loss was negatively related to fiber area percentages of type I and IIa ($r = -0.25$ and -0.26 , respectively) and positively related to type IIb percentage ($r = 0.39$). A similar tendency was found between lightness and fiber area percentage. In conclusion, increasing the percentage of type IIb fiber is related to increasing the postmortem metabolic rate, and is related to the deterioration of meat quality.

Keywords: Muscle fiber; Postmortem metabolic rate; Pork quality

Wendell K.T. Coltro, Marcia M.C. Ferreira, Francisco A.F. Macedo, Claudio C. Oliveira, Jesui V. Visentainer, Nilson E. Souza, Makoto Matsushita, Correlation of animal diet and fatty acid content in young goat meat by gas chromatography and chemometrics, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 358-363, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9Y5CG-6/2/9bb6ccd34ff8f59c65bd90aa8ecfd967>)

Abstract:

The meat fatty acids (FA) profiles of caprines submitted to different dietary treatments were determined by gas chromatography. The data were treated by Chemometrics to consider all variables together. The contents of saturated FA (SFA), monounsaturated FA (MUFA), polyunsaturated FA (PUFA), omega-3 (n-3) FA, and omega-6 (n-6) FA in 32 samples were analyzed. PUFA:SFA and n-6:n-3 ratios were also considered. The multivariate methods of hierarchical cluster analysis (HCA) and principal component analysis (PCA) were used to analyze the experimental results. HCA can group samples according to their basic composition, and PCA can explain the relationship among the dietary treatments according to the meat fatty acid composition. Treatment 1 presented the highest n-6 FA concentration, PUFA:SFA, and n-6:n-3 ratios, and the lowest MUFA and n-3 concentrations. Opposite results were observed for treatment 4. Treatments 2 and 3 were highly similar with differences mainly in SFA and MUFA concentrations.

Keywords: Fatty acids; Caprines; Gas chromatography; Chemometrics

Bussayarat Maikhunthod, Kanok-Orn Intarapichet, Heat and ultrafiltration extraction of broiler meat carnosine and its antioxidant activity, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 364-374, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9Y5CG-3/2/c6652a6e78271e96f7fd3222d78b5720>)

Abstract:

This study examined the effects of extraction and further ultrafiltration on the carnosine content, antioxidant activity and total iron content of chicken muscle extracts. Fresh breast meat had 7-fold higher carnosine than fresh thigh meat (2900 versus 419 $\mu\text{g/g}$ meat, respectively). Carnosine extracts of breast and thigh were prepared by heating at 60, 80 and 100 $^{\circ}\text{C}$, and ultrafiltration (UF) using a 5000 MW cut-off. At increasing temperatures, protein concentrations decreased while carnosine, total iron and antioxidant activity increased. Antioxidant abilities of the 80 and 100 $^{\circ}\text{C}$ -heated extracts were greater than that of the 60 $^{\circ}\text{C}$ extract ($p < 0.05$). The ultrafiltrate from the 80 $^{\circ}\text{C}$ -heated extract had approximately 20% higher carnosine, but 40% lower protein and 10-30% lower iron than the 80 $^{\circ}\text{C}$ -heated ultrafiltrate. However, compared in terms of carnosine concentration, the meat extracts had greater antioxidant activity than pure carnosine ($p < 0.05$).

Keywords: Broiler meats; Carnosine; Antioxidant; Heat extraction; Ultrafiltration

P.L. Johnson, R.W. Purchas, J.C. McEwan, H.T. Blair, Carcass composition and meat quality differences between pasture-reared ewe and ram lambs, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 383-391, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9GP05-2/2/00258284f95c924a1cec8ec9a901df64>)

Abstract:

Comparisons were made of carcass and meat quality characteristics of pasture-raised Texel-cross ewe ($n = 269$) and ram ($n = 275$) lambs between 5 and 8 months of age with an average carcass weight of 17.2 kg. Carcass assessment was based on linear dimensions and dissection of a leg into muscle, fat and bone, and meat quality measurements were made on *M. semimembranosus* and *M. longissimus*. At a set carcass weight, ewe lambs had higher dressing percentages (2%),

shorter carcasses (0.7 cm), and heavier leg cuts (35 g) ($P < 0.01$) than males. At the same leg weight, legs of ewe lambs were fatter than males (subcutaneous plus intermuscular fat; 11.2% vs 9.6%; $P < 0.001$), whereas legs of ram lambs contained significantly more muscle and bone than females ($P < 0.001$). Leg muscle to bone ratio (4.7 vs 4.4) and muscularity were higher for females than males ($P < 0.001$). However, the relationship between leg muscle to bone ratio and muscularity was not the same between the sexes, and for any given muscularity value the muscle to bone ratio of ram lambs was lower than females. As a result, if carcass lean meat yield is predicted from a measure of carcass shape, such as muscularity, lean meat yields will be overestimated for males and underestimated for females. Meat quality was lower in ram lambs than in females ($P < 0.001$) as shown by higher Warner-Bratzler shear values (peak value 109.8 vs 97.0 N for M. Semimembranosus), higher ultimate meat pH values, and lower redness (a^*) and lightness (L^* , for the longissimus muscle only) values ($P < 0.001$). It is concluded that significant differences between ewe and ram lambs do exist for many carcass and meat quality traits, but for most quality traits the differences are small.

Keywords: Sex effects; Lean meat yield; Fatness; Muscularity; Meat quality

K.S. Rhee, L.M. Anderson, A.R. Sams, Comparison of flavor changes in cooked-refrigerated beef, pork and chicken meat patties, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 392-396, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9GP05-3/2/baf4e6e13151262f9c495cff4c5a01b0>)

Abstract:

Beef and pork longissimus dorsi (LD) and semimembranosus (SM) and chicken breast (B) and thigh (T) muscles excised 24 h postmortem were ground by muscle/species group, formed into patties, pan-fried, refrigerated for 0, 3 or 6 days, and evaluated by a trained sensory panel for intensity of specific flavors. The rate of decline in species-specific natural meat flavor intensity and the rate of increase in 'cardboard' (CBD) flavor intensity during the first half of the 6-day storage were fastest for beef, while such decline and increase during the entire storage period were slowest for chicken B. Overall trends of natural meat flavor and CBD intensity changes for chicken T appeared more like those for the red meats than chicken B. It was concluded that, while flavor deterioration can occur in cooked-stored meats from all the species, quantitative or the magnitude of differences between species would depend on muscle types and sensory terms/method used.

Keywords: Comparison of flavor changes; Trained-panel sensory evaluation; Beef; Chicken; Pork

Shai Barbut, Effects of chemical acidification and microbial fermentation on the rheological properties of meat products, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 397-401, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.026.

(<http://www.sciencedirect.com/science/article/B6T9G-4GC1RP0-3/2/73195f4dad33a557844f6faa7f75c3c>)

Abstract:

The gelation patterns of meat batters acidified with lactic acid bacteria (LAB) fermentation, liquid lactic acid, encapsulated lactic, citric and gluconic acids were studied. LAB provided slow (overnight) acidification that resulted in a significantly higher pre-cooking modulus of rigidity (G') value compared to all treatments, including a non-acidified control. The LAB heat-gelation pattern was also different from all other treatments. Liquid lactic acid caused an immediate pH reduction (from 5.6 to 4.6), crumbly texture, moisture release, and an initial higher G' value compared to the control, but lower than the LAB. The hydrogenated oil encapsulated acids, designed to release acid at 51-55 [degree sign]C, did not produce crumbly texture or moisture release. Encapsulated lactic acid showed an increase in the initial G' , probably because of limited pre-cooking acid release. However, citric and gluconic acids showed no such effect. During cooling, LAB treatment

showed the lowest G' value curve, followed by the control, liquid lactic acid, and the encapsulated acids.

Keywords: Gelation; Encapsulation; Fermentation; Lactic acid bacteria; Meat; Rheology; Salami

Y. Li, S. Zhuang, A. Mustapha, Application of a multiplex PCR for the simultaneous detection of *Escherichia coli* O157:H7, *Salmonella* and *Shigella* in raw and ready-to-eat meat products, *Meat Science*, Volume 71, Issue 2, October 2005, Pages 402-406, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4G9Y5CG-1/2/bab3c36220602532d928c6059e6b7a20>)

Abstract:

Escherichia coli O157:H7, *Salmonella* and *Shigella* might contaminate similar types of meat products and cause deadly diseases in humans. Traditional microbiological analyses to detect these pathogens are labor-intensive and time-consuming. The objective of this study was to apply a multiplex PCR for simultaneous detection of the pathogenic bacteria in certain raw and ready-to-eat meat matrices. The tested samples had aerobic plate counts ranging from non-detectable, in chicken nuggets and salami, to 8.36 log₁₀ CFU/g in ground pork. The pH of homogenates spanned from 6.86, in ground beef, to 7.17 in salami. Following a 24-h enrichment, the multiplex PCR assay could concurrently detect the three pathogens at 0.2 log₁₀ CFU/g in ground beef, roast beef, beef frankfurters, chicken nuggets, salami and turkey ham, and 1.2 log₁₀ CFU/g in ground pork. This multiplex PCR offers an efficient microbiological tool for presumptive detection of *E. coli* O157:H7, *Salmonella* and *Shigella* in meat.

Keywords: Multiplex PCR; *Escherichia coli* O157:H7; *Salmonella*; *Shigella*; Meat products

G. Alexandre, N. Mandonnet, Goat meat production in harsh environments, *Small Ruminant Research*, Volume 60, Issues 1-2, Plenary papers of the 8th International Conference on Goats, October 2005, Pages 53-66, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.005.

(<http://www.sciencedirect.com/science/article/B6TC5-4GXVG9M-1/2/6d042138cb81991a8d4b3b9c213d0178>)

Abstract:

This paper provides some insight into special attributes of the goat as an efficient producer of meat under harsh environments. The overview is not intended to be exhaustive; it gives the readers a comprehensive synthesis on the subject allowing them to consult the list of references. Moreover, it would not be possible to classify the most limiting factor among the numerous and diverse constraints that negatively affect goat production: high ambient temperatures and/or humidity, and erratic and/or low rainfall that have concomitant effects on quality and quantity of feeds, a wide variety of diseases and low levels of animal husbandry. The paper highlights some particular conditions illustrated by data coming from different parts of the world, which can be classified as having harsh environments. Finally, the objectives of this work are not to propose ready-made solutions, but to recommend a holistic approach to the problems and their analyses allude to opportunities for improvement in the future.

Keywords: Goat production; Harsh environments; Goat adaptability; Goat herd management; Economics

J.J. Olivier, S.W.P. Cloete, S.J. Schoeman, C.J.C. Muller, Performance testing and recording in meat and dairy goats, *Small Ruminant Research*, Volume 60, Issues 1-2, Plenary papers of the 8th International Conference on Goats, October 2005, Pages 83-93, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.022.

(<http://www.sciencedirect.com/science/article/B6TC5-4GVGTNJ-1/2/6476856656f9d8e86dd18e66ab974990>)

Abstract:

This contribution reviews the global importance of goat farming in subsistence-based, market-based and high-input production systems and discusses performance recording and performance testing of meat and dairy goats with special reference to the South African environment. Environmental effects, genetic parameters and breeding strategies are considered. Marked progress has been made with performance testing and recording of meat and dairy goats in South Africa, but there is still ample scope for further improvements in the national improvement programmes.

Keywords: Environment; Growth; Reproduction; Milk yield; Butterfat; Protein; Breeding strategy

E.C. Webb, N.H. Casey, L. Simela, Goat meat quality, *Small Ruminant Research*, Volume 60, Issues 1-2, Plenary papers of the 8th International Conference on Goats, October 2005, Pages 153-166, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.06.009.

(<http://www.sciencedirect.com/science/article/B6TC5-4H2G92H-2/2/6c9ae82efb27e9f7db7c67e80e5c1b62>)

Abstract:

Goat meat has been established as lean meat with favourable nutritional quality. Its attributes are concordant with present day consumer demands for leaner and nutritious meat, and hence should be the basis for promoting the meat. Sensory evaluations have shown that goat meat is acceptably palatable and desirable to consumers. The meat may be as acceptable as mutton if animals of similar ages are compared. However, goat meat tends to be less tender and less juicy than sheep meat because of some possible mitigating factors that are discussed. Goat meat has a species-specific flavour and aroma, which differ from that of sheep meat. In terms of appearance, goat meat tends to have a slightly lower a^* value than had been reported for sheep meat, but indications are that the colour is acceptable to consumers. The meat tends to have a high ultimate pH, a fact that is at least partly attributed to stressful peri-mortem handling and the related effects on glycogen metabolism. Goat carcasses are less compact and leaner than those of sheep. This has implications on the proportions of primal cuts, separable tissues within the carcass as well as carcass chilling, which affects the quality of the meat. Recommendations have thus been made about the post-mortem handling of goat carcasses, carcass grading/classification systems and that carcass jointing be cognisant of these factors.

Keywords: Goat meat; Meat quality

R.M. Garcia-Rey, R. Quiles-Zafra, M.D. Luque de Castro, Effect of genotype and seasonality on pig carcass and meat characteristics, *Livestock Production Science*, Volume 96, Issues 2-3, 30 September 2005, Pages 175-183, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.01.008.

(<http://www.sciencedirect.com/science/article/B6T9B-4FN4VVY-1/2/7480788608ae85796d2a2f7d0c244579>)

Abstract:

The effect of the genetics and the slaughter time on pig carcasses and raw ham characteristics has been assessed. With this aim, 1257 pigs from five different crosses including Duroc (DU), Landrace (LR) and Large White (LW) in five slaughters distributed along a year (namely, December 2000, March, April, July and November 2001) were used for the study. The variables studied included carcass weight (CW), ham weight (HW), lean meat percentage in the ham (% Lean), pH at 45 min post-mortem (pH 45 min) and at 48 h post-mortem (pH 48 h). The percent of ham yield (% HW-CW ratio) was calculated as the ratio ham weight/carcass weight multiplied by 100. Semimembranosus muscle (SM) from 237 hams was collected at 48 h post-mortem in order to determine the moisture, protein and intramuscular fat content and pH measurement in the laboratory (pH Lab). A univariate analysis of variance including genetics as fixed factor and slaughter time as random factor revealed that carcass and meat traits are influenced by both the time of year in which the animals are slaughtered and the genetics; however, the latter exerts a less significant effect than the slaughter time.

Keywords: Pig carcass; Ham; Slaughter time; Genetics

R.J.B. Bessa, P.V. Portugal, I.A. Mendes, J. Santos-Silva, Effect of lipid supplementation on growth performance, carcass and meat quality and fatty acid composition of intramuscular lipids of lambs fed dehydrated lucerne or concentrate, *Livestock Production Science*, Volume 96, Issues 2-3, 30 September 2005, Pages 185-194, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2005.01.017.

(<http://www.sciencedirect.com/science/article/B6T9B-4G94HWK-1/2/473a2aa84eae9de9ce43b86f3578c7a2>)

Abstract:

Thirty-two Merino Branco ram lambs were used to evaluate the effects of basal diet and soybean oil supplementation on growth, carcass and meat quality and fatty acid composition of longissimus thoracis muscle. The lambs were submitted to four diets: ground and pelleted lucerne; ground and pelleted lucerne plus 10% soybean oil; concentrate; concentrate plus 10% soybean oil. Lambs were slaughtered after 7 weeks of trial. Lambs fed lucerne had higher intake and lower carcass weight. Intake decreased and carcass weight increased with oil supplementation in lucerne. Carcass weight decreased with oil inclusion in concentrate. Muscle and muscle/bone ratio were higher on concentrate. Oil decreased muscle proportion. Basal diet and lipid supplementation had minor effects on meat quality traits. Consumer's distinguished meat from oil supplemented lambs, but did not reveal any particular preference. The trans-octadecenoates and conjugated octadecadienoates isomers are strongly dependent of basal diet and oil exacerbates the differences. The predominant trans-octadecenoate was 18:1 trans-11 in lucerne and 18:1 trans-10 in concentrate. The main conjugated octadecadienoic isomer was 18:2 cis-9, trans-11 in both basal diets. Oil increased 18:2 cis-9, trans-11 only in lucerne and 18:2 trans-10, cis-12 in concentrate. Lucerne fed lambs showed low ratio n-6/n-3 fatty acids.

Keywords: Lamb; Lipid supplementation; Meat quality; Fatty acid composition; Conjugated linoleic acid; Trans fatty acids

Lone Nukaraq Moller, Eskild Petersen, Christian M.O. Kapel, Mads Melbye, Anders Koch, Outbreak of trichinellosis associated with consumption of game meat in West Greenland, *Veterinary Parasitology*, Volume 132, Issues 1-2, Trichinellosis - Proceedings of the 11th International Conference on Trichinellosis, 5 September 2005, Pages 131-136, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2005.05.041.

(<http://www.sciencedirect.com/science/article/B6TD7-4GMGWKS-2/2/956c728423e34811e0c17a1d4067f770>)

Abstract:

The Inuit population of the Arctic has always been at risk of acquiring trichinellosis and severe outbreaks have been recorded in Alaska and Canada. In West Greenland, a number of large outbreaks took place during the 1940s and 1950s; they involved total 420 cases including 37 deaths. Since then only sporadic cases have been reported. Here, we describe an outbreak of infection with *Trichinella* spp. after consumption of infected meat presumably from walrus or polar bear caught in western Greenland. Six persons who had eaten of the walrus and polar bear meat were two males and four females, age range 6-47 years. Using ELISA and Western blot analysis (*Trichinella*-specific IgG antibodies against excreted/secreted antigen and synthetic tyvelose antigen, respectively) four of these persons were found to be sero-positive for *Trichinella* antibodies, with three of these having clinical symptoms compatible with trichinellosis. On re-test, 12-14 months later one of the two sero-negative persons had sero-converted, probably due to a new, unrelated infection. This study demonstrates that acquiring *Trichinella* from the consumption of marine mammals remains a possibility in Greenland, and that cases may go undetected. Trichinellosis in Greenland can be prevented by the implementation of public health measures.

Keywords: *Trichinella nativa*; Walrus (*Odobenus rosmarus*); Polar bear (*Ursus maritimus*); Human trichinellosis; Greenland; Outbreak

M. Djordjevic, K. Cuperlovic, M. Savic, S. Pavlovic, The need for implementation of International Commission on Trichinellosis recommendations, quality assurance standards, and proficiency sample programs in meat inspection for trichinellosis in Serbia, *Veterinary Parasitology*, Volume 132, Issues 1-2, Trichinellosis - Proceedings of the 11th International Conference on Trichinellosis, 5 September 2005, Pages 185-188, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2005.05.053.

(<http://www.sciencedirect.com/science/article/B6TD7-4GHRC8R-5/2/3e32517a06ffe33aaeea232ca6a91e4b>)

Abstract:

Implementation of methods to control inspection for *Trichinella* in meat recommended by International Commission on Trichinellosis (ICT), particularly the introduction of the quality assurance standards and proficiency panels for certified analysts is extremely important in Serbia and other countries where Trichinellosis is endemic. In spite of existing regulations, including the inspection of 0.5 g samples of diaphragm by the compression method or by artificial digestion of 1 g samples, in Serbia 280 people were diagnosed with clinical trichinellosis after consumption of inspected meat during the period 2001-2002. These outbreaks, which occurred in the municipalities of Kumane, Surcin and Bogatic, were a consequence of inadequate application of inspection methods and insufficient education of some veterinary inspectors. The problem of inadequate veterinary inspection in Serbia can be overcome by strict application of the ICT recommendations for the control of *Trichinella* with specific emphasis on implementing the quality assurance system (QAS) and proficiency sampling (PS/-PP/panel).

Keywords: Regulations; Trichinoscopy; Pepsin digestion; Larva

A.C. Goncalves, R.C.C. Almeida, M.A.O. Alves, P.F. Almeida, Quantitative investigation on the effects of chemical treatments in reducing *Listeria monocytogenes* populations on chicken breast meat, *Food Control*, Volume 16, Issue 7, September 2005, Pages 617-622, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.06.026.

(<http://www.sciencedirect.com/science/article/B6T6S-4D6369S-2/2/c717270a74fea46e2e1bdb3f782fd2fd>)

Abstract:

The effectiveness of treatments for the reduction of *Listeria monocytogenes* surface-inoculated in chicken breast meat was investigated. The treatments consisted of dipping breasts in chemical solutions for 15 min: buffered phosphate (control), calcium hypochlorite, trichloroisocyanuric acid, sodium acetate, sodium lactate, l-lactic acid or trisodium phosphate. The rates of inactivation observed with the chlorine compounds were similar, and in the presence of 100 mg/l of active chlorine viability decreased by 4.41 log units, compared with less than 1.0 log unit decrease observed when cells were submitted to 45 mg/l of active chlorine. Sodium lactate at 2.5% was a more effective antilisterial agent, producing a reduction of 3.88 log units. The present study extends existing findings on the importance of the use of lactic acid, sodium acetate, sodium lactate, trisodium phosphate (chemically classified as GRAS) and chlorine compounds on the inactivation of *L. monocytogenes*.

Keywords: *Listeria monocytogenes*; Chemical treatments; Chicken breast meat

V.R. Tarnawski, D.J. Cleland, S. Corasaniti, F. Gori, R.H. Mascheroni, Extension of soil thermal conductivity models to frozen meats with low and high fat content, *International Journal of Refrigeration*, Volume 28, Issue 6, September 2005, Pages 840-850, ISSN 0140-7007, DOI: 10.1016/j.ijrefrig.2005.01.012.

(<http://www.sciencedirect.com/science/article/B6V4R-4FVJBY5-2/2/096f1e82c86d94afd70468b2d1eab4db>)

Abstract:

Thermal conductivity models of frozen soils were analyzed and compared with similar models developed for frozen foods. In total, eight thermal conductivity models and 54 model versions were tested against experimental data of 13 meat products in the temperature range from 0 to -40 [degree sign]C. The model by deVries, with water+ice (wi) as the continuous phase, showed overall the best predictions. The use of wi leads generally to improved predictions in comparison to ice; water as the continuous phase is beneficial only to deVries model, mostly from -1 to -20 [degree sign]C; fat is advantageous only to meats with high fat content. The results of this work suggest that the more sophisticated way of estimating the thermal conductivity for a disperse phase in the deVries model might be more appropriate than the use of basic multi-phase models (geometric mean, parallel, and series). Overall, relatively small differences in predictions were observed between the best model versions by deVries, Levy, Mascheroni, Maxwell or Gori as applied to frozen meats with low content of fat. These differences could also be generated by uncertainty in meat composition, temperature dependence of thermal conductivity of ice, measurement errors, and limitation of predictive models.

Keywords: Frozen food; Modelling; Thermal conductivity; Experiment; Comparison; Soil; Produit congele; Modelisation; Conductivite thermique; Experimentation; Comparaison; Sol

C. James, I. Lejay, N. Tortosa, X. Aizpurua, S.J. James, The effect of salt concentration on the freezing point of meat simulants, *International Journal of Refrigeration*, Volume 28, Issue 6, September 2005, Pages 933-939, ISSN 0140-7007, DOI: 10.1016/j.ijrefrig.2005.01.011.

(<http://www.sciencedirect.com/science/article/B6V4R-4FSK7NV-1/2/e7d98f2a9395a3f1459b917080c73005>)

Abstract:

Accurate data on the initial freezing point of cured meat is required to predict freezing rates or identify optimal slicing temperatures. However, little data was found in the literature. Experiments were therefore carried out using the 'Karlsruhe test substance' ('Tylose') with varying salt concentrations as a cured meat substitute. Initial freezing points were -1.4, -3.1, -4.1, -5.2 and -6.3 [degree sign]C at salt contents of 0.5, 2, 3, 4 and 5 kg salt/100 kg sample, respectively. These values were within +/-0.5 [degree sign]C of published values for cured pork and within +/-0.9 [degree sign]C of theoretical predictions. Modifying the salt content of Tylose is therefore a simple way of determining the initial freezing point of cured lean meats, and Tylose modified in this way can be used to simulate the freezing of cured meat.

Keywords: Meat; Meat stimulant; Experiment; Measurement; Freezing point; Viande; Produit carne; Substitut; Experimentation; Mesure; Temperature de congelation

P. Sebastian, D. Bruneau, A. Collignan, M. Rivier, Drying and smoking of meat: heat and mass transfer modeling and experimental analysis, *Journal of Food Engineering*, Volume 70, Issue 2, September 2005, Pages 227-243, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.10.002.

(<http://www.sciencedirect.com/science/article/B6T8J-4DXT7X8-1/2/d59d0b9ba09234a4e5f50769c6a52755>)

Abstract:

There has been recent interest in developing hot smoking kilns avoiding benzo(a)pyrene deposition on meat. An experimental kiln limiting this deposition phenomenon has been designed, built and tested. This kiln is used to dry, smoke and cook pork meat in order to obtain boucane, a traditional smoked product from La Reunion Island. Smoking is performed by using cooled pyrolysis smoke, while heating is obtained by means of radiant metal plates heated by combustion smoke. The dimensioning of the drying-cooking chamber has been performed by developing and solving a dynamic model that takes into account the heat and mass transfer phenomena on a local scale. This paper is mainly devoted to the presentation of this model and to the comparison of the first experimental results--concerning temperature variations in the chamber, and the product temperature and mass loss--to numerical simulation results. Some results obtained from dynamic

simulations are discussed. The relative influences of the system dimensions, of the radiative transfers and of the drying phenomena on the performances of the system are discussed.

Keywords: Drying; Smoking; Cooking; Food; Meat; Thermodynamics; Modeling; Simulation; Experiment

Eleese Cunningham, Should Meat and Poultry Be Washed before Cooking?, Journal of the American Dietetic Association, Volume 105, Issue 9, September 2005, Page 1479, ISSN 0002-8223, DOI: 10.1016/j.jada.2005.07.033.

(<http://www.sciencedirect.com/science/article/B758G-4GY39P-16/2/0f097614a7d5b1e72f70e233ee76014a>)

Melvin C. Hunt, 51st International Congress of Meat Science and Technology (51st ICoMST) Baltimore, USA, 7-12 August 2005, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Page 1, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4GD4STC-4/2/918dbc0449eb1f5f3e07df41a1b4554c>)

F.R. Dunshea, D.N. D'Souza, D.W. Pethick, G.S. Harper, R.D. Warner, Effects of dietary factors and other metabolic modifiers on quality and nutritional value of meat, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 8-38, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.05.001.

(<http://www.sciencedirect.com/science/article/B6T9G-4GGWGNB-4/2/ff8618fdbda835b35981ff5e78ff76fc>)

Abstract:

A number of technologies that increase feed efficiency and lean tissue deposition while decreasing fat deposition have been developed in an effort to improve profitability of animal production. In general, the mode of action of these metabolic modifiers is to increase muscle deposition while often simultaneously reducing fat deposition. However, there have been some concerns that the focus on increasing production efficiency and lean meat yield has been to the detriment of meat quality. The aim of this review is to collate data on the effects of these metabolic modifiers on meat quality, and then discuss these overall effects. When data from the literature are collated and subject to meta-analyses it appears that conservative use of each of these technologies will result in a 5-10% (0.3-0.5 kg) increase in shear force with a similar reduction in perception of tenderness. However, it should be borne in mind that the magnitude of these increases are similar to those observed with similar increases in carcass leanness obtained through other means (e.g. nutritional, genetic selection) and may be an inherent consequence of the production of leaner meat. To counter this, there are some other metabolic factors and dietary additives that offer some potential to improve meat quality (for example immunocastration) and it is possible that these can be used on their own or in conjunction with somatotropin, approved [beta]-agonists, anabolic implants and CLA to maintain or improve meat quality.

Keywords: Diet; Meat quality; Nutritional value; Metabolic modifiers; Beef; Pork

R.A. Mancini, M.C. Hunt, Current research in meat color, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 100-121, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.003.

(<http://www.sciencedirect.com/science/article/B6T9G-4G7GFXX-1/2/7a59029c747fd68b6ed350a3d68707c7>)

Abstract:

This review surveyed recent literature focused on factors that affect myoglobin chemistry, meat color, pigment redox stability, and methodology used to evaluate these properties. The

appearance of meat and meat products is a complex topic involving animal genetics, ante- and postmortem conditions, fundamental muscle chemistry, and many factors related to meat processing, packaging, distribution, storage, display, and final preparation for consumption. These factors vary globally, but the variables that affect basic pigment chemistry are reasonably consistent between countries. Essential for maximizing meat color life is an understanding of the combined effects of two fundamental muscle traits, oxygen consumption and metmyoglobin reduction. In the antemortem sector of research, meat color is being related to genomic quantitative loci, numerous pre-harvest nutritional regimens, and housing and harvest environment. Our knowledge of postmortem chilling and pH effects, atmospheres used for packaging, antimicrobial interventions, and quality and safety of cooked color are now more clearly defined. The etiology of bone discoloration is now available. New color measurement methodology, especially digital imaging techniques, and improved modifications to existing methodology are now available. Nevertheless, unanswered questions regarding meat color remain. Meat scientists should continue to develop novel ways of improving muscle color and color stability while also focusing on the basic principles of myoglobin chemistry.

Keywords: Color; Color stability; Myoglobin; Hemoglobin; MAP; Bone marrow; Antimicrobials; Quantitative loci

Emoke Bendixen, The use of proteomics in meat science, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 138-149, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4G4N0GS-2/2/e416734a5b0534f860e0ea6ec2b917a5>)

Abstract:

Characterising the function of genes is a major challenge in the post-genomic era. Post-genomic tools and technologies have dramatically changed the experimental approaches by which complex biological systems can be characterised.

Proteomics is an important cornerstone in functional genome characterisation, and like all other functional genomics tools, including transcriptomics and metabolomics, the aim of proteome studies is to translate genome information into useful biological insight, that will allow scientists to build and test better hypotheses, with the ultimate goal to find better solutions to challenges in food production, medicine and environmental management.

In agricultural sciences as well as in all other life sciences, the implementation of proteomics and the other post-genomic tools is an important step towards achieving better product quality and a more sustainable animal production.

The aim of this review is to introduce the developing field of proteomics, and to discuss the use of proteomics in meat science projects. The most frequently used technologies for characterising cellular protein expression patterns will be introduced, and some early examples of applying proteomics to meat quality research will be discussed.

Keywords: Proteomics; Review; Meat; Quality; Mass spectrometry; Systems biology

K.R. Smith, P. Clayton, B. Stuart, K. Myers, P.M. Seng, The vital role of science in global policy decision-making: An analysis of past, current, and forecasted trends and issues in global red meat trade and policy, Meat Science, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 150-157, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4G7GFXX-2/2/aa0e662a100e3597f5ee1fbb35c8fff9>)

Abstract:

As global populations and economies change, the dynamics of global trade and policy change as well. In analyzing the past trends and projections for global populations, economic developments,

animal product production and consumption, global trade policy, and current issues being faced, one can begin to make some predictions or projections as to how the global red meat and poultry infrastructure will change and, more importantly, point to areas where a proactive approach is necessary to shape these changes to meet the most globally beneficial end.

Many issues face the global red meat industry, from food safety to animal disease, and are becoming more and more complicated as consumer knowledge increases and as politics intervene. Internationalized science is key and vital in the future of global trade policy as science can address the more informed consumer in a manner, which reduces anxiety over unknowns.

The role of the industry is to provide the information and knowledge to the consumer necessary to convey the validity of globally accepted standards, which relate to ensuring consumer safety, animal welfare, and provide assurances that these standards are being met within the production sector.

Keywords: Meat; Trade; Global; BSE; Zoonoses

Elisabeth Huff-Lonergan, Steven M. Lonergan, Mechanisms of water-holding capacity of meat: The role of postmortem biochemical and structural changes, *Meat Science*, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 194-204, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.022.

(<http://www.sciencedirect.com/science/article/B6T9G-4GD4STC-1/2/19d9f10c3222021ee8f3e70f0585cb46>)

Abstract:

Unacceptable water-holding capacity costs the meat industry millions of dollars annually. However, limited progress has been made toward understanding the mechanisms that underlie the development of drip or purge. It is clear that early postmortem events including rate and extent of pH decline, proteolysis and even protein oxidation are key in influencing the ability of meat to retain moisture. Much of the water in the muscle is entrapped in structures of the cell, including the intra- and extramyofibrillar spaces; therefore, key changes in the intracellular architecture of the cell influence the ability of muscle cells to retain water. As rigor progresses, the space for water to be held in the myofibrils is reduced and fluid can be forced into the extramyofibrillar spaces where it is more easily lost as drip. Lateral shrinkage of the myofibrils occurring during rigor can be transmitted to the entire cell if proteins that link myofibrils together and myofibrils to the cell membrane (such as desmin) are not degraded. Limited degradation of cytoskeletal proteins may result in increased shrinking of the overall muscle cell, which is ultimately translated into drip loss. Recent evidence suggests that degradation of key cytoskeletal proteins by calpain proteinases has a role to play in determining water-holding capacity. This review will focus on key events in muscle that influence structural changes that are associated with water-holding capacity.

Keywords: Water-holding capacity; Drip loss; Calpain; Proteolysis; pH

R.D. Warner, F.R. Dunshea, E.N. Ponnampalam, J.J. Cottrell, Effects of nitric oxide and oxidation in vivo and postmortem on meat tenderness, *Meat Science*, Volume 71, Issue 1, 51st International Congress of Meat Science and Technology (ICoMST), September 2005, Pages 205-217, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.04.008.

(<http://www.sciencedirect.com/science/article/B6T9G-4G94HXN-2/2/2804aeb3d61b058d1266aca000c56d72>)

Abstract:

Metabolic processes in muscle tissue in vivo result in the production of reactive oxygen species and oxidative compounds including superoxide anions and nitric oxide (NO). Reactive oxygen species can react with both lipids and proteins and often have deleterious effects, contributing to the onset of ageing and senescence as well as cell death. Nitric oxide (NO) is a free radical that is constantly produced or released throughout the body by diverse tissues and is known to influence proteolytic activity in human and rodent skeletal muscle as well as being involved in regulation of

calcium homeostasis in the muscle cell. The influence of nitric oxide on development of meat tenderness has been studied through postmortem manipulation and also through in vivo studies. The effect of NO on meat tenderness is postulated to be via its regulatory effects on the proteins calpain, cathepsins, ryanodine receptor channel in the sarcoplasmic reticulum (SR) and the sarcoplasmic-endoplasmic release calcium ATPase in the SR. NO is an oxidant although the effects of NO on effector proteins can be distinguished from a direct oxidation reaction. The onset of oxidation in meat postmortem is well known to produce off-odours, discolouration and unacceptable flavours associated with rancidity. Oxidation during the immediate postmortem period appears to inhibit tenderisation during ageing, probably through an inhibitory effect of oxidation on the calpain enzyme. Oxidation of muscle tissue occurring as a result of availability of oxygen during modified atmosphere packaging may also have deleterious consequences for tenderness development during storage of meat prior to retail display. In conclusion, it is proposed that postmortem meat tenderisation is influenced by skeletal muscle's release of NO pre-slaughter and the oxidation of proteases postmortem. This proposal is compatible with the existing tenderness model and will hopefully assist in increasing the accuracy of prediction of meat tenderness. Future directions for research are discussed.

Keywords: Nitric oxide; Oxidation; Tenderness; Calpain

Peter Paulsen, Peter Kanzler, Friederike Hilbert, Sigrid Mayrhofer, Susanne Baumgartner, Frans J.M. Smulders, Comparison of three methods for detecting *Campylobacter* spp. in chilled or frozen meat, *International Journal of Food Microbiology*, Volume 103, Issue 2, 25 August 2005, Pages 229-233, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2004.12.022.

(<http://www.sciencedirect.com/science/article/B6T7K-4GGXX6D-1/2/baa718e67f267ea43c05d126a926a84d>)

Abstract:

There is a demand from the meat industry as well as from public health authorities for a simple and rapid detection method for thermophilic *Campylobacter* spp. from food. Hence, we compared different isolation procedures for their usefulness for this purpose. Bolton enrichment medium without blood, incubated statically in stomacher bags in microaerophilic atmosphere, detected more samples positive for thermophilic *Campylobacter* spp. than did Preston enrichment broth in bottles with small headspace and tight caps, incubated in aerobic atmosphere. Use of an automated antigen detection system to identify enrichment cultures positive for *Campylobacter* spp. was as sensitive as selective agars, and reduced the detection time by 24 h. *Campylobacter* spp. were recovered from 18.4% of the 461 samples tested. The prevalence was highest in refrigerated poultry meat (52% of the 80 samples tested) and poultry offal (41% of the 44 samples tested).

Keywords: *Campylobacter*; Detection; Meat

Carolien T. Hoogland, Joop de Boer, Jan J. Boersema, Transparency of the meat chain in the light of food culture and history, *Appetite*, Volume 45, Issue 1, August 2005, Pages 15-23, ISSN 0195-6663, DOI: 10.1016/j.appet.2005.01.010.

(<http://www.sciencedirect.com/science/article/B6WB2-4GC1R44-2/2/52bb4557b9a0fe50c2ab1bf59027a2b5>)

Abstract:

Current patterns of meat consumption are considered to be unsustainable. Sustainable development may require that consumers choose to eat smaller quantities of meat as well as meat that is produced in a more sensible way. A policy tool directed at consumer behaviour is that of enhancing consumer-oriented transparency of the production chain. Transparency is expected to allow people to make more mindful consumption choices, in line with their personal values. As most dietary habits are deeply rooted in the past, an assessment of the effect of transparency on food choices requires a historical perspective to food culture. Such a perspective provides us with

at least two trends of relevance to meat consumption: increased concern for animal welfare and an ongoing dissociation of meat from its animal origin. Combined, these two trends may interact to allow people to consume in ways that actually conflict with their personal values: their concern for animal welfare does not translate into corresponding food choices, as the product meat does not remind them of its animal origin. An experiment was designed to test the hypothesis that people sensitive to animal welfare will respond to increased salience of animal origin and of animal welfare, and that they will show this by either avoiding to buy meat or by favouring free range and organic meat. Results confirmed the expected effect. The effect was observed mainly among those with Universalistic values, which limits the ultimate prospects of transparency as a policy tool.

Keywords: Consumer behaviour; Portrait Values Questionnaire; Food choice criteria; Sustainability; Transparency; Meat

Emanuele Boselli, Maria Fiorenza Caboni, Maria Teresa Rodriguez-Estrada, Tullia Gallina Toschi, Mara Daniel, Giovanni Lercker, Photoxidation of cholesterol and lipids of turkey meat during storage under commercial retail conditions, *Food Chemistry*, Volume 91, Issue 4, August 2005, Pages 705-713, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.06.043.

(<http://www.sciencedirect.com/science/article/B6T6R-4D98JP5-9/2/1fd8d1d691b0379fdd1f962753c976fa>)

Abstract:

Photoxidation of cholesterol and lipids of raw turkey patties packed in vessels with transparent shrink film was studied during storage at 4 [degree sign]C under commercial retail conditions. Two different storage periods were applied: a 3-day storage and a 11-day storage. When meat was stored in the dark at 4 [degree sign]C, the maximum peroxide number was reached after 5 days and the maximum concentration of cholesterol oxidation products was attained only after 7 days. Turkey meat exposed to the white fluorescent light (under a daylight lamp) showed a maximum COPs concentration and peroxide value after just 1 day of storage (12 h effective light exposure). A lamp with low emission in the blue band (warm-tone lamp) was useful for lowering peroxidation and cholesterol oxidation, thus being a suitable solution for the exhibition of meat products in supermarkets or meat processing industries.

Keywords: Turkey meat; Photoxidation; Cholesterol oxidation; Lipid oxidation; Gas chromatography-mass spectrometry

Vladimir Babak, Jarmila Schlegelova, Hana Vlkova, Interpretation of the results of antimicrobial susceptibility analysis of *Escherichia coli* isolates from bovine milk, meat and associated foodstuffs, *Food Microbiology*, Volume 22, Issue 4, August 2005, Pages 353-358, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.08.010.

(<http://www.sciencedirect.com/science/article/B6WFP-4F032B8-9/2/2be8764cf340d03fd35c7ee1dd02fca9>)

Abstract:

Strains of indicator bacteria *Escherichia coli* (*E. coli*) contaminating raw milk can, under specific conditions, become vectors of genes encoding resistance to antimicrobial drugs. The susceptibility of 1162 *E. coli* isolates originating from milk, milk products, meat, meat products and swabs from meat processing plant facilities to selected antimicrobial drugs (amikacin--AMI, ampicillin--AMP, cephalothin--CLT, cotrimoxazole--SXT, cefotaxime--CTX, gentamicin--GEN, neomycin--NEO, streptomycin--STR, tetracycline--TET, norfloxacin--NOR, chloramphenicol--CMP and erythromycin--ERY) was analysed. A standard microdilution method was used to detect minimal inhibition concentrations (MIC). The current criteria for interpretation (clinical breakpoints) do not allow identification of bacterial strains with acquired and potentially transmissible resistance to antimicrobial drugs. Microbiological breakpoints may be more appropriate because they take into account MIC distribution in a bacterial population of a certain species only. The aim of this study

was to determine the microbiological breakpoints. Critical MICR values (microbiological breakpoints) were derived, which enabled E. coli strains to be characterized by MIC values into two subgroups; the first one comprises susceptible strains (MIC<MICR) and the second one comprises strains which are resistant to a given antimicrobial drug (MIC[greater-or-equal, slanted]MICR). We obtained the following values of microbiological breakpoints: AMI-32, AMP-32, CLT-64, CTX-8, CMP-32, GEN-8, ERY-[greater-or-equal, slanted]512, NEO-16, NOR-1, STR-32, SXT-0.8/15.2 and TET-16 [μ]g/ml.

Keywords: Clinical breakpoints; Microbiological breakpoints; Antimicrobial susceptibility; Escherichia coli; Acquired resistance

Patricia M. Guenther, Helen H. Jensen, S. Patricia Batres-Marquez, Chun-Fu Chen, Sociodemographic, Knowledge, and Attitudinal Factors Related to Meat Consumption in the United States, *Journal of the American Dietetic Association*, Volume 105, Issue 8, August 2005, Pages 1266-1274, ISSN 0002-8223, DOI: 10.1016/j.jada.2005.05.014.

(<http://www.sciencedirect.com/science/article/B758G-4GRH23B-12/2/46d7546bb169d0258a7806058a5d59fb>)

Abstract: Objective

To provide information about meat consumption and factors that explain differences among subpopulations, and to evaluate how knowledge and attitudes about nutrition and awareness of diet and health influence meat consumption. Design

The 1994-1996 Continuing Survey of Food Intakes by Individuals provided two nonconsecutive 24-hour recalls. The Diet and Health Knowledge Survey was administered at least 1 week after the last 24-hour recall. Meat subgroups (chicken, beef, pork, and processed pork products) were calculated from Food Guide Pyramid meat groups by using recipe ingredients. Subjects

The study sample included 4,802 children and 9,460 adults from the Continuing Survey of Food Intakes by Individuals and 5,649 adults from the Diet and Health Knowledge Survey. Statistics

Weighted percentages and means described the food intake and self-assessed dietary characteristics. Relationships among types of meat intake, dietary characteristics, and demographics were evaluated using a two-stage, multivariate regression model. Results

Individuals in higher income households consumed relatively more chicken; those in low-income households consumed more processed pork products. Those consuming no beef and smaller amounts of chicken had the lowest discretionary fat intakes. Beef and pork consumers were more likely to think that their diets were too high in fat, but less likely to believe it is important to eat a low-fat diet. Region of residence affected the probability of consuming most meats. Having a high level of education was associated with a lower likelihood of consuming beef and pork. Conclusions Sociodemographic factors are strong predictors of the probability of choosing particular types of meat and of the amounts eaten. Knowledge and attitudes about diet and meat products also influence choices.

J. Altarriba, L. Varona, C. Moreno, G. Yague, C. Sanudo, Consequences of selection for growth on carcass and meat quality in Pirenaica cattle, *Livestock Production Science*, Volume 95, Issues 1-2, 1 August 2005, Pages 103-114, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.12.008.

(<http://www.sciencedirect.com/science/article/B6T9B-4FC8V35-1/2/032a05103eb0d6e7e1a9365351d415f5>)

Abstract:

The male progeny of nine bulls used in artificial insemination were sampled to determine the effects of selection for weight at 210 days of age (W210) on carcass and meat quality in the Pirenaica cattle breed. For each of the 125 male offspring raised in experimental conditions, we measured 38 variables (y) defining carcass and meat quality. In turn, the breeding values of those animals for the W210 trait (u210) were calculated without their own record and without data of maternal siblings. Indirect responses were estimated from the slope of the covariate between the

selection index (u210) and the phenotype of those variables (b(y, u210)). We derived that the covariate depends on the genetic correlation and the genetic variances of the selection index and the trait. Consequently, this method provides an unbiased estimator of the correlated response, without requiring an estimate of the genetic correlation. We conclude that, in the Pirenaica breed, selection for W210 produces animals with higher live- and carcass weights at slaughter, wider carcasses, deeper and longer legs with a greater perimeter, and greater loin surface. Genetic changes were not detected in dressing percentage and physicochemical or sensorial parameters of meat quality.

Keywords: Correlated response; Growth; Carcass quality; Meat quality; Beef cattle

G. Collewet, P. Bogner, P. Allen, H. Busk, A. Dobrowolski, E. Olsen, A. Davenel, Determination of the lean meat percentage of pig carcasses using magnetic resonance imaging, *Meat Science*, Volume 70, Issue 4, August 2005, Pages 563-572, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.02.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4FSCVGF-1/2/b96ea3df85ace958cf5420993049bc19>)

Abstract:

The purpose of Workpackage 3 of the European Eupigclass project was to test indirect methods of measuring the lean meat percentage of a carcass that would be less costly, at least as accurate and more consistent than dissection. Magnetic resonance imaging was one of the three indirect methods tested to measure the lean meat weight and the lean meat percentage of pig carcasses, the other methods being X-ray CT and vision techniques. One hundred and twenty carcasses from three different genotypes and from both sexes were slaughtered. The left parts of the carcasses were fully dissected and the right parts were investigated with an indirect method using a 1.5T MRI system. The acquisition protocol was chosen to give an optimized contrast between fat and muscle tissues. Two different approaches, image segmentation and PLS regression, were used to extract information from the images. Automatic image segmentation was performed to quantify the volume of muscle in the images and gave a standard error of prediction using a linear regression with the dissection of the left half carcasses of 586 g and 1.10% for lean meat weight and lean meat percentage, respectively. PLS regression using the signal intensities histograms gave an estimation error of 465 g for lean meat weight. These results showed that MRI could be used in place of full dissection for authorizing and monitoring classification equipment of pig carcasses.

Keywords: Magnetic resonance imaging; Pig carcass grading; Image segmentation

H.J. Swatland, A method for simultaneous fluorometry and rheology of connective tissue in bulk meat, *Meat Science*, Volume 70, Issue 4, August 2005, Pages 605-611, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.02.010.

(<http://www.sciencedirect.com/science/article/B6T9G-4FSNXXW-2/2/05782f40bd702129a5cab540e7d3fb71>)

Abstract:

A probe tipped with optical fibres was mounted on the load cell of a compression tester and pushed into well-aged beef rib roasts (Canada Grade AAA, n = 6, 33 +/- 3.6 days post-mortem). Fluorescence (F; excitation 365 nm, emission >420 nm) and reflectance (R; 365 nm) were measured through single optical fibres. Diffuse R was measured using different fibres for illumination and detection, thus responding to tissue between the two fibres. Replication was by a matrix pattern of penetrations on single roasts. For example, in a typical roast, F was correlated with the force of penetration (mean r = 0.86 +/- 0.06, n = 20, all P < 0.001). R was less (P < 0.001) strongly correlated with penetration force (mean r = 0.46 +/- 0.10, n = 20, all P < 0.001). F signals from connective tissue contained less peaks than R signals from both connective and adipose tissue (respectively, 2.75 +/- 0.43 versus 5.57 +/- 0.67 peaks cm⁻¹, P < 0.001, n = 20 pairs) and F peaks were wider than R peaks (respectively, 3.54 +/- 0.88 versus 1.38 +/- 0.19 mm, P < 0.001, n

= 20 pairs). For the spinales dorsi aponeurosis, the depth at which peak force was reached was strongly correlated with the depths at which both peak F and peak R were reached ($r = 0.98$, $P < 0.001$, $n = 20$ for both). Diffuse R was only weakly correlated with penetration force (mean $r = 0.29 \pm 0.12$ with only 5/10 correlations significant $P < 0.001$). This new method showed the primary resistance to dorso-ventral penetrometry of well-aged beef rib roasts originated from connective tissue.

Keywords: Fluorescence; Connective tissue; Penetrometer rheology; Fibre-optics

J.A. Boles, J.G.P. Bowman, D.L. Boss, L.M.M. Surber, Meat color stability affected by barley variety fed in finishing diet to beef steers, *Meat Science*, Volume 70, Issue 4, August 2005, Pages 633-638, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.02.012.

(<http://www.sciencedirect.com/science/article/B6T9G-4FXWWYC-2/2/1d3f961d89fb6233bec953170a948263>)

Abstract:

Angus crossbred steers were assigned randomly to one of four finishing diets based on corn, Chinook, Logan, or H3 barley. Steers were harvested and after a 72-h chill, carcass quality and yield grade data were collected. Beef ribs were removed from 72 carcasses for further analysis. Ribs were aged in vacuum bag at 2 [degree sign]C for 14 days. After aging three adjacent steaks (3.18 cm) were removed to determine color stability, tenderness, proximate analysis and pH. Diets fed to steers had no effect on quality and yield grade or tenderness of beef steaks. Steaks from steers fed Logan barley variety were significantly less red at 10 days of storage (Hunter $a^* = 24.06$) than steaks from steers fed the other barley varieties (Chinook $a^* = 26.4$; H3 $a^* = 28.05$) or corn ($a^* = 26.14$). Identification of barley varieties that affect color stability could result in designing diets specifically for improved color and increase the use of barley as a finishing grain.

Keywords: Barley; Beef cattle; Color stability; Corn; Tenderness

Sara Lauzurica, Jesus de la Fuente, Maria Teresa Diaz, Inmaculada Alvarez, Concha Perez, Vicente Caneque, Effect of dietary supplementation of vitamin E on characteristics of lamb meat packed under modified atmosphere, *Meat Science*, Volume 70, Issue 4, August 2005, Pages 639-646, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.02.013.

(<http://www.sciencedirect.com/science/article/B6T9G-4FWSDTS-1/2/488102ffb7bacb817a95791b15487786>)

Abstract:

The effect of dietary vitamin E supplementation on modified-atmosphere packed lamb meat during storage was studied. Thirty-six weaned male Manchego breed lambs were fed diets supplemented with three different vitamin E concentrations (0, 250, 500 and 1000 mg/kg feed) for an average of 37 days, in the 13-26 kg live weight growth range. Slices of m. longissimus dorsi were packaged under modified atmosphere (70% O₂ and 30% CO₂), stored at 2 +/- 1 [degree sign]C in darkness for 14 and 28 days. Meat quality parameters after both storage periods were assessed. Dietary vitamin E supplementation significantly increased [alpha]-tocopherol concentration in muscle. Initially, lipid oxidation (TBARS), meat colour and bacterial load were similar in all groups. Lipid and colour oxidation of meat increased significantly ($P < 0.001$) throughout storage. The increase was greater in non-supplemented lambs than in supplemented ones. The bacterial counts after 28 days of storage reached the limit for microbiological shelf life (7 log₁₀cfu/cm²). Dietary vitamin E supplementation increased the shelf life of meat packaged under modified atmosphere to 14 days. TBARS, pigment oxidation and bacterial load were inside the acceptable limit. The meat maintained its quality for 28 days of storage only when lambs were fed with the 1000 mg/kg dietary supplement, though the bacterial load was at the limit of acceptability.

Keywords: Vitamin E; Modified atmosphere packing; Lamb meat; Lipid oxidation; Pigment oxidation

M.D. Guardia, J. Estany, S. Balasch, M.A. Oliver, M. Gisbert, A. Diestre, Risk assessment of DFD meat due to pre-slaughter conditions in pigs, *Meat Science*, Volume 70, Issue 4, August 2005, Pages 709-716, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.03.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4G24XNX-1/2/e133e8a42b23d7c17cdf7f517be7a7d1>)

Abstract:

A polychotomous logistic regression model was used to identify and assess the risk factors for pork becoming dark, firm and dry meat (DFD). A total of 116 deliveries, comprising 3075 commercial pigs delivered from different farms to five commercial Spanish pig abattoirs were surveyed. The DFD condition was described as an ordinal response variable (normal, moderate and serious) based on measurements of pH₂₄ in the Semimembranosus muscle. The abattoir, the floor of the lorry, the season, the gender, and the stocking density during transportation influenced the risk of DFD, as well as on-farm fasting time, lairage time and estimated carcass lean content. No effect of the RYR1 gene in the risk of DFD was found. Abattoirs should be especially careful with females slaughtered in winter, where the risk of serious DFD is 4.6% higher than with males slaughtered in summer. The risk of DFD increased with high stocking density and lairage time, and with on-farm fasting times longer than 22 h. Our results revealed that lowering the stocking density from 0.37 to 0.50 m² per 100 kg pig during transport would increase the risk of DFD pork by 11%.

Keywords: Meat quality; Pigs; Pre-slaughter treatment; DFD; Risk

S. Prache, A. Cornu, J.L. Berdague, A. Priolo, Traceability of animal feeding diet in the meat and milk of small ruminants, *Small Ruminant Research*, Volume 59, Issues 2-3, Methodology nutrition and products quality in grazing sheep and goats, August 2005, Pages 157-168, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.05.004.

(<http://www.sciencedirect.com/science/article/B6TC5-4GFCPXR-1/2/b583f3bd5e1710c5a00affbd2fa9efd5>)

Abstract:

Supplying the consumers with guarantees concerning the feed given to animals needs reliable methods for characterizing meat and milk. Bodies operating product certification systems also require control tools, to be able to guarantee objectively that specification commitments have been fully met. This paper reviews the current state of knowledge concerning the traceability of animal feeding diets in the meat and milk of small ruminants. It presents the potential tracers and different methods that have been studied, together with recent results. Plant biomarkers such as carotenoids, terpenes and phenolic compounds, animal metabolites such as 2,3-octanedione, skatole, fatty acids and ratios of oxygen, carbon and nitrogen stable isotope, are potential tracers in meat and milk or animal tissues, of animal feeding diets. Terpenes, phenolic compounds and ratios of stable isotope are also potential tracers of the geographical origin of milk and meat. Global approaches, especially near infrared spectroscopy and functional genomics are just emerging and need further experimental evaluation. These techniques already allowed to discriminate among products obtained in contrasting feeding conditions. Intermediate situations, for example, in case of modification of animal's diet, may be less easily recognized and may require the combination of tracing methods. In particular, the persistence of tracers when animals are stall-fed a concentrate-based diet after pasture, and its implications for traceability are discussed. Further directions for research are finally highlighted.

Keywords: Authentication; Meat; Milk; Sheep; Traceability

A. Priolo, M. Bella, M. Lanza, V. Galofaro, L. Biondi, D. Barbagallo, H. Ben Salem, P. Pennisi, Carcass and meat quality of lambs fed fresh sulla (*Hedysarum coronarium* L.) with or without polyethylene glycol or concentrate, *Small Ruminant Research*, Volume 59, Issues 2-3, Methodology nutrition and products quality in grazing sheep and goats, August 2005, Pages 281-288, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2005.05.012.

(<http://www.sciencedirect.com/science/article/B6TC5-4GFCPXR-6/2/b7ef4d4439858583562b143fb5f18353>)

Abstract:

Twenty-four male Comisana lambs aged 85 d were assigned to one of three treatments (control, sulla and PEG). The sulla group was offered fresh sulla as sole diet. The PEG lambs received fresh sulla but were also orally drenched once daily with 80 g of polyethylene glycol (PEG) with the aim to eliminate the effects of condensed tannins from sulla. The control group was fed commercial concentrate and oats hay. The animals were slaughtered at 148 d of age. Carcass and meat quality were studied. The carcass yield was lower ($P < 0.01$) in the animals given sulla without PEG, compared to those given concentrates and to those given sulla plus PEG. Carcass weight was however unaffected by diet treatment. Meat from sulla lambs was lighter in colour (higher L^* -value) compared to the other two groups ($P < 0.05$). This effect seems to be due to the presence of condensed tannins in sulla. Saturated fatty acids 10:0, 12:0, 14:0 and 16:0 were higher ($P < 0.05$) in the fat from animals of the control group compared to the other two groups. Linoleic acid (18:2 n-6) was at higher concentrations ($P < 0.0005$) in the fat from control animals compared to the other two groups. Linolenic acid (18:3 n-3) was increased by four-fold by grass diets as compared to concentrate diet ($P < 0.0005$). Addition of PEG to the sulla diet reduced ($P < 0.05$) this fatty acid concentration. Conjugated linoleic acid was present at double concentration ($P < 0.0005$) in the fat from animals fed fresh sulla (with or without PEG) compared to those given concentrates. Among the long chain n-3 fatty acids, eicosapentaenoic acid (22:5; EPA) was higher ($P = 0.001$) in the fat from sulla and PEG groups compared to the control group. The n-6:n-3 ratio was increased by three-fold ($P < 0.0005$) in animals given concentrate as compared to those receiving sulla.

Keywords: Conjugated linoleic acid; Fatty acids; Hedysarum coronarium; Meat; Sheep; Tannins

Cristina Castane, Rafael Zapata, Rearing the predatory bug *Macrolophus caliginosus* on a meat-based diet, *Biological Control*, Volume 34, Issue 1, July 2005, Pages 66-72, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.04.002.

(<http://www.sciencedirect.com/science/article/B6WBP-4G4MMPM-1/2/35148cede9592521c75b40b24fdb7b2c>)

Abstract:

A meat-based diet was tested for the rearing of the polyphagous predatory bug *Macrolophus caliginosus* (Heteroptera: Miridae). Several continuous generations were completed with this meat diet, without the availability of any plant material and using dental cotton rolls as an oviposition substrate. When meat-reared insects were compared with conventionally reared individuals (on tobacco plants and with moth eggs as prey) they were significantly smaller in size, lighter in weight, and displayed delayed development. When potato sprouts were tested as oviposition substrate, consistent improvement was observed in oviposition and other life history traits. Performance of adults from the seventh meat-diet generation was evaluated on three preys: the greenhouse whitefly, *Trialeurodes vaporariorum*; the sweet potato whitefly, *Bemisia tabaci*; and the two-spotted spider mite, *Tetranychus urticae*. Predation efficiency for meat-diet females and nymphs was similar to that of conventionally reared insects. The rearing method proposed in this work constitutes an alternative to the conventional method and represents an improvement in the production of this predator.

Keywords: *Macrolophus caliginosus*; Generalist predator; Artificial diet; Insect rearing; Mirid bugs; Potato sprouts; Oviposition substrate; Greenhouse whitefly; *Trialeurodes vaporariorum*; Sweet potato whitefly; *Bemisia tabaci*; Red spider mite; *Tetranychus urticae*

Chang-Suk Kong, Effects of lubrication and sample dimensions on compression property of fish-meat gels, *Food Research International*, Volume 38, Issue 6, July 2005, Pages 673-679, ISSN 0963-9969, DOI: 10.1016/j.foodres.2005.01.005.

(<http://www.sciencedirect.com/science/article/B6T6V-4FM01C5-1/2/8fdc1a83942dfeaa832124091e2f4e27>)

Abstract:

Effects of lubrication and sample dimension on compression property of fish-meat gel were investigated using the modified Mooney-Rivlin equation. Cylindrical fish-meat gels were cut into 26 mm in diameter and 10, 20 and 30 mm in heights, respectively. Lubrication of samples led to the lower stress-strain curve. Stress at fracture was dependent on sample dimension in non-lubricated test. In lubricated compression, the dependant was reduced and the agreement of stress-strain data for all samples was observed at the low strain region. The similar results were observed in comparing compression properties of non-lubricated and lubricated fish-meat gels according to the modified Mooney-Rivlin equation. In order to reduce friction problems in compression test of fish-meat gels, the experiment setting can be suggested as follows: for the samples with small dimensions, the surface of gel sample has to be lubricated, or gel samples have to be made with large dimensions.

Keywords: Fish-meat gel; Compression test; Lubrication; Sample dimension; Mooney-Rivlin equation

M.L. Escudero-Gilete, M.L. Gonzalez-Miret, F.J. Heredia, Multivariate study of the decontamination process as function of time, pressure and quantity of water used in washing stage after evisceration in poultry meat production, *Journal of Food Engineering*, Volume 69, Issue 2, July 2005, Pages 245-251, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.08.015.

(<http://www.sciencedirect.com/science/article/B6T8J-4DGDB28-1/2/6adf0baa7feb5255cc88c10ab9c48d39>)

Abstract:

In poultry production, the washing stage takes place after the gutting stage. In the washing stage the carcasses are cleaned with pressurised water in order to remove any remains of blood, dirt and feathers on the skin, to reduce the superficial contamination, and to avoid subsequent drying in the freezers. This step is an important phase in the productive line because of its usefulness and its cost, since water is an expensive product and, sometimes, in short supply.

Total Count, *Pseudomonas*, *Enterobacteriaceae* and *Staphylococcus* are microbial groups frequently analysed on carcasses in slaughterhouses. Their usefulness as index of microbiological quality can be assessed by means of univariate and multivariate statistical methods.

In this study the influence of the washing stage on the superficial contamination of the chicken carcasses is shown with regard to the following factors: the water pressure, the amount of water and the length of the washing stage.

It makes clear that multivariate statistics appears as a valuable tool for designing and implementing quality control systems, demonstrating that the contamination decreases significantly due to the effect of the washing stage and the water pressure. Time and amount of water variations do not affect the microbiological variables except for the *Pseudomonas*, which are affected by the amount of water and time variation but not by pressure variation.

Keywords: Poultry meat; Statistical process control; Quality control; Washing

Eero Puolanne, Marita Ruusunen, 50th International Congress of Meat Science and Technology (50th ICoMST) Helsinki, Finland, 8-13 August 2004, *Meat Science*, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Page 405, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.004.

(<http://www.sciencedirect.com/science/article/B6T9G-4FM5D5M-1/2/f5d358c47e56e8e0c887164272aeea41>)

E. Puolanne, Greetings of the First European Meeting of Meat Research Workers, *Meat Science*, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13

August 2004, Helsinki, Finland, July 2005, Pages 407-408, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.005.

(<http://www.sciencedirect.com/science/article/B6T9G-4FJXNH4-2/2/793a3fdf3bec92377a362da1b0f5c934>)

G.S. Plastow, D. Carrion, M. Gil, J.A. Garci'a-Regueiro, M. Font i Furnols, M. Gispert, M.A. Oliver, A. Velarde, M.D. Guardia, M. Hortos, M.A. Rius, C. Sarraga, I. Di'az, A. Valero, A. Sosnicki, R. Klont, S. Dornan, J.M. Wilkinson, G. Evans, C. Sargent, G. Davey, D. Connolly, B. Houeix, C.M. Maltin, H.E. Hayes, V. Anandavijayan, A. Foury, N. Geverink, M. Cairns, R.E. Tilley, P. Mormede, S.C. Blott, Quality pork genes and meat production, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 409-421, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.06.025.

(<http://www.sciencedirect.com/science/article/B6T9G-4FNP2NN-1/2/503393d8e653ae29586777f77e059f5d>)

Abstract:

Functional genomics, including analysis of the transcriptome and proteome, provides new opportunities for understanding the molecular processes in muscle and how these influence its conversion to meat. The Quality Pork Genes project was established to identify genes associated with variation in different aspects of raw material (muscle) quality and to then develop genetic tools that could be utilized to improve this quality. DNA polymorphisms identified in the porcine PRKAG3 and CAST genes illustrate the impact that such tools can have in improving meat quality. The resources developed in Quality Pork Genes provide the basis for identifying more of these tools.

Keywords: Pig; Pork; Meat quality; Muscle genes; Functional genomics

A.R. Poso, E. Puolanne, Carbohydrate metabolism in meat animals, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 423-434, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.12.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4FKYF15-2/2/3a86c0fa2debb2fc900643249efcd76b>)

Abstract:

Oxidative energy production is by far dominant in living animal muscles, with the exception the short periods of severe stress, where the aerobic capacity is exceeded, and formation of large amounts of lactate and protons will take place. Energy consumption in muscle cells continues post-mortem with formation of large amounts of lactate and protons, because the aerobic processes for energy production are not available. Post-mortem, the fall in pH is delayed only by buffering capacity of the muscle fibres. In living animals, in addition to buffering capacity, both respiration and transport of lactate and protons out of the muscle fibres by monocarboxylate transporters participate in the regulation of muscle fibre pH which never falls as low as the ultimate pH of the meat. Understanding the regulation of pH in muscle is important both for the welfare of living animals and from the technological point of view as a factor influencing meat quality.

Keywords: Glycogenolysis; Glycolysis; Monocarboxylate transporters; Oxidative capacity

Peter P. Purslow, Intramuscular connective tissue and its role in meat quality, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 435-447, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.06.028.

(<http://www.sciencedirect.com/science/article/B6T9G-4FNDS4W-1/2/a6a442f3621f75774350b02eb61f9baa>)

Abstract:

The amount, spatial distribution and composition of the connective tissue within muscle vary with muscle position in the carcass and with animal age. This has long been recognised to influence the tenderness of cooked meat. This paper builds upon some historical perspectives with a review of some recent clarifications of the biological function of intramuscular connective tissue (IMCT) and of its contribution to meat texture, which is clearly multifactorial. The perimysial component of IMCT varies most in amount between muscles and is also the IMCT structure most involved in defining the mechanical integrity of cooked meat. The distribution of perimysium defines muscle fascicle size (muscle 'grain' size), which is also still regarded as an indicator of tenderness. Postmortem conditioning of meat has consistently been shown to reduce the strength of intramuscular connective tissue in the raw state, but with equal consistency, this has been shown not to affect the toughness of cooked meat. Cooking increases IMCT strength in the range 20-50 [degree sign]C and decreases its contribution at higher temperatures and longer cooking times. Crosslinking of collagen in older animals is generally considered to result in tougher meat, although definitive links between mature crosslink content and cooked meat toughness have been difficult to prove. In the last quarter-century, IMCT has been increasingly viewed as a 'background' contributor to meat texture, which is difficult to change. However, the large variation in perimysial content of muscles in one animal represents an incredible range of expression. This appears to be firmly fixed to the functional properties of different muscles. In particular, it is hypothesised that definition of muscle fascicle size and shape by the bounding perimysium is related to the need for sub-sections of the whole muscle to slip past each other in the normal contractile function of the tissue. Despite this, the amounts and composition of IMCT can be manipulated by animal nutrition and exercise, and factors affecting the turnover of IMCT may especially be a future target for manipulation of meat texture.

Keywords: Collagen; Meat toughness; Cooking; Turnover; Connective tissue; Crosslinks

Michael W. Peck, Sandra C. Stringer, The safety of pasteurised in-pack chilled meat products with respect to the foodborne botulism hazard, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 461-475, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4FNP2NN-2/2/fbf57ab85a29bfdc870aa1085144e8f4>)

Abstract:

There has been a substantial increase in sales of pasteurised in-pack chilled products over the last decade. It is anticipated that this trend will continue. These foods address consumer demand in being of high quality and requiring little preparation time. The microbiological safety of these foods commonly depends on a combination of a minimal heat treatment, refrigerated storage and a restricted shelf-life. The principal microbiological safety hazard for pasteurised in-pack meat products is foodborne botulism, as presented by non-proteolytic *Clostridium botulinum*. This review provides a summary of research that has contributed to the safe development of these foods without incidence of botulism.

Keywords: *Clostridium botulinum*; Botulism; Pasteurised; Sous-vide; Meat; Chilled

Johanna Bjorkroth, Microbiological ecology of marinated meat products, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 477-480, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.018.

(<http://www.sciencedirect.com/science/article/B6T9G-4FSFXK9-1/2/1d914e03d75d1a22c3eb2f3862ccc792>)

Abstract:

Marinated meat products are consumed increasingly. In addition to taste, marinating has been considered to increase product safety and shelf life. In Finland, marinades are complex, spiced

sauces. They are acidic water-oil emulsions typically containing salt, sugar, sorbate and/or benzoate. Marinated products are usually packaged under modified atmospheres. This results in the growth of psychrotrophic, anaerobic bacteria like lactic acid bacteria (LAB). Marinating did not increase the shelf life of Finnish poultry products and it strongly selected novel spoilage LAB. Surprisingly, it neither had inhibitory effect on *Campylobacter*. The buffering capability of meat neutralizes the acidic marinade and results in dissociation of the lipophilic acids making their antimicrobial effect nonexistent.

Keywords: Marinated broiler meat; Safety; Quality; Modified atmosphere packaging

E. Tornberg, Effects of heat on meat proteins - Implications on structure and quality of meat products, *Meat Science*, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 493-508, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.11.021.

(<http://www.sciencedirect.com/science/article/B6T9G-4FN76XM-1/2/c5801d8a9dc5a039e6343f3d1c922b1d>)

Abstract:

Globular and fibrous proteins are compared with regard to structural behaviour on heating, where the former expands and the latter contracts. The meat protein composition and structure is briefly described. The behaviour of the different meat proteins on heating is discussed. Most of the sarcoplasmic proteins aggregate between 40 and 60 [degree sign]C, but for some of them the coagulation can extend up to 90 [degree sign]C. For myofibrillar proteins in solution unfolding starts at 30-32 [degree sign]C, followed by protein-protein association at 36-40 [degree sign]C and subsequent gelation at 45-50 [degree sign]C (conc. > 0.5% by weight). At temperatures between 53 and 63 [degree sign]C the collagen denaturation occurs, followed by collagen fibre shrinkage. If the collagen fibres are not stabilised by heat-resistant intermolecular bonds, it dissolves and forms gelatine on further heating. The structural changes on cooking in whole meat and comminuted meat products, and the alterations in water-holding and texture of the meat product that it leads to, are then discussed.

Keywords: Meat proteins; Whole meat; Meat products; Cooking; Water-holding; Texture

H.-K. Biesalski, Meat as a component of a healthy diet - are there any risks or benefits if meat is avoided in the diet?, *Meat Science*, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 509-524, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.017.

(<http://www.sciencedirect.com/science/article/B6T9G-4FTS350-1/2/9f4f75a1d4fd217303df6e508a6265c8>)

Abstract:

Meat is frequently associated with a 'negative' health image due to its 'high' fat content and in the case of red meat is seen as a cancer-promoting food. Therefore, a low meat intake, especially red meat is recommended to avoid the risk of cancer, obesity and metabolic syndrome. However, this discussion overlooks the fact, that meat is an important source for some of micronutrients such as iron, selenium, vitamins A, B12 and folic acid. These micronutrients are either not present in plant derived food or have poor bioavailability. In addition, meat as a protein rich and carbohydrate 'low' product contributes to a low glycemic index which is assumed to be 'beneficial' with respect to overweight, the development of diabetes and cancer (insulin resistance hypothesis). Taken together meat is an important nutrient for human health and development. As an essential part of a mixed diet, meat ensures adequate delivery of essential micronutrients and amino acids and is involved in regulatory processes of energy metabolism.

Keywords: Meat; Processed meats; Nutrition; Fat; Proteins; Micronutrients; Cancer; Protecting factors

L.M. Valsta, H. Tapanainen, S. Mannisto, Meat fats in nutrition, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 525-530, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.12.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4FNDS4W-2/2/fc4bc80b21376688dbe7ed3e7f921170>)

Abstract:

This article reviews the fat content and fatty acid composition of meats in the human diet and discusses nutritional facts related to meat, meat products and other meat-containing foods as sources of dietary fats. Meat is an increasingly important source of high-value animal protein worldwide. Meat fat comprises mostly monounsaturated and saturated fatty acids, with oleic (C18:1), palmitic (C16:0), and stearic acid (C18:0) being the most ubiquitous. Meat and meat products are considerable sources of cholesterol in the diet. In most industrialized countries, a high meat intake contributes to a higher than recommended total and saturated fat and cholesterol intake. Another concern is that meat may replace sources of other important nutrients in the diet. Therefore, the advice to consumers is to prefer lean meats and low-fat meat products and use meat in moderation only.

Keywords: Meat; Meat products; Fatty acid consumption patterns; Food sources of fatty acids; Cholesterol; Dietary intake

Marita Ruusunen, Eero Puolanne, Reducing sodium intake from meat products, Meat Science, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology,(ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 531-541, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4FM5D5M-2/2/973d4040c365f2d24f3284fe416e6d85>)

Abstract:

Sodium intake exceeds the nutritional recommendations in many industrialized countries. Excessive intake of sodium has been linked to hypertension and consequently to increased risk of stroke and premature death from cardiovascular diseases. The main source of sodium in the diet is sodium chloride. It has been established that the consumption of more than 6 g NaCl/day/person is associated with an age-increase in blood pressure. Therefore, it has been recommended that the total amount of dietary salt should be maintained at about 5-6 g/day. Genetically salt susceptible individuals and hypertensives would particularly benefit from low-sodium diets, the salt content of which should range between 1 and 3 g/day. In industrialized countries, meat products and meat meals at home and in catering comprise one of the major sources of sodium, in the form of sodium chloride.

Sodium chloride affects the flavour, texture and shelf life of meat products. The salt intake derived from meat dishes can be lowered by, whenever possible, adding the salt, not during preparation, but at the table. In most cases, salt contents of over 2% can be markedly lowered without substantial sensory deterioration or technological problems causing economical losses. Salt contents down to 1.4% NaCl in cooked sausages and 1.75% in lean meat products are enough to produce a heat stable gel with acceptable perceived saltiness as well as firmness, water-binding and fat retention. A particular problem with low-salt meat products is, however, that not only the perceived saltiness, but also the intensity of the characteristic flavour decreases. Increased meat protein content (i.e. lean meat content) in meat products reduces perceived saltiness. The required salt content for acceptable gel strength depends on the formulation of the product. When phosphates are added or the fat content is high, lower salt additions provide a more stable gel than in non-phosphate and in low-fat products. Small differences in salt content at the 2% level do not have marked effects on shelf life of the products. By using salt mixtures, usually NaCl/KCl, the intake of sodium (NaCl) can be further reduced.

Keywords: Sodium; Meat products and meals; Salt; Sodium reduction; Sensory and technological aspects

Henrik J. Andersen, Niels Oksbjerg, Jette F. Young, Margrethe Therkildsen, Feeding and meat quality - a future approach, *Meat Science*, Volume 70, Issue 3, 50th International Congress of Meat Science and Technology, (ICoMST), 8-13 August 2004, Helsinki, Finland, July 2005, Pages 543-554, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.07.015.

(<http://www.sciencedirect.com/science/article/B6T9G-4FKYF15-1/2/ba4ab9e3471f46ba01d15399139ee1a1>)

Abstract:

The continuous demand for high standards of quality assurance in the meat production of today and tomorrow calls for development of new tools capable of meeting such demands. The present paper aims to re-think the traditional way of using feeding as a quality control tool in the production of meat and to introduce the potential of a nutrigenomic approach as a first step in the development of pro-active quality control systems which fulfil future demands from industry and consumers. A few chosen examples present how specific feeding strategies can manipulate (i) muscle protein turnover and thereby meat tenderness as well as the cost and sustainability of the production and (ii) muscle energy levels at slaughter and thereby the pH decline, water-holding capacity and the sensory characteristics of meats. The examples are discussed in relation to exploiting essential and basic understanding of physiological and physical processes, which can subsequently be included in a systems biology line of thought of importance for development of unique decision support systems in future meat production.

Keywords: Pigs, Cattle, Pork, Beef; Post-genomic area; Nutrigenomics; Quality control; Systems biology; Decision support systems

M.A. Stevenson, R.S. Morris, A.B. Lawson, J.W. Wilesmith, J.B.M. Ryan, R. Jackson, Area-level risks for BSE in British cattle before and after the July 1988 meat and bone meal feed ban, *Preventive Veterinary Medicine*, Volume 69, Issues 1-2, 10 June 2005, Pages 129-144, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.01.016.

(<http://www.sciencedirect.com/science/article/B6TBK-4FJ8C1K-1/2/aff9ceee118c91a62e1c90dc6d593e20>)

Abstract:

In this paper we investigate area-level risk factors for BSE for the cattle population present in Great Britain between 1986 and 1997. By dividing this population into two birth cohorts, those born before the July 1988 ban on feeding ruminant-derived meat and bone meal to ruminants and those born after, second-order regional influences are distinguished from the strong first-order south-to-north gradient of area-level BSE risk using Bayesian hierarchical models that account for structured (spatially correlated) and unstructured heterogeneity in the data. For both cohorts area-level risk of BSE was increased by a more southerly location and greater numbers of dairy cattle, relative to non-dairy cattle. For the cohort of cattle born after the July 1988 ban on feeding ruminant-derived meat and bone meal area-level BSE risk was additionally associated with greater numbers of pigs, relative to cattle. These findings support the role of low level cross-contamination of cattle feed by pig feed as an influence on BSE incidence risk as the epidemic evolved. Prior to the 1988 meat and bone meal ban unexplained BSE risk was relatively uniformly distributed across the country whereas after the ban there were spatially aggregated areas of unexplained risk in the northern and eastern regions of England suggesting that local influences allowed BSE control measures to be less-successfully applied in these areas, compared with the rest of the country. We conclude that spatially localised influences were operating in divergent ways during the two phases of the epidemic.

Keywords: Bovine spongiform encephalopathy; Epidemiology; Spatial epidemiology

A. Di Pinto, V. T. Forte, M. C. Conversano, G. M. Tantillo, Duplex polymerase chain reaction for detection of pork meat in horse meat fresh sausages from Italian retail sources, *Food Control*, Volume 16, Issue 5, June 2005, Pages 391-394, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2004.04.004.

(<http://www.sciencedirect.com/science/article/B6T6S-4CK7V9F-1/2/4bf3df6d5b8e1d9b1c562e983ffa2e79>)

Abstract:

Species identification in meat products represents an important subject in the field of modern food control according to the European Union, which has implemented a set of very strict procedures to label food. Thus, specific, sensitive and easy analytical methods for the species detection of food are necessary in order to verify the compliance with labelling requirements. A PCR-based assay for the detection of pork meat in horse fresh sausages was optimised and it was used to evaluate the presence of fraudulently added pork meat. The developed assay showed the presence of pork meat in 6/30 and the total absence of horse meat in 1/30 of the analyzed horse sausage samples.

Keywords: D-PCR; Species identification; Horse; Pork; Sausages

Jean-Marie Codron, Eric Giraud-Heraud, Louis-Georges Soler, Minimum quality standards, premium private labels, and European meat and fresh produce retailing, *Food Policy*, Volume 30, Issue 3, Private Agri-food Standards: Implications for Food Policy and Agri-food Systems, June 2005, Pages 270-283, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2005.05.004.

(<http://www.sciencedirect.com/science/article/B6VCB-4GP1VS2-1/2/8eeae93dbbe74f8e1e37590632364987>)

Abstract:

This article treats the interaction between decisions of public policy makers and private enterprises in the definition and implementation of standards, in particular with respect to food safety. Based on the observation that European retail chains are becoming increasingly engaged in specifying the conditions of agrifood production, we describe the nature and determinants of the strategies adopted by retailers following the mad cow crisis. We compare these strategies in the beef and the produce (fruit and vegetables) sectors. Due to the different conditions facing both governments and private actors in the two sectors, this comparison permits us to characterize the variables that condition the strategies of the retailers, collectively and individually. The paper then analyses how the levels and the monitoring systems of the standards formulated and enforced by governments, influence the strategies of retail chains. That analysis leads to conclusions regarding what variables governments should take into account when they define minimum quality standards.

Keywords: Food quality; Standards; Labelling

Sheryl A. Barringer, Jareer Abu-Ali, Hai-Jung Chung, Electrostatic powder coating of sodium erythorbate and GDL to improve color and decrease microbial counts on meat, *Innovative Food Science & Emerging Technologies*, Volume 6, Issue 2, June 2005, Pages 189-193, ISSN 1466-8564, DOI: 10.1016/j.ifset.2005.01.003.

(<http://www.sciencedirect.com/science/article/B6W6D-4FPJB24-2/2/edb9f9bc5420d14b3aadbb12b6ab3641>)

Abstract:

Powdered sodium erythorbate (SE) and a 3:1 mixture of glucono-delta-lactone and sodium erythorbate (GDL:SE) were coated electrostatically onto the surface of meats to extend the shelf life. The total number of microorganisms after refrigerated storage was reduced an average of 2 logs, with little difference by type of powder. Coliforms, mesophiles and psychrotrophs showed equivalent reductions. The color, as measured by the a value, was better for the treated samples than the control. GDL:SE samples were redder than SE. Electrostatic coating produced better results than nonelectrostatic coating due to the increased transfer efficiency of the process.

Electrostatic coating also reduced the dust that is produced when powder is coated nonelectrostatically. Industrial relevance

Sodium erythorbate and glucano-delta-lacton have been shown to extend the shelf life of meat products. This paper offers an interesting processing variable via electrostatic surface application of the powder. Electrostatic coating proved effective likely due to increased transfer efficiency and evenness of the process.

Keywords: Electrostatic; Sodium erythorbate; GDL; Meat

Osman Hassan, Lam Swet Fan, The anti-oxidation potential of polyphenol extract from cocoa leaves on mechanically deboned chicken meat (MDCM), *LWT - Food Science and Technology*, Volume 38, Issue 4, June 2005, Pages 315-321, ISSN 0023-6438, DOI: 10.1016/j.lwt.2004.06.013.

(<http://www.sciencedirect.com/science/article/B6WMV-4D5P45S-1/2/6f8b8863f8688fc0e838a3d0afc72309>)

Abstract:

Polyphenols were extracted from young cocoa leaves (CL) and analysed for their total phenols (Folin-Ciocalteu method), catechin composition (HPLC method) and reducing power (Fe³⁺ reduction). The extracts (at different concentrations) were tested for their anti-oxidation potential in a model meat system, based on mechanically deboned chicken meat (MDCM). The anti-oxidation characteristics were compared against a 1:1 butylated hydroxyl anisole (BHA)/butylated hydroxyl toluene (BHT) mixture (200 mg/kg) and green tea extract (GT) (200 mg/kg). The MDCMs containing the various antioxidants were cooked, stored at 4 [degree sign]C and samples were analysed for their peroxide value, thiobarbituric acid reactive substance and hexanal generation. Although, the best antioxidation characteristics was shown by the BHA/BHT mix, the performance was closely matched by the natural polyphenols from GT and 800 mg/kg CL. At lower concentrations of 200 and 400 mg/kg, the antioxidation potential of CL extracts were about 50-80% of the BHA/BHT.

Keywords: Polyphenol; Cocoa leaves; Antioxidation; Mechanically deboned chicken meat (MDCM)

T. Adnoy, A. Haug, O. Sorheim, M.S. Thomassen, Z. Varszegi, L.O. Eik, Grazing on mountain pastures-does it affect meat quality in lambs?, *Livestock Production Science*, Volume 94, Issues 1-2, Product quality and livestock systems, June 2005, Pages 25-31, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.026.

(<http://www.sciencedirect.com/science/article/B6T9B-4F3FF10-3/2/c6da26d9f570f28776938f81d02d12d9>)

Abstract:

Meat from lambs raised on mountain pastures without any supplementary feeding or treatment is often considered to be of superior quality. Hence, the objective of this study was to compare the quality of meat from lambs grazing on unimproved mountain range (1000 m above sea level) with meat from lambs grazing on cultivated lowland pastures.

The experiment was undertaken in Hardanger on the Western Coast of Norway with 150 Norwegian Crossbred Sheep (Norsk Kvitsau) randomly allocated to 'Lowland' and 'Mountain' groups. Twenty lambs from each group were selected for final evaluation. Slaughtering and grading were performed at a commercial slaughterhouse. Thereafter, loin samples of *M. longissimus dorsi* were analyzed for sensory traits and other meat quality. For further comparisons, loin samples were also taken from lambs slaughtered at two other locations in Norway. Significant differences between the groups were found in grading, fat content and fatty acid composition, meat colour, and meat flavour. Differences in sensory traits were in general small and most likely not noticed by the consumer. Still the results suggest that meat from lambs raised in extensive systems on mountain range has certain qualities that might be used in promotion of local and regional products.

Keywords: Sheep; Grazing; Meat quality; Carcass characteristics

Claudia Terlouw, Stress reactions at slaughter and meat quality in pigs: genetic background and prior experience: A brief review of recent findings, *Livestock Production Science*, Volume 94, Issues 1-2, Product quality and livestock systems, June 2005, Pages 125-135, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.032.

(<http://www.sciencedirect.com/science/article/B6T9B-4F83PJG-1/2/b3ec2526d5678cbc0b169d3f2f582b0b>)

Abstract:

Stress reactions to the slaughter procedure influence ante- and post-mortem muscle metabolism and, consequently, the rate and extent of glycogen breakdown and pH decline, colour and drip loss. Effects are principally due to variations in ATPase activity and muscle glycogen reserves. Behavioural, physiological and metabolic responses to aversive situations depend on genetic background and prior experience of the animals. For example, reactivity to humans depends on breed; compared to Large White pigs, Durocs approach humans more. The effect of slaughter conditions on peri-mortem muscle metabolism depends also on breed; muscles of Durocs were relatively insensitive to slaughter conditions. Prior experience, such as repeated handling, modifies reactivity to familiar and unfamiliar humans. Repeated positive handling during rearing did not modify meat quality of Large Whites. Mild negative handling during rearing changed pre-slaughter muscle metabolism only if the negative handler was present at slaughter. Literature indicates that severe negative handling during rearing may influence peri-mortem muscle metabolism in the absence of the negative handler. Reactivity to humans measured in pigs with no handling experience, weeks or months before slaughter, may predict pre- or post-slaughter muscle metabolism. Thus, physical and visual contacts with the human, established by the pig, were negatively correlated with post-bleeding muscle temperature and ultimate pH. Fighting during mixing was positively correlated with ultimate pH and colour. Up to 42% of variability in ultimate pH in pigs of similar genetic and rearing background could be explained by fighting during mixing and reactivity to humans. Fighting during mixing could be predicted by fighting during a food competition test and levels of exploration of an unfamiliar object. Overall, results show that the technological meat quality indicators studied were little influenced by positive or mildly negative handling experience during rearing. In contrast, genetic background, slaughter conditions and behavioural characteristics of the pig, established early in life, explained a large part of variability in a number of technological meat quality parameters.

Keywords: Pigs; Meat quality; pH; Colour; Stress reactivity; Slaughter conditions; Breed

Karin Nuernberg, D. Dannenberger, G. Nuernberg, K. Ender, J. Voigt, N.D. Scollan, J.D. Wood, G.R. Nute, R.I. Richardson, Effect of a grass-based and a concentrate feeding system on meat quality characteristics and fatty acid composition of longissimus muscle in different cattle breeds, *Livestock Production Science*, Volume 94, Issues 1-2, Product quality and livestock systems, June 2005, Pages 137-147, ISSN 0301-6226, DOI: 10.1016/j.livprodsci.2004.11.036.

(<http://www.sciencedirect.com/science/article/B6T9B-4F4NYH0-2/2/d4ab5e8f6f910c8d3c9de597fa995752>)

Abstract:

The objective of this study was to examine the effects of feeding system and breed on the content of the beneficial n-3 polyunsaturated fatty acids and conjugated linoleic acids (CLA) in beef muscle. German Simmental (GS) (n=31) and German Holstein (GH) (n=33) bulls were produced on either an indoor concentrate system or a grass-based system consisting of a period of summer pasture feeding followed by a winter indoor period on grass silage and a concentrate containing linseed. All animals were slaughtered at 620 kg. The grass-based system increased ($P<0.05$) the percentage of n-3 fatty acids in the longissimus muscle lipids of bulls (GS 2.22 vs. 0.46%, GH 1.61 vs. 0.34%). The n-6 fatty acid proportions were not affected by the feeding system in GS and GH

loin muscle. Therefore, the n-6/n-3 ratio of grass-based GS bulls was 2.0 and of GH was 1.9 in contrast to 8.3 and 6.5 for bulls fed concentrates indoors. The grass-based system increased the percentage of C18:1trans fatty acid isomers in both breeds. The percentage of CLA cis-9,trans-11 (0.87% vs. 0.72% in GS, 0.84% vs. 0.75% in GH) in muscle was significantly higher in animals on the grass-based system.

Keywords: Beef; n-3 fatty acids; Sensory traits; CLA; Shelf life

D.A. King, R.C. Anderson, R.K. Miller, M.A. Carr, G.E. Carstens, J.W. Savell, Y.S. Jung, T.R. Callaway, T.S. Edrington, K.J. Genovese, D.J. Nisbet, Effects of pre-harvest supplemental chlorate on beef carcass and meat quality, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 215-221, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.12.019.

(<http://www.sciencedirect.com/science/article/B6T9G-4FXNRP6-1/2/90d1cf4dd178ff038aa524c96ea35c6a>)

Abstract:

Effects of feeding sodium chlorate on carcass quality, tenderness and color stability were evaluated. Heifers (n = 64) were fed chlorate at either 0.01% or 0.05% of body weight (BW) in the last feeding or 0.01% for the last 5 d before harvest, while control cattle received no chlorate. During the 12 h period between feed withdrawal and transport to the harvest facility, the cattle were provided water containing either no sodium chlorate or sodium chlorate (approximately 30 mM). Feed treatments at 0.01% of BW produced higher marbling scores than feeding 0.01% of BW for 5 d. However, neither of these treatments produced marbling scores that were different from non-treated controls. Water supplementation increased tenderness in cattle fed 0.01% of BW for 5 d, but decreased tenderness in cattle fed 0.05% of BW at the last feeding. Although tenderness differences existed, it is not clear whether or not they were caused by the feed or water treatments or by pre-existing variation in the cattle. Neither feed nor water supplementation affected color stability. These data suggest that chlorate preparations could be used to reduce pathogens without adversely impacting meat quality or display life. However, further research is needed to further substantiate these findings.

Keywords: Beef; Carcass quality; Color; Sodium chlorate; Tenderness

Benedicte Le Bret, Anne-Sophie Guillard, Outdoor rearing of cull sows: Effects on carcass, tissue composition and meat quality, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 247-257, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.007.

(<http://www.sciencedirect.com/science/article/B6T9G-4FS23J2-1/2/f171c939ae45f32463d03da69d4178ed>)

Abstract:

The objective of this study was to provide some information on the influence of outdoor rearing on pasture (O) compared with indoor (I) on carcass and meat quality of cull sows. Twelve sows (6 per group) originating from the same breeding unit were slaughtered 11 days after their last weaning. O sows had heavier and fatter carcasses, however lipid content in Longissimus (L) and Triceps brachii (TB) muscles was not affected. Grazing of O sows led to a high increase in the n - 3 fatty acid content, particularly the C18:3 linolenic acid in the backfat and L muscle, thus improving the meat nutritional quality. Vitamin E content appeared (P = 0.13) to be increased in the backfat of O sows, but not in the muscles. Lipid oxidation in meat during storage was similar between groups. Histological and metabolic observations showed that outdoor rearing increased the glycolytic capacity of the L muscle, and the oxidative capacity of the TB. Outdoor rearing did not influence meat pH₁ and pH_u, but decreased colour (a* and b* values) of the TB, and increased the processing yield of loin into cured bacon. Outdoor rearing decreased the red colour intensity and homogeneity, but improved tenderness of cured loins.

Keywords: Rearing environment; Cull sow; Fatty acids; Muscle fibers; Pork quality

A. Dalle Zotte, H. Remignon, J. Ouhayoun, Effect of feed rationing during post-weaning growth on meat quality, muscle energy metabolism and fibre properties of Biceps femoris muscle in the rabbit, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 301-306, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.016.

(<http://www.sciencedirect.com/science/article/B6T9G-4FNW4XR-1/2/22514478d107d6e2d91db028a8fa46d3>)

Abstract:

During the weaning period (5 weeks of age), 50 hybrid rabbits were divided at random into five groups (or blocks). Animals from the block 1 were immediately slaughtered at this age and used as initial reference. The remaining rabbits were placed in individual cages and fed the same amount of food until slaughter, but differently rationed. From 5 to 8 weeks of age, the rabbits coming from blocks 2 and 4, and from blocks 3 and 5 received 70% and 90% of the ad libitum ration, respectively. Animals of blocks 2 and 3 were slaughtered at 8 weeks of age. Between 8 and 11 weeks of age, animals from blocks 4 and 5 were fed, respectively, 90% and 70% of the ad libitum ration, prior to sacrifice. At slaughter the Biceps femoris (BF) muscles were immediately removed from each rabbit and the ultimate pH (pHu) and meat colour L*a*b* parameters were measured. Thereafter, one BF was used for aldolase and isocitrate dehydrogenase (ICDH) activity determinations, while the other BF muscle was used for fibre distribution (% of [beta]R, [alpha]R and [alpha]W) and morphometric trait measurements. As expected, at 8 weeks of age, rabbits given for 3 weeks the strictest feed rationing (70% of the ad libitum ration) were lighter than rabbits fed the lowest feed rationing (90% of the ad libitum ration). At 11 weeks of age, rabbits given the 70% ration initially and then switched to 90% ration showed significantly higher body weights than rabbits fed the alternative diet (90% ration initially and then switched to 70% ration), and the best feed conversion ratio. Fibre type distribution, fibre cross-sectional area and compactness, colour and metabolic characteristics varied according to slaughter age. The effects of feeding treatment were low.

Keywords: Rabbit; Feed rationing; Post-weaning growth; Muscle; Fibre type

June Frisby, Declan Raftery, Joe P. Kerry, Dermot Diamond, Development of an autonomous, wireless pH and temperature sensing system for monitoring pig meat quality, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 329-336, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.023.

(<http://www.sciencedirect.com/science/article/B6T9G-4FS23J2-2/2/94fd37411a3fac7c7426c7d05206aaf4>)

Abstract:

This paper focuses on the development of a unique wireless pH and temperature monitoring system to assess pig meat quality. Pale, soft and exudative (PSE) pig meat continues to be a major problem in the pig meat industry today. The PSE condition in pork is related to a number of factors including genetics, pre-slaughter stress and insufficient chilling of pig carcasses, which cause a rapid rate of glycolysis post-mortem (<1 h). As a result the pH drops to low levels while the muscle temperature is still high. A wireless dual channel system that monitors pH and temperature simultaneously has been developed to provide pH and temperature data of the carcass during the first 24 h after slaughter. We have demonstrated that this approach can distinguish in real time, pH and temperature profiles that are 'non-normal', and identify carcasses that are PSE positive quickly and easily.

Keywords: Wireless sensing; pH; Temperature; PSE pig meat; Food quality

Claude Yven, Joseph Culioli, Laurence Mioche, Meat bolus properties in relation with meat texture and chewing context, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 365-371, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.02.002.

(<http://www.sciencedirect.com/science/article/B6T9G-4FSCVGF-3/2/56ded04de0f1069ee2a6815212df386d>)

Abstract:

During chewing the meat sample is fragmented by compressive and shear bite forces while saliva is incorporated. At the end of this process meat is transformed into a bolus with specific properties, which elicit deglutition. This study aims to analyze the mechanical properties of the boli and juice-saliva interactions in different chewing contexts. Two groups of subjects with different chewing efficiencies participated in the study: healthy dentate (n = 9) and denture wearers (n = 7). Meat boli were obtained from two beef samples exhibiting different textures obtained by varying aging time and cooking temperature.

Variables linked to saliva-food matrix interactions (boli volume and weight, dry matter content) were not dependent on muscle fiber disorganization evaluated using shear tests. No texture effect was observed from the mechanical properties of the boli, whatever the chewing context. Denture wearers swallowed less disorganized boli but with a similar water content as dentate. Between subjects variability was the highest for saliva-food interactions and the lowest for mechanical properties. The variations obtained in meat boli characteristics could have consequences on sensory properties perception and on the digestion process.

Keywords: Meat; Texture; Food bolus; Dental status; Saliva; Chewing; Mastication; Denture wearers

Jose M. Rodriguez-Calleja, Maria-Luisa Garcia-Lopez, Jesus A. Santos, Andres Otero, Development of the aerobic spoilage flora of chilled rabbit meat, *Meat Science*, Volume 70, Issue 2, June 2005, Pages 389-394, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2005.01.009.

(<http://www.sciencedirect.com/science/article/B6T9G-4FJXNH4-3/2/ae958940597f5105c5949f1efb485278>)

Abstract:

Even though worldwide production of rabbit meat is over 1,000,000 ton, little information is available on rabbit meat microbiology. This paper reports on the microflora developing on chill-stored rabbit carcasses. Four different lots of 24 h post-mortem rabbit carcasses dressed and kept at 0 [degree sign]C in a medium-size abattoir were collected and evaluated for sensory, physicochemical and microbiological changes during aerobic storage at 3 +/- 1 [degree sign]C. Mean initial pH value (pH₂₄), extract-release volume (ERV) and lactate content of Biceps femoris muscle, were 6.26 +/- 0.20, 13.50 +/- 3.50 ml and 0.70 +/- 0.07%, respectively. As with other muscle foods kept chilled in air, pH increased and ERV and lactate decreased as storage progressed. Initial levels (log cfu/g) of aerobes (APC), psychrotrophic flora, *Pseudomonas* spp., *Brochothrix thermosphacta*, lactic acid bacteria, Enterobacteriaceae and yeasts were 4.76 +/- 0.31, 4.81 +/- 0.81, 3.39 +/- 1.12, 2.01 +/- 0.92, 2.76 +/- 0.51, 0.49 +/- 0.45 and 3.46 +/- 0.32, respectively. Pseudomonads, most of them fluorescent, and to a lesser extent *B. thermosphacta* and yeasts grew faster than the remaining microorganisms and became predominant at the end of the shelf life. Carcasses spoiled when mean APC, psychrotrophic and pseudomonads numbers were ca. 8 log cfu/g, their mean shelf life being estimated at 6.8 days. A lot of DFD-like rabbit carcasses, with higher pH and lower ERV values but similar microbial loads to normal meat, developed a strong putrid odour after 4 days.

Keywords: Normal and DFD rabbit meat; Microbial spoilage; Physicochemical characteristics

Larry G. Paisley, Julie Hostrup-Pedersen, A quantitative assessment of the BSE risk associated with fly ash and slag from the incineration of meat-and-bone meal in a gas-fired power plant in Denmark, *Preventive Veterinary Medicine*, Volume 68, Issues 2-4, 10 May 2005, Pages 263-275, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2005.01.010.

(<http://www.sciencedirect.com/science/article/B6TBK-4FGXS47-1/2/8fdeee6acfc743500b927b673933b1b9>)

Abstract:

It has been recommended that meat-and-bone meal (MBM) be incinerated at 850 [degree sign]C for at least 2 s and the ashes and slag disposed of in controlled landfills, to dispose of animal-derived proteins. Most commonly, the MBM is incinerated in cement works or coal-fired power plants and the ashes and slag are incorporated into the cement or concrete.

Our goal was to assess with a Monte Carlo simulation model the bovine spongiform encephalopathy (BSE) risk to cattle and humans posed by the ash and slag. The results will be used by decision makers to evaluate the need for disposal of the fly ash in controlled landfills and the feasibility of use of the ash by the phosphate and fertilizer industries.

We assumed that all specified risk material (SRM) and MBM produced in Denmark would be incinerated in this gas-fired power plant. Based on observations in 2001, we assumed that, on average, six (range: 0-15) clinical BSE cases each year were rendered into MBM and incinerated. In addition, SRM or carcasses from 0 to 31 (median = 10) BSE-infected-but-undetected animals/BSE case were also incinerated.

The simulations were run on a 1-week basis. Our results suggest that if the slag is collected and re-incinerated the median BSE infectivity remaining in the fly ash per week would be 3.1E-11 cattle ID50. A cattle ID50 is the amount of infectivity that will cause infection in 50% of cattle exposed to it. During the weeks when BSE was infected in the SRM-MBM, the median infectivity in the fly ash was estimated as 8.7E-10 cattle ID50 and 2.9E-12 human ID50. The 95th percentiles were 2.1E-08 cattle ID50 and 5.8E-10 human ID50, respectively. One ton of fly ash would contain $\leq 1.8E-07$ cattle ID50 95% of the time. These are the potential exposures of the cattle or human populations. The potential exposures of individuals are far less.

Keywords: BSE; MBM; SRM; Incineration; Risk assessment

Jason Chen, Shaun Chen, Removal of polycyclic aromatic hydrocarbons by low density polyethylene from liquid model and roasted meat, Food Chemistry, Volume 90, Issue 3, May 2005, Pages 461-469, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.05.010.

(<http://www.sciencedirect.com/science/article/B6T6R-4CPVMKP-6/2/89e1bb50b8eb3e64f3b5b384f5c6bbc7>)

Abstract:

Low density polyethylene (LDPE) was used to remove polycyclic aromatic hydrocarbons (PAHs) from liquid media and roasted meat by sorption. Three liquid models and five carcinogenic PAHs were employed to monitor the sorption process, and amounts of chemicals were determined by GC-FID. More than 50% of the total adsorption occurred within 24 h for the selected PAHs in the three model systems. The water-oil system yielded the highest PAHs removal by LDPE; and the system containing phospholipid resisted the diffusion and resulted in the least adsorption among three models. Certain residual PAHs in the LDPE were significantly decreased to a range of 70.8-84.0% after 3 h of UV radiation, and benzo(a)pyrene was the most sensitive to UV among these PAHs. Removal of PAHs in roasted meat packaged under vacuum was achieved, and potent contamination by the PAHs in the LDPE may be avoided by subsequent UV irradiation.

Keywords: PAHs; Sorption; LDPE; GC-FID; UV