**Komoditas : Jahe**
**Tahun 2004-2008 (88 judul)**

Chia-Feng Kuo, Ming-Hon Hou, Tsu-Shing Wang, Charng-Cherng Chyau, Yi-Ting Chen, Enhanced antioxidant activity of Monascus pilosus fermented products by addition of ginger to the medium, Food Chemistry, Volume 116, Issue 4, 15 October 2009, Pages 915-922, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.03.047.
(http://www.sciencedirect.com/science/article/B6T6R-4VWB1DY-2/2/75ecbdae982763160903d97a35d013ee)
Abstract:
The fermented products of Monascus sp. are known for their antihypercholesterolaemic effects, however, their antioxidant activities are different from those of many plant-derived foods. To evaluate the effect of ginger addition into the medium on the antioxidant activity of Monascus pilosus fermented products, we cultured uninoculated PDB medium (PDB), inoculated PDB medium (MP), uninoculated ginger-containing medium (PDBG), and inoculated ginger-containing medium (MPG). The broth and mycelia were collected, freeze-dried, and extracted to evaluate their free radical scavenging activities, inhibition of peroxidation, phenolic content, inhibition of DNA damage, cellular antioxidant activity, and expression of the antioxidant enzymes. The results showed that MPG had significantly higher antioxidant activity than PDB, MP, and PDBG at all fermentation time points. Moreover, the fermentation process significantly increased the antioxidant activities of MPG. After the inherent level of antioxidant capacity was increased, the modified M. pilosus fermented product demonstrated a higher anti-atherosclerotic value than the unmodified product.
Keywords: Monascus pilosus; Ginger; Antioxidant activity

Su-Chen Ho, Ya-Li Tang, Shih-Min Lin, Yih-Fong Liew, Evaluation of peroxynitrite-scavenging capacities of several commonly used fresh spices, Food Chemistry, In Press, Accepted Manuscript, Available online 14 August 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.08.020.
(http://www.sciencedirect.com/science/article/B6T6R-4X0PC51-6/2/647bdbd6420253426fc1389a2830e05c)
Abstract:
Peroxynitrite-induced nitration of protein tyrosine residues is considered as one of the major pathological causes of several human diseases, e.g. cardiovascular disorders. Therefore, it appears that attenuation of peroxynitrite- induced nitration by certain foods could be beneficial to human health. Certain spices, used widely in folk medicine for cardiovascular disorders, conceivably protect against the activities of peroxynitrite. Seven culinary spices, including chilli, garlic, ginger, leek, onion, shallot and Welsh onion, were selected for this study. The peroxynitrite-scavenging capacities of these aqueous spice extracts were evaluated on the basis of their ability to attenuate peroxynitrite-induced nitrotyrosine formation in albumin. All of the spices had abilities to attenuate the peroxynitrite-mediated protein nitration. Ginger had outstanding peroxynitrite-scavenging ability. The phenolics and flavonoids in certain spices had abilities to suppress the peroxynitrite-mediated tyrosine nitration reaction. This indicates that these compounds could act as peroxynitrite-scavengers.
Keywords: Peroxynitrite; 3-Nitrotyrosine; Flavonoid, Phenolics; Spices

Ali A. Shati, Fahmy G. Elsaid, Effects of water extracts of thyme (Thymus vulgaris) and ginger (Zingiber officinale Roscoe) on alcohol abuse, Food and Chemical Toxicology, Volume 47, Issue 8, August 2009, Pages 1945-1949, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.05.007.

(http://www.sciencedirect.com/science/article/B6T6P-4W9XG98-2/2/ecf5e822d1e965dce3fef7395e2e0010)
Abstract: Introduction
Alcohol abuse has many harmful effects on human body. This study aimed to investigate the role of water extracts of thyme (Thymus vulgaris) and ginger (Zingiber officinale Roscoe) as natural product extracts to detoxify the injuries of alcohol abuse on liver and brain of mice.Materials and methods
Alcohol at a dose of 1.25 ml/50 ml water was orally administered at the first day of treatment with continuously increase of 1.25 ml per day to the end of experiment (14 days, 0.1 ml/45 g /d). Mice also were orally administered with alcohol and water extracts of thyme and ginger in concentration of 500 mg /kg body weight for 2 weeks.Results
The results showed very highly significant increase in nitric oxide and malondialdehyde level in liver and brain and a very highly significant decrease in the total antioxidant capacity and glutathione peroxidase activity in alcoholic group. In addition, the liver function enzymes such as l-[gamma]-glutamyl transpeptidase and butyryl cholinesterase activities showed very highly significant increase in alcoholic group. In contrast, the water extracts of thyme and ginger showed significant amelioration on these changes both in liver and brain tissues.Conclusion
The water extracts of thyme and ginger has detoxifying and antioxidant effects. Therefore, it is recommended to use them to avoid alcohol toxicity.
Keywords: Alcohol abuse; Thyme; Ginger; Antioxidant enzymes; Liver function; Mice

Cheryl Lans, Nancy Turner, Gerhard Brauer, Tonya Khan, Medicinal plants used in British Columbia, Canada for reproductive health in pets, Preventive Veterinary Medicine, Volume 90, Issues 3-4, 1 August 2009, Pages 268-273, ISSN 0167-5877, DOI: 10.1016/j.prevetmed.2009.05.002.
(http://www.sciencedirect.com/science/article/B6TBK-4WDNBP5-2/2/c14bc4c86d832ef34269f73ad668842d)
Abstract:
In 2003, semi-structured interviews were conducted in British Columbia, Canada with participants obtained using a purposive sample on the ethnoveterinary remedies used for animals. Twenty-nine participants provided the information in this paper on the ethnoveterinary remedies used for reproductive health in dogs and cats. The plants used for pregnancy support and milk production in pets were raspberry-leaf (Rubus idaeus), motherwort (Leonurus cardiaca), flaxseed (Linum usitatissimum) and ginger (Zingiber officinale). Uterine infections were treated with black cohosh (Actaea racemosa) and goldenseal (Hydrastis canadensis). Most of the studies conducted on these plants have not been conducted on companion animals.
Keywords: Reproductive health; Pets; Ethnoveterinary medicine; British Columbia

A.S. El-Sharaky, A.A. Newairy, M.A. Kamel, S.M. Eweda, Protective effect of ginger extract against bromobenzene-induced hepatotoxicity in male rats, Food and Chemical Toxicology, Volume 47, Issue 7, July 2009, Pages 1584-1590, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.04.005.
(http://www.sciencedirect.com/science/article/B6T6P-4W2D1P2-1/2/3a8a2985322217199da32ed5a3e6d630)
Abstract:
The bromobenzene (BB)-induced hepatotoxicity comes from its reactive metabolites. The efficacy of different doses of ginger (Zingiber officinales Rose) extract in alleviating hepatotoxicity was investigated in male albino rats. Oxidative stress parameters were monitored. The drugs metabolizing enzymes; cytochrome P450 and GST, pro-inflammatory marker; COX-2 and the apoptotic marker; caspase-3 were assessed. Animals were assigned to 1 of 5 groups: control group; bromobenzene (460 mg/kg BW) alone, three animal groups 3-5 treated with different doses

of ethanolic ginger extract (100, 200, 300 mg/kg BW, respectively) 2 weeks prior bromobenzene (460 mg/kg BW) treatment. Rats received orally ginger extract daily for 21 days whereas bromobenzene treatment for 7 days starting from 15th day of treatment. Oral treatment of BB was found to elicit a significant decrease in the activities of the antioxidant enzymes; SOD, GPx and the GSH level, while the activities of GR and drug metabolizing enzymes; GSTs and Cyt P450 were enhanced. Also, BB-treatment resulted in a great enhanced production of nitric oxide products and activation of COX-2 and caspase-3. Pre-treatment with different doses of ginger extract prior to BB-treatment alleviated its toxic effects on the tested parameters in the three animal groups.
Keywords: Ginger; Bromobenzene; Rats; Lipid peroxidation; Nitric oxide products; Antioxidant enzymes; Drug metabolizing enzymes; Pro-inflammatory marker; Apoptotic marker; Biochemical parameters

L.T. Merawin, A.K. Arifah, R.A. Sani, M.N. Somchit, A. Zuraini, S. Ganabadi, Z.A. Zakaria, Screening of microfilaricidal effects of plant extracts against Dirofilaria immitis, Research in Veterinary Science, In Press, Corrected Proof, Available online 4 June 2009, ISSN 0034-5288, DOI: 10.1016/j.rvsc.2009.05.017.
(http://www.sciencedirect.com/science/article/B6WWR-4WFGRSV-1/2/e26bb5681be201377b0d5ad53b157f2b)
Abstract:
Canine dirofilariasis is a common tropical parasitic disease of companion animals, caused by infestation of Dirofilaria immitis filarids within the pulmonary arteries and extending into the right heart. Increased reports of adverse reactions elicited by current microfilaricidal agents against D. immitis such as neurological disorders, circulatory collapse and potential resistance against these agents, warrant the search for new agents in forms of plant extracts. The use of plant extracts in therapeutic medicine is commonly met with scepticism by the veterinary community, thus the lack of focus on its medical potential. This study evaluated the presence of microfilaricidal activities of the aqueous extracts of Zingiber officinale, Andrographis paniculata and Tinospora crispa Miers on D. immitis in vitro at different concentrations; 10 mg/ml, 1 mg/ml, 100 [mu]g/ml, 10 [mu]g/ml and 1 [mu]g/ml within 24 h, by evaluation of relative microfilarial motility as a measure of microfilaricidal activity. All extracts showed microfilaricidal activity with Z. officinale exhibiting the strongest activity overall, followed by A. paniculata and T. crispa Miers. It is speculated that the microfilaricidal mechanism exhibited by these extracts is via spastic paralysis based upon direct observation of the microfilarial motility.
Keywords: Dirofilaria immitis; Zingiber officinale; Andrographis paniculata; Tinospora crispa Miers

Hyo Won Jung, Cheol-Ho Yoon, Kwon Moo Park, Hyung Soo Han, Yong-Ki Park, Hexane fraction of Zingiberis Rhizoma Crudus extract inhibits the production of nitric oxide and proinflammatory cytokines in LPS-stimulated BV2 microglial cells via the NF-kappaB pathway, Food and Chemical Toxicology, Volume 47, Issue 6, June 2009, Pages 1190-1197, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.02.012.
(http://www.sciencedirect.com/science/article/B6T6P-4VNH45H-1/2/815165743cd7cd0eb28799a7b28b7a62)
Abstract:
Excessive production of inflammatory mediators such as nitric oxide (NO), prostaglandin E2 (PGE2), and proinflammatory cytokines, including tumor necrosis factor-alpha (TNF-[alpha]) and interleukin-1beta (IL-1[beta]) from activated microglia contributes to uncontrolled inflammation in neurodegenerative diseases. It seems possible that treatment with anti-inflammatory agents, including plants used in Oriental medicine, might delay the progression of neurodegeneration through the inhibition of microglial activation. The present study is focused on the inhibitory effect of the rhizome hexane fraction extract of Zingiber officinale Roscoe (ginger hexan extract; GHE)

on the production of inflammatory mediators such as NO, PGE2, and proinflammatory cytokines in lipopolysaccharide (LPS)-stimulated BV-2 cells, a mouse microglial cell line. GHE significantly inhibited the excessive production of NO, PGE2, TNF-[alpha], and IL-1[beta] in LPS-stimulated BV2 cells. In addition, GHE attenuated the mRNA expressions and protein levels of inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), and proinflammatory cytokines. The molecular mechanisms that underlie GHE-mediated attenuation are related to the inhibition of the phosphorylation of three mitogen-activated protein kinases (MAPKs), extracellular signal-regulated kinases 1 and 2 (ERK1/2), p38 MAPK, and c-Jun N-terminal kinase (JNK), and the activation of nuclear factor-kappaB (NF-[kappa]B). Our results indicate that GHE exhibits anti-inflammatory properties by suppressing the transcription of inflammatory mediator genes through the MAPK and NF-[kappa]B signaling pathways. The anti-inflammatory properties of GHE may make it useful as a therapeutic candidate for the treatment of human neurodegenerative diseases.
Keywords: Anti-inflammation; Microglia; Nitric oxide; Nuclear factor-kappaB; Cytokine; Zingiber officinale

K. Kandiannan, Utpala Parthasarathy, K.S. Krishnamurthy, C.K. Thankamani, V. Srinivasan, Modeling individual leaf area of ginger (Zingiber officinale Roscoe) using leaf length and width, Scientia Horticulturae, Volume 120, Issue 4, 19 May 2009, Pages 532-537, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.11.037.
(http://www.sciencedirect.com/science/article/B6TC3-4V995XH-3/2/0f829389a98e254edfb615526f8b07ac)
Abstract:
Leaf area estimation is an important biometrical observation one has to do for comparing plant growth in field and pot experiments. In this study, a leaf area estimation model was developed for ginger (Zingiber officinale Roscoe), using linear measurements of leaf length (L) and maximum width (W). Leaves from five ginger varieties (Varada, Rejatha, Mahima, Maran and Himachal) were used to develop the model in 2006-2007. The actual leaf area (LA) was measured with a leaf area meter (LI-3100, LI-COR, Lincoln, NE, USA) and taken as reference LA. The linear measurements were used to build linear (LA = a + b x L x W) and power models (LA = [alpha] x (L x W)[beta]) for each variety, as the modeling among variety were not different from each other, data for all five varieties have been pooled and compared with earlier models by graphical procedures and statistical criteria such as Mean Square Error (MSE), Root Mean Square Error (RMSE) and Chi-square ([chi]2). The selected model was validated during 2007-2008. The validation data set was used to produce a validation model for each variety by re-estimating the model parameters to develop the estimation model and the models were compared for consistency. The predicted LA (PLA) was compared with observed LA (OLA) by graphical procedures and lack of agreement was evaluated by calculating the relative bias, estimated by the mean of differences (d) and the standard deviation (SD) of the differences. Normality test was carried out by Spearman's rank correlation coefficient (rs) and residuals were normally distributed. Finally, the proposed model for leaf area estimation of ginger is LA = -0.0146 + 0.6621 x L x W, R2 = 0.997. This model can be reliably used for estimating leaf area of ginger non-destructively. The same equation can be extrapolated to all varieties and land races of ginger as it is vegetatively propagated crop with narrow genetic variability.
Keywords: Ginger; Leaf area estimation; Model; Non-destructive method; Zingiber officinale Roscoe

Kalyan Reddy Manda, Craig Adams, Nuran Ercal, Biologically important thiols in aqueous extracts of spices and evaluation of their in vitro antioxidant properties, Food Chemistry, In Press, Corrected Proof, Available online 18 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.025.

(http://www.sciencedirect.com/science/article/B6T6R-4W9XF00-2/2/f0f3abe7618455edfa56aa66f15c4b6a)
Abstract:
The levels of the biologically important thiols in aqueous extracts of different spices were determined using a sensitive high performance liquid chromatography (HPLC) technique. The spices analysed: turmeric, ginger, cardamom, mustard, fenugreek, and coriander showed different levels of thiols. Biologically important thiols or biothiols measured in these spices included glutathione (GSH), cysteine (CYS), N-acetylcysteine (NAC), homocysteine (HCYS), and [gamma]-glutamyl cysteine (GGC). Our results showed that thiol levels varied from 4 to 1089 nM/g weight (dry or wet). Furthermore, none of the biothiols analysed were found in cumin, nutmeg, clove or star anise. We also studied the antioxidant abilities of these aqueous extracts using various in vitro antioxidant methods to correlate between the levels of these thiols and their antioxidant effects. Our results suggested that antioxidant activities may be independent of thiol content and may be, in part the combination of all the phytochemicals present. These results may be useful in explaining the effect of spices on thiol levels in in vitro and in vivo studies.
Keywords: Spices; Aqueous extracts; Thiols; Oxidative stress; Antioxidant activity

N.A. Nik Norulaini, O. Anuar, A.K.M. Omar, Abbas F.M. AlKarkhi, Wahyu B. Setianto, M.O. Fatehah, F. Sahena, I.S.M. Zaidul, Optimization of SC-CO2 extraction of zerumbone from Zingiber zerumbet (L) Smith, Food Chemistry, Volume 114, Issue 2, 15 May 2009, Pages 702-705, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.09.075.
(http://www.sciencedirect.com/science/article/B6T6R-4TJX1W5-G/2/e5d30b921430e148bae310d782bc2859)
Abstract:
Response surface methodology (RSM) was applied to optimize the variables affecting the Supercritical carbon dioxide (SC-CO2) extraction of non-polar compounds from Zingiber zerumbet using the Box-Behnken design (BBD). Dependent variables were the percentage of the chemical components in the ginger vis a vis [alpha]-caryophyllene (y1), camphene (y2), and zerumbone (2,6,10-cycloundecatrien-1-one, 2,6,9,9-tetramethyl-) (y3). Pressure was the most significant parameter affecting the amount of each compound extracted. When temperature was kept constant and pressure was increased, all of the dependent variables increased concomitantly. Since pressure and temperature are two of the major influential factors in the extraction using SC-CO2, any combination of these two parameters could be selected to ascertain the optimum combination for a particular compound in the extract. Extraction at 30 [degree sign]C and 55 MPa with total amount of 30 g of CO2 used was found to maximize all the responses.
Keywords: Supercritical carbon dioxide; Zingiber zerumbet; Zerumbone; Response surface methodology; Box-Behnken design

Derya Kara, Evaluation of trace metal concentrations in some herbs and herbal teas by principal component analysis, Food Chemistry, Volume 114, Issue 1, 1 May 2009, Pages 347-354, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.09.054.
(http://www.sciencedirect.com/science/article/B6T6R-4TJ1HS3-7/2/0105aefc65de4d1878f5e2670aeadf1f)
Abstract:
Sixteen trace metallic analytes (Ba, Ca, Ce, Co, Cr, Cu, Fe, K, La, Mg, Mn, Na, Ni, P, Sr and Zn) in acid digests of herbal teas were determined and the data subjected to chemometric evaluation in an attempt to classify the herbal tea samples. Nettle, Senna, Camomile, Peppermint, Lemon Balm, Sage, Hollyhock, Linden, Lavender, Blackberry, Ginger, Galangal, Cinnamon, Green tea, Black tea, Rosehip, Thyme and Rose were used as plant materials in this study. Trace metals in these plants were determined by using inductively coupled plasma-atomic emission spectrometry and inductively coupled plasma-mass spectrometry. Principal component analysis (PCA), linear

discriminant analysis (LDA) and cluster analysis (CA) were used as classification techniques. About 18 plants were classified into 5 groups by PCA and all group members determined by PCA are in the predicted group that 100.0% of original grouped cases correctly classified by LDA. Very similar grouping was obtained using CA.
Keywords: Classification; Herbs; Herbal teas; Trace elements; Atomic spectrometry; Principal component analysis; Linear discriminant analysis; Cluster analysis

Jae-Hyung Mah, Young Jun Kim, Han-Joon Hwang, Inhibitory effects of garlic and other spices on biogenic amine production in Myeolchi-jeot, Korean salted and fermented anchovy product, Food Control, Volume 20, Issue 5, May 2009, Pages 449-454, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.07.006.
(http://www.sciencedirect.com/science/article/B6T6S-4T0MMFV-1/2/893f64d31b9f6a3c31045bb4a7fcbc1b)
Abstract:
This study was carried out to reduce biogenic amine contents in Myeolchi-jeot, Korean salted and fermented anchovy (Engraulis japonicus). The effects of a variety of spices including ginger, garlic, green onion, red pepper, clove and cinnamon, on biogenic amine production were determined by HPLC. The greatest inhibitory effect on biogenic amine production was observed in the culture treated by garlic extract. In the culture, the contents of putrescine, cadaverine, histamine, tyramine and spermidine were reduced by up to 11.2%, 18.4%, 11.7%, 30.9% and 17.4%, respectively, compared to control. The other spice extracts tested showed less or no effect in reducing biogenic amine contents. In addition, the extract of garlic showed the highest antimicrobial activity against the amine producers tested. The extract of garlic at a concentration of 5% (weight basis) was finally applied to the ripening of Myeolchi-jeot in situ, and then overall production of biogenic amines in Myeolchi-jeot was found to be reduced by up to 8.7%, compared to control. Consequently, it is expected that the findings of this study might be helpful for enhancing the safety of Myeolchi-jeot.
Keywords: Biogenic amines; Korean salted and fermented fish product; Myeolchi-jeot; Spices; Garlic

Xiu-Yan Lin, Chang-Yi Lu, Yong Ye, Toxicity of crude extracts from several terrestrial plants to barnacle larvae on mangrove seedlings, Ecological Engineering, Volume 35, Issue 4, Wetland restoration and ecological engineering, April 2009, Pages 502-510, ISSN 0925-8574, DOI: 10.1016/j.ecoleng.2008.04.013.
(http://www.sciencedirect.com/science/article/B6VFB-4W45N7T-8/2/30772c0c5339ed1f96182b2dc8457102)
Abstract:
This study involved the use of terrestrial plant extracts as substitutes for toxic chemicals to control the major fouling organisms of mangroves, the barnacles. In terms of the solvents used to obtain the plant crude extracts, ethyl acetate was best, ethyl alcohol next and pure water worst, except in the case of Allium cepa (AC), where pure water was better than ethyl alcohol. For different plants, different solvents resulted in different poisonous effects, and plants belonging to different classes showed different levels of activities. In particular, using ethyl acetate crude extracts, Allium sativum (AS), AC and Capsicum annuum (CA) caused massive death of barnacle larvae at a low concentration in the shortest time. The less poisonous organic solvents were able to extract more active materials, and this was advantageous in enhancing the effect. For pure water crude extracts, AC and Zingiber officinale were best, but for 95% ethyl alcohol crude extracts, AS and AC were best. For ethyl acetate crude extracts, the effects of AS, AC and CA were better. Different solvent extracts of AC with 12 h of exposure all had LC50 values <100 mg/L. The concentrations of the effective plant crude extracts used were close to, or even lower than, those used for pesticides referred to in the literature.

Keywords: Mangrove seedlings; Barnacle; Plant crude extracts; Antifouling

Donald A. Ukeh, Michael A. Birkett, John A. Pickett, Alan S. Bowman, A. Jennifer Mordue, Repellent activity of alligator pepper, Aframomum melegueta, and ginger, Zingiber officinale, against the maize weevil, Sitophilus zeamais, Phytochemistry, Volume 70, Issue 6, April 2009, Pages 751-758, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2009.03.012.
(http://www.sciencedirect.com/science/article/B6TH7-4W4DVDT-1/2/33d1ef00da54862a325d7e4c68303d47)
Abstract:
The repellent activity of alligator pepper, Aframomum melegueta, and ginger, Zingiber officinale (Zingiberaceae), against the maize weevil, Sitophilus zeamais (Coleoptera: Curculionidae), was investigated in four-way olfactometer bioassays. Results showed that vacuum distilled A. melegueta and Z. officinale extracts were repellent towards adult S. zeamais both in the absence and the presence of maize, Zea mays, grains. Bioassay-guided liquid chromatographic fractionation of the distillates showed that fractions containing oxygenated compounds accounted for the repellent activity. Coupled gas chromatography-mass spectrometry (GC-MS), followed by GC peak enhancement and enantioselective GC using authentic compounds, identified 3 major compounds in the behaviourally active fractions of A. melegueta and Z. officinale to be (S)-2-heptanol, (S)-2-heptyl acetate and (R)-linalool in a ratio of 1:6:3, and 1,8-cineole, neral and geranial in a ratio of 5.48:1:2.13, respectively. The identification of these behaviourally active compounds provides the scientific basis for the observed repellent properties of A. melegueta and Z. officinale, and demonstrates the potential for their use in stored-product protection at the small-scale farmer level in Africa.
Keywords: Aframomum melegueta; Zingiber officinale; Repellent; Sitophilus zeamais

E.W.C. Chan, Y.Y. Lim, S.K. Wong, K.K. Lim, S.P. Tan, F.S. Lianto, M.Y. Yong, Effects of different drying methods on the antioxidant properties of leaves and tea of ginger species, Food Chemistry, Volume 113, Issue 1, 1 March 2009, Pages 166-172, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.07.090.
(http://www.sciencedirect.com/science/article/B6T6R-4T4HP8W-2/2/6923485f35c2753bb73ceb5973cf96e1)
Abstract:
Effects of five different drying methods on the antioxidant properties (AOP) of leaves of Alpinia zerumbet, Etlingera elatior, Curcuma longa, and Kaempferia galanga were assessed. All methods of thermal drying (microwave-, oven-, and sun-drying) resulted in drastic declines in total phenolic content (TPC), ascorbic acid equivalent antioxidant capacity (AEAC), and ferric-reducing power (FRP), with minimal effects on ferrous ion-chelating ability and lipid peroxidation inhibition activity. Of the non-thermal drying methods, significant losses were observed in air-dried leaves. Freeze-drying resulted in significant gains in TPC, AEAC, and FRP for A. zerumbet and E. elatior leaves. After one week storage, AOP of freeze-dried E. elatior leaves remained significantly higher than those of fresh control leaves. Freeze-dried tea of A. zerumbet was superior to the commercial tea for all AOP studied.
Keywords: Thermal; Non-thermal and freeze-drying; Antioxidant properties; Zingiberaceae

Xiaoyan Zhao, Zaibin Yang, Guosheng Gai, Yufeng Yang, Effect of superfine grinding on properties of ginger powder, Journal of Food Engineering, Volume 91, Issue 2, March 2009, Pages 217-222, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.08.024.
(http://www.sciencedirect.com/science/article/B6T8J-4TCHKDB-1/2/c0a61288997a631c80688b6fbc1c2f4e)
Abstract:

The superfine grinding could produce a narrow and uniform particle size distribution in dry ginger. The physical-chemical properties of five types of ginger powders with particles size of 300, 149, 74, 37 and 8.34 [mu]m were investigated. The size was smaller for ginger powders, greater for the surface area (from 0.331 to 1.320 m2/g) and bulk density (from 0.3069 to 0.3426 g/ml) and smaller for the angle of repose (from 51.50[degree sign] to 46.33[degree sign]) and slide (from 45.80[degree sign] to 39.50[degree sign]). The values of water absorption index (WAI), water solubility index (WSI) and protein content significantly increased with decreasing the size of ginger particles ($p < 0.05$). Interestingly, the values of WAI, WSI and protein content of ginger powder with a particle size of 8.34 [mu]m during soaking reached 0.52 g/g, 33.70% and 84.93% for 60 min, respectively. SEM observations revealed the shape and surface morphology of five types of ginger powders.
Keywords: Ginger; Superfine grinding; Particle size; Physical and chemical properties

Lubomir Vechet, Lenka Burketova, Milada Sindelarova, A comparative study of the efficiency of several sources of induced resistance to powdery mildew (Blumeria graminis f. sp. tritici) in wheat under field conditions, Crop Protection, Volume 28, Issue 2, February 2009, Pages 151-154, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.09.009.
(http://www.sciencedirect.com/science/article/B6T5T-4TYXKX1-1/2/ba8294a0cef49ead2f46917b47a3661c)
Abstract:
In comparison with untreated controls, both synthetic and biologically sourced inducers of resistance significantly decreased the severity of powdery mildew in a 3-year, small-plot experiment which included other cultivars with varying resistance to powdery mildew as reference, on the susceptible winter wheat cultivar, Kanzler. The most prominent effects were observed following treatments with benzothiadiazole, extracts made of ginger (Zingiber officinale Roscoe) and curcuma (Curcuma longa L.) rhizomes, and giant knotweed (Reynoutria sacchaliensis L.) leaves, which were highly efficient in all 3 years of the experiment. Other inducers such as oak bark (Quercus robur L.) extract, salicylic acid as well as a solution of glycine betaine were also effective. All inducers under study had halted disease progress by 27 d after application. The induced resistance was long-lasting and the severity of the disease, when compared with the untreated control, was decreased to between 2% and 53%, depending upon the year.
Keywords: Winter wheat; Powdery mildew; Induced resistance

Hamzah Tangki, Nick A. Chappell, Biomass variation across selectively logged forest within a 225-km2 region of Borneo and its prediction by Landsat TM, Forest Ecology and Management, Volume 256, Issue 11, 20 November 2008, Pages 1960-1970, ISSN 0378-1127, DOI: 10.1016/j.foreco.2008.07.018.
(http://www.sciencedirect.com/science/article/B6T6X-4T7443V-1/2/0e09d44a78986dbbed3c1fb9a96c1766)
Abstract:
Estimates of biomass integrated over forest management areas such as selective logging coupes, can be used to assess available timber stocks, variation in ecological status and allow extrapolation of local measurements of carbon stocks. This study uses fifty 0.1 ha plots to quantify mean tree biomass of eight logging coupes (each 450-2500 ha) and two similarly sized areas in un-logged forest. These data were then correlated with the spectral radiance of individual Landsat-5 TM bands over the 15 km x 15 km study area. Explanation of the differences in radiance between the ten forest sites was aided by measurements of the relative reflectance of selected leaves and canopies from ground and helicopter platforms.
The analysis showed a marked variation in the stand biomass from 172 t ha-1 in coupe C88 that was disturbed by high-lead logging to 506 t ha-1 in a similarly sized area of protection forest. A two-parameter linear model of Landsat TM radiance in the near-infrared (NIR) band was able to

explain 76% of the variation in the biomass at this coupe-scale. The local-scale measurements indicated that the differences in the mean radiance of each coupe (in cloud-free areas) may relate to a change in the proportion of climax tree canopy relative to a cover of either pioneer trees or ginger/shrubs; the canopies of climax trees have the lowest NIR radiance of the vegetation characteristic of selectively logged forest. The coupe harvested following `Reduced Impact Logging' guidelines had a residual biomass and NIR radiance more like that of undisturbed lowland dipterocarp forest than coupes disturbed by `conventional' selection felling. The predictability of tree biomass (at the coupe-scale) by such a parsimonious model makes remote sensing a valuable tool in the management of tropical natural forests.
Keywords: Landsat; Logging; Model; Rain forest; Selection felling; Tree biomass

Kazuhiro Ishiguro, Takafumi Ando, Osamu Watanabe, Hidemi Goto, Specific reaction of [alpha],[beta]-unsaturated carbonyl compounds such as 6-shogaol with sulfhydryl groups in tubulin leading to microtubule damage, FEBS Letters, Volume 582, Issues 23-24, 15 October 2008, Pages 3531-3536, ISSN 0014-5793, DOI: 10.1016/j.febslet.2008.09.027.
(http://www.sciencedirect.com/science/article/B6T36-4TGG4C4-1/2/f721d55f60c95ab787fbf0c4282dfe31)
Abstract:
6-Shogaol and 6-gingerol are ginger components with similar chemical structures. However, while 6-shogaol damages microtubules, 6-gingerol does not. We have investigated the molecular mechanism of 6-shogaol-induced microtubule damage and found that the action of 6-shogaol results from the structure of [alpha],[beta]-unsaturated carbonyl compounds. [alpha],[beta]-Unsaturated carbonyl compounds such as 6-shogaol react with sulfhydryl groups of cysteine residues in tubulin, and impair tubulin polymerization. The reaction with sulfhydryl groups depends on the chain length of [alpha],[beta]-unsaturated carbonyl compounds. In addition, [alpha],[beta]-unsaturated carbonyl compounds are more reactive with sulfhydryl groups in tubulin than in 2-mercaptoethanol, dithiothreitol, glutathione and papain, a cysteine protease.
Keywords: Cancer; Ginger; Microtubule; Tubulin; [alpha],[beta]-Unsaturated carbonyl compound

Dun-ming XU, Fang YANG, Sheng-yu LU, Jin-chang LAN, Kong-jie YU, Chun-ping CAI, Xian-jin LIU, Determination of Indoxacarb Residue in Foodstuffs of Plant and Animal Origin by GC-ECD and LC-MS/MS, Agricultural Sciences in China, Volume 7, Issue 10, October 2008, Pages 1228-1234, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60169-8.
(http://www.sciencedirect.com/science/article/B82XG-4TSKFY5-B/2/412f370edb7c4f71a9e9f842e7b1227e)
Abstract:
An effective method for the trace analysis of indoxacarb residue in foodstuffs of plant and animal origin [grapefruit, ginger, fresh soybean, bamboo shoot, qing-gen-cai (cruciferous vegetable), chicken, fish, and pork] was developed using gas chromatography (GC-ECD) and liquid chromatography tandem mass spectrometry (LC-MS/MS). Samples were extracted using acetone and n-hexane mixed solvent (1:2, v/v) and then purified using solid-phase extraction (SPE) columns. The extracts were analyzed using GC-ECD and LC-MS/MS. The multiple reaction monitoring (MRM) scheme used involved transitions of the precursor ions to selected two product ions in which one pair for identification was m/z 529 --> 293 and another pair for quantification was m/z 529 --> 249. The detection limits (LODs) of the method were 0.0015 and 0.0006 mg kg-1, and the quantification limits (LOQs) were 0.005 and 0.002 mg kg-1 for GC-ECD and LC-MS/MS, respectively. The relative standard deviations (RSDs) of recovery for indoxacarb were lower than 15% in 10 types of agro-products. Ten repetitive determinations of recovery achieved good reproducibility for indoxacarb and the recovery ranged from 72.08 to 113.74%. The proposed procedure was applied to the analysis of several real samples of different origin from Fujian

Province, China, and 299 samples were screened for indoxacarb residue, of which 5 positive samples were found.
Keywords: indoxacarb; residue; GC; LC-MS/MS; plant and animal origin; foodstuff

T.Y. Chien, L.G. Chen, C.J. Lee, F.Y. Lee, C.C. Wang, Anti-inflammatory constituents of Zingiber zerumbet, Food Chemistry, Volume 110, Issue 3, 1 October 2008, Pages 584-589, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.02.038.
(http://www.sciencedirect.com/science/article/B6T6R-4RWBT2K-3/2/2756db8267f93167902d29e180a5f2ad)
Abstract:
Zingiber zerumbet Smith has long been used as a botanical medicine for anti-inflammation in Southeast Asia. In this paper, zerumbone (1), 3-O-methyl kaempferol (2), kaempferol-3-O-(2, 4-di-O-acetyl-[alpha]-l-rhamnopyranoside) (3), and kaempferol-3-O-(3,4-di-O-acetyl-[alpha]-l-rhamnopyranoside) (4) were isolated from the rhizome of Z. zerumbet. The inhibitory effects of these compounds on NO and PGE2 production from lipopolysaccharide (LPS)-induced RAW 264.7 macrophages were measured. Among them, 1 and 2 demonstrated potent inhibition of NO production, with respective IC50 values of 4.37 and 24.35 [mu]M, and also significantly suppressed iNOS expression in a dose-dependent manner. However, 1 and 2 could inhibit PGE2 production only at high doses (20 and 40 [mu]M, respectively), and COX-2 protein level was not affected. According to the in vitro study, 1 had greater anti-inflammatory effects than 2. Therefore, mice were administered with 1 (10 mg/kg) 1 h before carrageenan injection, and the oedema was significantly attenuated compared to the vehicle control. Mature rhizomes were richer in 1 and lower in moisture. We suggest that the economic cultivation period of Z. zerumbet is the 5th month after seeding when its functions as food and anti-inflammatory are maximum, because 1 is dramatically increased at that time.
Keywords: Zingiber zerumbet Smith; Zingiberaceae; Zerumbone; 3-O-methyl kaempferol; iNOS; Paw oedema

Gurdip Singh, I.P.S. Kapoor, Pratibha Singh, Carola S. de Heluani, Marina P. de Lampasona, Cesar A.N. Catalan, Chemistry, antioxidant and antimicrobial investigations on essential oil and oleoresins of Zingiber officinale, Food and Chemical Toxicology, Volume 46, Issue 10, October 2008, Pages 3295-3302, ISSN 0278-6915, DOI: 10.1016/j.fct.2008.07.017.
(http://www.sciencedirect.com/science/article/B6T6P-4T3DD0F-3/2/b0b8afdeb0f7c05f5d3a1aa5aa42c2fa)
Abstract:
The essential oil and oleoresins (ethanol, methanol, CCl4 and isooctane) of Zingiber officinale were extracted respectively by hydrodistillation and Soxhlet methods and subjected to GC-MS analysis. Geranial (25.9%) was the major component in essential oil; eugenol (49.8%) in ethanol oleoresin, while in the other three oleoresins, zingerone was the major component (33.6%, 33.3% and 30.5% for, methanol, CCl4 and isooctane oleoresins, respectively). The antioxidant activity of essential oil and oleoresins were evaluated against mustard oil by peroxide, anisidine, thiobarbituric acid (TBA), ferric thiocyanate (FTC) and 2,2'-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging methods. They were found to be better antioxidants than butylated hydroxyanisole (BHA). The antimicrobial properties were also studied using various food-borne pathogenic fungal and bacterial species. The essential oil and CCl4 oleoresin showed 100% zone inhibition against Fusarium moniliforme. For other tested fungi and bacteriae, the essential oil and all oleoresins showed good to moderate inhibitory effects. Though, both essential oil and oleoresins were found to be effective, essential oil was found to be better than the oleoresins.
Keywords: Zingiber officinale; Essential oil; Oleoresins; GC-MS; Antioxidant; Antimicrobial

Carey A. Williams, Emily D. Lamprecht, Some commonly fed herbs and other functional foods in equine nutrition: A review, The Veterinary Journal, Volume 178, Issue 1, October 2008, Pages 21-31, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2007.06.004.
(http://www.sciencedirect.com/science/article/B6WXN-4PCH4K8-2/2/221049a1df38fee0ef02d61fa42c57a0)
Abstract:
Most herbs and functional foods have not been scientifically tested; this is especially true for the horse. This paper reviews some of the literature pertinent to herbal supplementation in horses and other species. Common supplements like Echinacea, garlic, ginger, ginseng, and yucca are not regulated, and few studies have investigated safe, efficacious doses. Ginseng has been found to exert an inhibitory effect on pro-inflammatory cytokines and cyclooxygenase-2 expression. Equine studies have tested the anti-inflammatory effects of a single dose of ginger, post-exercise. Echinacea has been reported to have anti-inflammatory and antioxidant properties. Yucca contains steroid-like saponins, which produce anti-inflammatory, antioxidant, and anti-spasmodic effects. However, some herbs have drug-like actions that interact with dietary components and may contain prohibited substances like salicylates, digitalis, heroin, cocaine and marijuana. Horses fed garlic at >0.2 g/kg per day developed Heinz body anaemia. Drug-herb interactions are common and caution needs to be taken when implementing `natural product' usage.
Keywords: Anti-inflammatory; Herb; Horse; Immunostimulant; Phytomedicine

A.K. Lincy, K. Jayarajan, B. Sasikumar, Relationship between vegetative and rhizome characters and final rhizome yield in micropropagated ginger plants (Zingiber officinale Rosc.) over two generations, Scientia Horticulturae, Volume 118, Issue 1, 2 September 2008, Pages 70-73, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.05.012.
(http://www.sciencedirect.com/science/article/B6TC3-4SW85HP-4/2/dfde5435b5d6df34c4996a12f3a2bf9f)
Abstract:
Correlation and path analysis for yield and yield contributing characters in two types of micropropagated ginger plants (plantlets directly regenerated from aerial stem explants and plantlets regenerated from aerial stem derived callus) were carried out over first and second generations in two varieties viz. var. `Jamaica' and var. `Varada'. Irrespective of the regeneration method, the in vitro derived plants showed high positive correlation and maximum positive direct effect of circumference of cormlets, length of cormlets and number of cormlets with the rhizome yield in the first generation. But tiller number exhibited negative correlation and negative direct effect with the rhizome yield in the first generation. In the second generation of the aerial stem regenerated plants, tiller number, number of nodes per cormlets, circumference of cormlets, number of cormlets and plant height exhibited high positive correlation and maximum direct effect with rhizome yield. However, in the second generation also, the callus regenerated plants showed the same trend as in the first generation. Even though the tiller number showed positive significant correlation with rhizome yield, it showed negative direct effect with the yield.
Keywords: Aerial stem regenerated plants; Correlation; Ginger; Path analysis

Abdulrahman O. Musaiger, Jassim H. Al-Jedah, Reshma D'souza, Occurrence of contaminants in foods commonly consumed in Bahrain, Food Control, Volume 19, Issue 9, September 2008, Pages 854-861, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.08.011.
(http://www.sciencedirect.com/science/article/B6T6S-4PJ04VH-3/2/3b5032a7b3b59136f0927e560e0ac0fb)
Abstract:
The occurrence of mycotoxins (aflatoxins, zearalenone, deoxynivalenol), heavy metals and pesticide residues in 198 susceptible food commodities available in Bahrain was determined. Aflatoxins were found in many of the foods tested and three samples of red chili powder (35.9,

52.6 and 69.2 ng/g), one sample of black pepper powder (27.7 ng/g) and one sample of unshelled pistachio nuts (81.6 ng/g) exceeded the maximum allowable limit of aflatoxins. Zearalenone was present in some samples including cornflakes (3.1 ng/g) and crushed wheat (0.3 ng/g). Although many samples contained heavy metals, one sample of cinnamon powder (13.0 [mu]g/g) and one sample of black pepper powder (11.2 [mu]g/g) exceeded the maximum allowable limit for lead. The average levels of cadmium were highest in cinnamon powder (0.3 [mu]g/g) and ginger powder (0.3 [mu]g/g). Some amount of pesticides was found in cumin powder (0.06 [mu]g/g of lindane), turmeric power (0.04 [mu]g/g heptachlor) and coriander powder (0.4 [mu]g/g permethrin). Almonds, peanuts, cashew nuts infant formulas were free of contaminants. Although the contamination of most foods in Bahrain was within the limit, strengthening of the food control systems is important.
Keywords: Mycotoxins; Heavy metals; Pesticides

T.A. Ajith, M.S. Aswathy, U. Hema, Protective effect of Zingiber officinale roscoe against anticancer drug doxorubicin-induced acute nephrotoxicity, Food and Chemical Toxicology, Volume 46, Issue 9, September 2008, Pages 3178-3181, ISSN 0278-6915, DOI: 10.1016/j.fct.2008.07.004.
(http://www.sciencedirect.com/science/article/B6T6P-4T0WK07-1/2/be327af88bdc603c51b7cc6b4e3fa7d2)
Abstract:
Oxidative stress due to abnormal production of reactive oxygen species has been implicated in the nephrotoxicity induced by a commonly used anticancer antibiotic doxorubicin (DXN). The nephroprotective effect of aqueous ethanol extract of Zingiber officinale (200 and 400 mg/kg, p.o) was evaluated against doxorubicin-induced (15 mg/kg, i.p) acute renal damage in rat. Serum urea and creatinine levels were evaluated as the markers of renal failure. Renal antioxidant status such as activities of superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and level of reduced glutathione (GSH) were determined. Level of lipid peroxidation as equivalents of malondialdehyde (MDA), and glutathione-S-transferase (GST) activity were determined in the kidneys. Serum urea and creatinine levels were reduced in the Z. officinale (200 and 400 mg/kg, p.o) plus DXN treated groups. The renal antioxidant enzymes activities such as SOD, CAT GPx, levels of GSH and GST activity were restored and that of MDA declined significantly ($p < 0.001$) in the Z. officinale (400 mg/kg) plus DXN treated group. The nephroprotection is mediated by preventing the DXN-induced decline of renal antioxidant status, and also by increasing the activity of GST.
Keywords: Antioxidants; Doxorubicin; Free radicals; Nephrotoxicity; Z. officinale

G. Alexander, B. Singh, A. Sahoo, T.K. Bhat, In vitro screening of plant extracts to enhance the efficiency of utilization of energy and nitrogen in ruminant diets, Animal Feed Science and Technology, Volume 145, Issues 1-4, Enzymes, Direct Fed Microbials and Plant Extracts in Ruminant Nutrition, 14 August 2008, Pages 229-244, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2007.05.036.
(http://www.sciencedirect.com/science/article/B6T42-4PG2RXN-1/2/9b5b46ffbe97c89ec88c4be6d6b6ae8c)
Abstract:
This study was completed to identify plant extracts that modulate partitioning of degraded organic matter (OM) towards microbial protein synthesis, at the expense of gas production, and decrease protein degradation in the rumen. In the preliminary study, effects of aqueous extracts of Picrorhiza kurroa root, Plumbago zeylanica root, Terminalia bellerica fruit and Zingiber officinale rhizome and aqueous methanol extract of Moringa oleifera seed on rumen fermentation end products were examined in vitro at 2.0 mg/ml of incubation medium using white clover hay (Trifolium repens) as substrate. Another study was conducted to evaluate the ability of two

promising extracts, selected based on their ability to decrease ammonia N concentration, on in vitro degradable crude protein (IVDCP) and protozoal populations using the same substrate at a lower dose (1 mg/ml). Finally, the extract which did not affect IVDCP, but decreased ammonia concentration, was further investigated to assess its effect on substrate degradability, microbial mass and a partitioning factor (PF; ratio of substrate truly degraded to gas volume produced at 24 h of incubation) at two different doses (0.75 and 1.0 mg/ml) using a mixed diet (700 g local grass hay and 300 g concentrate mixture/kg) as substrate. In the preliminary study, M. oleifera aqueous methanol extract decreased total gas, total volatile fatty acids (VFA) production, acetate propionate ratio and ammonia concentration and increased microbial purines (44%) and efficiency of microbial CP synthesis (EMPS). P. kurroa aqueous extract decreased total gas production and ammonia concentration (35%) and increased propionate production but did not affect total VFA production, microbial purines and EMPS. The decrease of ammonia in the presence of P. kurroa extract was mainly mediated through a decrease in in vitro CP degradability (28%). M. oleifera extract had activity against rumen protozoa, but did not influence CP degradability. Even at a lower concentration (i.e., 0.75 mg/ml) with a forage based mixed diet as substrate, M. oleifera extract decreased gas production, without affecting true organic matter or neutral detergent fibre degradability, and increased microbial purines and PF. Results suggest that aqueous methanol extract of M. oleifera seed and aqueous extract of P. kurroa root may have potential as feed additives to increase the efficiency of utilization of energy and N in ruminant diets.
Keywords: Plant extracts; Rumen fermentation; Microbial protein synthesis; Partitioning factor; Protein degradation

E.W.C. Chan, Y.Y. Lim, L.F. Wong, F.S. Lianto, S.K. Wong, K.K. Lim, C.E. Joe, T.Y. Lim, Antioxidant and tyrosinase inhibition properties of leaves and rhizomes of ginger species, Food Chemistry, Volume 109, Issue 3, 1 August 2008, Pages 477-483, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.02.016.
(http://www.sciencedirect.com/science/article/B6T6R-4RTW3Y7-3/2/f1619cb051769599ded6001066b2d7fa)
Abstract:
Total phenolic content (TPC) and ascorbic acid equivalent antioxidant capacity (AEAC) of leaves of 26 ginger species belonging to nine genera and three tribes were screened. For 14 species, TPC and AEAC of rhizomes were also assessed. Ferrous ion-chelating (FIC) abilities of leaves and rhizomes of eight species were compared. Leaves of five species of Etlingera were analysed for tyrosinase inhibition activity. Of the 26 species, leaves of Etlingera species had the highest TPC and AEAC. Eleven of the 14 species had significantly higher TPC and/or AEAC in leaves than in rhizomes. Values of leaves of Etlingera elatior and Etlingera maingayi were seven to eight times higher than those of rhizomes. In terms of FIC ability, six of the eight species clearly showed higher values in leaves than in rhizomes. The most outstanding was the FIC value of Alpinia galanga leaves which was more than 20 times higher than that of rhizomes. Of the five species of Etlingera, leaves of E. elatior displayed the strongest tyrosinase inhibition activity, followed by leaves of Etlingera fulgens and E. maingayi. Values of their inhibition activity were significantly higher than or comparable to the positive control. Besides promising tyrosinase inhibition ability, leaves of these three Etlingera species also have high antioxidant activity and antibacterial properties.
Keywords: Zingiberaceae; Leaves; Rhizomes; Total phenolic content; Antioxidant activity; Tyrosinase inhibition activity

R. Swetha Priya, R.B. Subramanian, Isolation and molecular analysis of R-gene in resistant Zingiber officinale (ginger) varieties against Fusarium oxysporum f.sp. zingiberi, Bioresource Technology, Volume 99, Issue 11, Exploring Horizons in Biotechnology: A Global Venture, July 2008, Pages 4540-4543, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.06.053.

(http://www.sciencedirect.com/science/article/B6V24-4PK8MGR-3/2/b02da133e987e43b0cd8e4839138dd18)
Abstract:
Marker assisted selection (MAS) of resistant varieties is a reliable and faster method of selecting the right varieties for cultivation. The aim of the present study is to find the genes responsible for resistance in highly resistant varieties. In the present work we report the presence of a Resistance (R) gene of CC-NBS-LRR class of plant resistance genes. Both direct PCR amplification from genomic DNA as well as cDNAs, yielded a 0.6 kb DNA sequence indicating the absence of an intron. Sequence analysis of the PCR amplicon obtained from the genomic DNA showed very high homology to R-genes. An interesting observation from the present study is the presence of the R-gene in only resistant varieties. Neither the partially resistant or susceptible varieties showed the presence of this gene sequence. This in turn raises interesting questions on the evolution of these ginger varieties. The cloned R-genes provide a new resource of molecular markers for rapid identification of fusarium yellows resistant ginger varieties.
Keywords: CC-NBS-LRR class; Fusarium oxysporum f.sp. zingiberi; Marker assisted selection; RT-PCR; R-genes

R.S. Policegoudra, S.M. Aradhya, Structure and biochemical properties of starch from an unconventional source--Mango ginger (Curcuma amada Roxb.) rhizome, Food Hydrocolloids, Volume 22, Issue 4, June 2008, Pages 513-519, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2007.01.008.
(http://www.sciencedirect.com/science/article/B6VP9-4MY0MNG-2/2/2bfe30ca4c401e7b5ce7b0c8fffaf16a)
Abstract:
Mango ginger (Curcuma amada Roxb.) belongs to the family Zingiberaceae. Its rhizomes are morphologically resemblant to ginger (Zingiber officinale) but endowed with raw mango flavor. Mango ginger is largely used in the preparation of pickles. Due to its exotic flavor and medicinal property, they are also used in the preparation of special foods, beverages and pharmaceutical and cosmetic industries. This is the first report on isolation and characterization of starch from mango ginger. It was characterized with respect to amylose, solubility, gelatinization, ash, moisture content, X-ray diffraction pattern and structure of starch granules. The mango ginger contains 1.3% ash, 9.8% moisture and 45% starch with 43% amylose. Solubility and water-holding capacity (WHC) of mango ginger starch increased linearly with increase in temperature. An increase in light transmittance (%) with increase in time was observed in DMSO, this is in contrast to decrease in water. Scanning electron micrograph revealed the variations in shape of granules that appeared as round, elliptic, irregular and polygonal. The granule sizes vary between 3-20 [mu]m for small granules and 20-48 [mu]m for large granules. X-ray diffractogram of mango ginger starch revealed B-type of starch, a characteristic feature of Curcuma sp. and majority of tuber starch, but in contrast with C-type pattern of ginger (Z. officinale). Low solubility accompanied with high amylose content of mango ginger starch can be a metabolic advantage.
Keywords: Curcuma amada; Mango ginger starch; Biochemical properties; DSC; Amylose; Water-holding capacity; X-ray diffraction; FT-IR; SEM

Mahuya Bandyopadhyay, Runu Chakraborty, Utpal Raychaudhuri, Antioxidant activity of natural plant sources in dairy dessert (Sandesh) under thermal treatment, LWT - Food Science and Technology, Volume 41, Issue 5, June 2008, Pages 816-825, ISSN 0023-6438, DOI: 10.1016/j.lwt.2007.06.001.
(http://www.sciencedirect.com/science/article/B6WMV-4NX8N38-2/2/7d8ec59e038f087a59146c87627cb53b)
Abstract:

Natural sources of antioxidant viz. beet (Beta vulgaris), mint (Mentha spicata L.) and ginger (Zingiber officinale L.) have been used to fortify sandesh (a heat desiccated product of coagulated milk protein mass called chhana which is in turn a heat and acid coagulated product of milk, analogous to cottage cheese). Three sets of experiments viz. antioxidant activity, peroxide value and ultra-violet absorbance were done to evaluate the effectiveness of natural antioxidants in reducing lipid oxidation in sandesh as compared to synthetic antioxidants like tertiary butyl hydroquinone (TBHQ), butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) under thermal treatment. Among the natural sources, ginger has the highest antioxidant activity and it was similar to TBHQ and BHA-BHT combined. Results of the antioxidant activity differed from those of the oven test at 63 [degree sign]C particularly for ginger and BHA-BHT combined. Control sandesh (without any antioxidants) showed the highest peroxide value and ultra-violet absorption. All the natural sources and their combinations significantly improved the oxidative stability of sandesh and their effectiveness was comparable with synthetic antioxidant TBHQ, a combination of BHA and BHT. Among the natural sources, although ginger had the highest antioxidant activity but mint showed better effectiveness in the inhibition of lipid oxidation. Regarding antioxidant activity and lipid oxidation, combination of mint or ginger with beet showed better result as compared to beet alone. Besides, sensory evaluation of freshly prepared natural source fortified sandesh samples was done as compared to control sandesh in order to commercialize the herbal sandesh in market. Sandesh containing beet, ginger, combination of beet with ginger or mint, or combination of mint with ginger were more acceptable to panelist than control sandesh.
Keywords: Natural antioxidants; Peroxide value; Chhana; Antioxidant activity; Sandesh

Peerapong Sangwanangkul, Parson Saradhuldhat, Robert E. Paull, Survey of tropical cut flower and foliage responses to irradiation, Postharvest Biology and Technology, Volume 48, Issue 2, May 2008, Pages 264-271, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.12.002.
(http://www.sciencedirect.com/science/article/B6TBJ-4RPVJ1W-3/2/1d1428a4a01391a6a497e3836d9fffcb)
Abstract:
The sensitivity of cut flowers and foliage to irradiation used for insect disinfestation varies from species to species and to a lesser extent variety to variety. Flowers with low sensitivity to 250 Gy of electron-beam irradiation were Red ginger (Alpinia purpurata) and Bird-of-Paradise (Strelitzia reginae) inflorescences, and Oncidium (Oncidium spp.-Gower Ramsey) sprays. Medium sensitive flowers were Dendrobium (Dendrobium spp.) `Royal Purples', Protea hybrid `Pink Ice' and heliconia `Red Stricta' (Heliconia stricta). Flowers that showed high sensitivity to 250 Gy were Heliconia `Keanae', `Beehive' ginger (Zingiber spectabilis), `Barbatus' ginger (Costus barbatus), and `Indian head' ginger (Costus woodsonii) inflorescences. White (UH 306) dendrobium was more sensitive than the Pink (UH 232) to irradiation (150 Gy). Pretreatment of UH 306 with 1-methylcyclopropene (1-MCP: 50 [mu]g L-1, 3 h) extended the vase life of dendrobium sprays and mitigated the effects of irradiation (250 Gy) on dendrobium vase life. Hot water at 40 [degree sign]C for 30 min or up to 47.5 [degree sign]C for 20-30 min reduced the minimal irradiation injury to Bird-of-Paradise inflorescences. For the heliconia `Keanae' inflorescences, a hot water treatment at 45-47.5 [degree sign]C for 40 min effectively reduced irradiation injury. Red ginger infloresences were able to withstand 500 Gy if pretreated with benzyladenine (BA) before irradiation. Green Ti (Cordyline terminalis) was not sensitive to irradiation doses from 0 to 500 Gy. Leather-leaf fern (Dryopteris erythrosora) and baby eucalyptus (Eucalyptus pulverulenta) foliage showed little or no sensitivity to irradiation. Lycopodium (Lycopodium taxifolium) and Bracken fern (Pteridium aquilinum) were sensitive. Ruscus leaves (Ruscus aeulectus L.) showed chlorosis after irradiation and leaves treated with BA had less chlorosis compared to the non-irradiated foliage. `Pink Ice' protea foliage withstood up to 500 Gy, if first pulsed with 2% glucose solution for 12 h.
Keywords: Electron-beam irradiation; Heat treatments; Pretreatments; Simulated shipping; Ornamentals; Insect disinfestation; Injury

Chun-Mei Han, Kai-Wen Pan, Ning Wu, Jin-Chuang Wang, Wei Li, Allelopathic effect of ginger on seed germination and seedling growth of soybean and chive, Scientia Horticulturae, Volume 116, Issue 3, 1 May 2008, Pages 330-336, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.01.005.
(http://www.sciencedirect.com/science/article/B6TC3-4S0287H-2/2/c9e25426fe471920a5490e7af0306a45)
Abstract:
The rhizome, stem and leaf aqueous extracts of ginger were assayed at 10, 20, 40, and 80 g l-1 for their effects on seed germination and early seedling growth of soybean and chive. All aqueous extracts at all concentrations inhibited seed germination, seedling growth, water uptake and lipase activity of soybean and chive compared with the control, and the degree of inhibition increased with the incremental extracts concentration. The degree of toxicity of different ginger plant parts can be classified in order of decreasing inhibition as stem > leaf > rhizome. The results of this study suggest that rhizome, stem and leaf of ginger contain water-soluble allelochemicals which could inhibit seed germination and seedling growth of soybean and chive. The rhizome is the main harvested part of ginger. The residue (mainly stems and leaves) of the ginger plant should be removed from the field so as to diminish its inhibitory effect. Further work is needed to specify and verify the allelochemicals produced by this plant. The results of this study suggest that ginger allelochemicals are heterotoxic, and thus intercropping should not be practiced using ginger.
Keywords: Ginger; Zingiber officinale Rosc.; Soybean; Glycine max (L.) Merr.; Chive; Allium schoenoprasum L.; Germination; Seedling growth; Water uptake; Lipase activity; Allelochemicals

Sung-Hye Cho, Chang-Hee Lee, Mi-Ran Jang, Young-Wook Son, Sang-Mok Lee, In-Sun Choi, So-Hee Kim, Dai-Byung Kim, Aflatoxins contamination in spices and processed spice products commercialized in Korea, Food Chemistry, Volume 107, Issue 3, 1 April 2008, Pages 1283-1288, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.08.049.
(http://www.sciencedirect.com/science/article/B6T6R-4PJ052P-1/2/7a14f3da52151d5617749b6af1de7ee7)
Abstract:
A survey for total aflatoxins (aflatoxins B1, B2, G1, and G2) was conducted on 88 spices and processed spice products commercialized in Korea. The presence of aflatoxins was determined by high-performance liquid chromatography (HPLC) with fluorescence detector using immunoaffinity column clean-up. Total aflatoxins (AFs) are detected in 12 samples (13.6% of incidence) including seven red pepper powder, two red pepper pastes (Kochujang), two curry and one ginger product. The contamination levels are 0.08-4.45 [mu]g/kg as aflatoxin B1 and 0.08-4.66 [mu]g/kg as AFs. The liquid chromatography-tandem mass spectrometry (LC-MS/MS) analysis on contaminated samples was conducted for the confirmation of detected aflatoxins. The 12 samples which showed aflatoxins by HPLC/FLD were confirmed as aflatoxins by LC-MS/MS.
Keywords: Aflatoxins; Spices; Immunoaffinity column; HPLC-FLD; LC-MS/MS

Muthupandian Ashokkumar, Devi Sunartio, Sandra Kentish, Raymond Mawson, Lloyd Simons, Kamaljit Vilkhu, Cornelis (Kees) Versteeg, Modification of food ingredients by ultrasound to improve functionality: A preliminary study on a model system, Innovative Food Science & Emerging Technologies, Volume 9, Issue 2, Food Innovation: Emerging Science, Technologies and Applications (FIESTA) Conference, April 2008, Pages 155-160, ISSN 1466-8564, DOI: 10.1016/j.ifset.2007.05.005.
(http://www.sciencedirect.com/science/article/B6W6D-4PYYTVB-3/2/67d3d470a07a45aff1572cd2f2543344)
Abstract:
The use of high-intensity ultrasound for food processing applications is being constantly explored. Extraction of gingerol from ginger, homogenisation of milk and generation of high quality

emulsions from food ingredients are some examples where ultrasonication has been found to be efficient, at least in laboratory-scale trials. These ultrasonic processes primarily rely upon the physical effects of ultrasound. However, the potential restrictions and/or uses of the chemical effects generated by ultrasound-induced cavitation phenomena have often been overlooked. Our investigation shows that unwanted reactions between ultrasonically generated radicals and food ingredients could be minimised by selecting lower ultrasonic frequencies for food processing. However, high frequency ultrasound could also be used for food processing, provided suitable radical scavengers are present in the solution. Preliminary results identified the potential of sonochemical hydroxylation of phenolic compounds as an efficient way of enhancing the antioxidant properties of certain food materials. Overall, these investigations have enabled the development of strategies for management of radical sonochemistry in food processing applications.Industrial relevance
The aim of this work is to identify the problems associated with the application of high power ultrasound in food processing in order to make ultrasonic food processing a safe, viable and innovative processing technology in food industry. Several food and chemical industries will be able to adopt sonochemical treatment to improve the quality and the productivity of specific products. As an adjunct to existing processing technologies the application of ultrasonics can reduce energy requirements and simplify formulation with less need to add ingredients as processing aids.
Keywords: Ultrasound; Sonochemistry; Hydroxylation; Antioxidants

Fengnian Yu, Hisashi Harada, Kazuhisa Yamasaki, Sho Okamoto, Souta Hirase, Yasuo Tanaka, Norihiko Misawa, Ryutaro Utsumi, Isolation and functional characterization of a [beta]-eudesmol synthase, a new sesquiterpene synthase from Zingiber zerumbet Smith, FEBS Letters, Volume 582, Issue 5, 5 March 2008, Pages 565-572, ISSN 0014-5793, DOI: 10.1016/j.febslet.2008.01.020.
(http://www.sciencedirect.com/science/article/B6T36-4RR1YRP-9/2/9c957b5a7f8c623f04365c9d7173bced)
Abstract:
In this paper, we have identified a new sesquiterpene synthase gene (ZSS2) from Zingiber zerumbet Smith. Functional expression of ZSS2 in Escherichia coli and in vitro enzyme assay showed that the encoded enzyme catalyzed the formation of [beta]-eudesmol and five additional by-products. Quantitative RT-PCR analysis revealed that ZSS2 transcript accumulation in rhizomes has strong seasonal variations. To further confirm the enzyme activity of ZSS2 and to assess the potential for metabolic engineering of [beta]-eudesmol production, we introduced a gene cluster encoding six enzymes of the mevalonate pathway into E. coli and coexpressed it with ZSS2. When supplemented with mevalonate, the engineered E. coli produced a similar sesquiterpene profile to that produced in the in vitro enzyme assay, and the yield of [beta]-eudesmol reached 100 mg/L.
Keywords: Sesquiterpene synthase gene; [beta]-Eudesmol; Seasonal variation; Metabolic engineering; Mevalonate pathway; Zingiber zerumbet Smith

Nirmala Kota, Prasanna Krishna, Kalpagam Polasa, Alterations in antioxidant status of rats following intake of ginger through diet, Food Chemistry, Volume 106, Issue 3, 1 February 2008, Pages 991-996, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.07.073.
(http://www.sciencedirect.com/science/article/B6T6R-4PC3SMF-1/2/c2dabd9103186bf1e92aa99f1d8432c7)
Abstract:
Ginger is known to possess potent antioxidant and anti-inflammatory properties. Therefore, in vivo studies in rats were initiated to investigate if ginger fed through diet can improve their antioxidant status. Inbred male Wistar/NIN rats were divided into four groups containing six animals per group.

The 1st group received a stock diet whereas the 2nd, 3rd and 4th groups were fed with a diet incorporating ginger powder at 0.5%, 1% and 5% levels for a period of one month. After one month of feeding, rats were sacrificed and their livers and kidneys collected for the analysis of antioxidant enzymes like superoxide dismutase (SOD), catalase and glutathione peroxidase (GSHPx), and to estimate lipid peroxidation and protein oxidation. The levels of all the three enzymes, which are the important components of antioxidative defenses, were significantly stimulated in the livers of groups fed with ginger. The significant reduction in lipid peroxidation in livers and kidneys and inhibition of protein oxidative products in livers indicated the antioxidant potential of ginger when consumed naturally through diet. The findings reported suggest that regular intake of ginger through diet can protect against oxidative tissue damage.
Keywords: Ginger; Antioxidant enzymes; Superoxide dismutase (SOD); Catalase; Glutathione peroxidase (GSHPx); Thiobarbituric acid reactive substances (TBARS)

Badreldin H. Ali, Gerald Blunden, Musbah O. Tanira, Abderrahim Nemmar, Some phytochemical, pharmacological and toxicological properties of ginger (Zingiber officinale Roscoe): A review of recent research, Food and Chemical Toxicology, Volume 46, Issue 2, February 2008, Pages 409-420, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.09.085.
(http://www.sciencedirect.com/science/article/B6T6P-4PP77CR-2/2/032ab218b8880bd70470d8f627f03561)
Abstract:
Ginger (Zingiber officinale Roscoe, Zingiberacae) is a medicinal plant that has been widely used in Chinese, Ayurvedic and Tibb-Unani herbal medicines all over the world, since antiquity, for a wide array of unrelated ailments that include arthritis, rheumatism, sprains, muscular aches, pains, sore throats, cramps, constipation, indigestion, vomiting, hypertension, dementia, fever, infectious diseases and helminthiasis.
Currently, there is a renewed interest in ginger, and several scientific investigations aimed at isolation and identification of active constituents of ginger, scientific verification of its pharmacological actions and of its constituents, and verification of the basis of the use of ginger in some of several diseases and conditions.
This article aims at reviewing the most salient recent reports on these investigations.
The main pharmacological actions of ginger and compounds isolated therefrom include immuno-modulatory, anti-tumorigenic, anti-inflammatory, anti-apoptotic, anti-hyperglycemic, anti-lipidemic and anti-emetic actions. Ginger is a strong anti-oxidant substance and may either mitigate or prevent generation of free radicals. It is considered a safe herbal medicine with only few and insignificant adverse/side effects.
More studies are required in animals and humans on the kinetics of ginger and its constituents and on the effects of their consumption over a long period of time.
Keywords: Ginger; Gingerols; Anti-oxidant; Anti-emetic; Anti-tumorigenic; Anti-inflammatory

Ute Schweiggert, Silke Hofmann, Mareike Reichel, Andreas Schieber, Reinhold Carle, Enzyme-assisted liquefaction of ginger rhizomes (Zingiber officinale Rosc.) for the production of spray-dried and paste-like ginger condiments, Journal of Food Engineering, Volume 84, Issue 1, January 2008, Pages 28-38, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.04.013.
(http://www.sciencedirect.com/science/article/B6T8J-4NKJ07G-4/2/c24de05eab91ec717adaf7440be4a76c)
Abstract:
A novel process for the production of spray-dried ginger powder and paste-like ginger condiments was developed on pilot plant scale. The process includes the operations of fine grinding, enzymatic hydrolysis, finishing, pasteurization and spray-drying, respectively. Before scaling-up the enzymatic hydrolysis was optimized on laboratory scale using D-optimal design and analyzed by response surface methodology considering the individual and interactive effects of temperature

(40-55 [degree sign]C), pH (4.0-6.0), and enzyme concentration (500-5000 ppm) on the reduction of viscosity of the ginger homogenate. In-process determination of gingerols and shogaols demonstrated that pungency is hardly influenced by cell wall degrading enzymes, but significantly affected by temperature and pH. An enzyme mixture composed of cellulolytic and pectinolytic activities at a 2:1 ratio yielded maximal tissue digestion and highest retention of pungent principles within 2 h, applying a dosage of 5000 ppm at 40 [degree sign]C and pH 4.0. During processing the amounts of 4-, 6-, 8- and 10-gingerol slightly diminished, while 6- and 8-shogaol faintly increased. The ginger digest obtained after finishing turned out to be a valuable raw material to be processed into various ginger products. Pasteurization and spray-drying resulted in homogenous paste-like ginger preparations and spray-dried ginger powder, respectively. Additionally, the solid residue contained large amounts of pungent principles, which enables its application as a flavoring agent. Consequently, the process described in this study allows an exhaustive utilization of ginger rhizomes for the production of various ginger applications.
Keywords: Ginger; Processing; Enzymatic hydrolysis; Gingerols; Shogaols; Ginger paste

T.A. Ajith, U. Hema, M.S. Aswathy, Zingiber officinale Roscoe prevents acetaminophen-induced acute hepatotoxicity by enhancing hepatic antioxidant status, Food and Chemical Toxicology, Volume 45, Issue 11, November 2007, Pages 2267-2272, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.06.001.
(http://www.sciencedirect.com/science/article/B6T6P-4NXRMMP-1/2/e4910e1d1878757cd5ccc08ac01b9a71)
Abstract:
A large number of xenobiotics are reported to be potentially hepatotoxic. Free radicals generated from the xenobiotic metabolism can induce lesions of the liver and react with the basic cellular constituents - proteins, lipids, RNA and DNA. Hepatoprotective activity of aqueous ethanol extract of Zingiber officinale was evaluated against single dose of acetaminophen-induced (3 g/kg, p.o.) acute hepatotoxicity in rat. Aqueous extract of Z. officinale significantly protected the hepatotoxicity as evident from the activities of serum transaminase and alkaline phosphatase (ALP). Serum glutamate pyruvate transaminase (SGPT), serum glutamate oxaloacetate transaminase (SGOT) and ALP activities were significantly ($p < 0.01$) elevated in the acetaminophen alone treated animals. Antioxidant status in liver such as activities of superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase and glutathione-S-transferase (GST), a phase II enzyme, and levels of reduced glutathione (GSH) were declined significantly ($p < 0.01$) in the acetaminophen alone treated animals (control group). Hepatic lipid peroxidation was enhanced significantly ($p < 0.01$) in the control group. Administration of single dose of aqueous extract of Z. officinale (200 and 400 mg/kg, p.o.) prior to acetaminophen significantly declines the activities of serum transaminases and ALP. Further the hepatic antioxidant status was enhanced in the Z. officinale plus acetaminophen treated group than the control group. The results of the present study concluded that the hepatoprotective effect of aqueous ethanol extract of Z. officinale against acetaminophen-induced acute toxicity is mediated either by preventing the decline of hepatic antioxidant status or due to its direct radical scavenging capacity.
Keywords: Antioxidant; Free radicals; Hepatotoxicity; Zingiber officinale

R.S. Policegoudra, S.M. Aradhya, Biochemical changes and antioxidant activity of mango ginger (Curcuma amada Roxb.) rhizomes during postharvest storage at different temperatures, Postharvest Biology and Technology, Volume 46, Issue 2, November 2007, Pages 189-194, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.04.012.
(http://www.sciencedirect.com/science/article/B6TBJ-4P481S4-1/2/1cf754b88f76803bd6a274b6f7a7e12b)
Abstract:

Mango ginger (Curcuma amada Roxb.) is a unique species having mango flavour in its rhizomes and is of high medicinal importance. Its shelf-life and quality is governed by storage temperature and time. The present study pertains to biochemical changes and antioxidant activity in mango ginger rhizomes during storage. No significant changes were observed in pH, titrable acidity and TSS of the rhizomes stored at different temperatures, viz. room temperature (RT, 25 [degree sign]C), low temperature (LT, 14 [degree sign]C) and chilling temperature (CT, 4 [degree sign]C). Total protein decreased initially from 11.2 to 7.9 mg/100 g rhizome up to 70 days, followed by a rapid increase to 10.6 mg on the 120th day of storage at RT. In contrast, total protein content increased at LT from 10 days onwards. The highest accumulation of total phenolic contents from 20.8 to 57.4 mg/100 g rhizome in juice and from 380 to 568 mg/100 g in pulp was observed in LT storage. The DPPH scavenging activity of mango ginger juice and pulp decreased sharply to 30 and 33%, respectively at RT, when compared with a steady activity of around 56% in juice and 72% in pulp at LT. Mango ginger rhizome could be stored for 4-5 months at LT compared with 2-3 months at RT. Shrivelling and sprouting are the limiting factors for further storage at RT, and the threshold percentage of water loss ranging from 30 to 36% was responsible for commercially objectionable levels of shrivelling. Within the range of temperatures, rhizomes exhibited chilling injury symptoms as water-soaked lesions with tissue softening, browning, loss of mango flavour and failure to sprout at the lowest temperature (CT), and rapid deterioration of physical, physiological and antioxidant properties at room temperature. Moderate low temperature (LT) minimized the biochemical changes, maintained or increased the antioxidant activity and doubled the shelf-life as a function of temperature with storage time.
Keywords: Mango ginger; Curcuma amada Roxb.; Storage; Water loss; Chilling injury; Phenolics; Antioxidant activity

Cheryl Lans, Nancy Turner, Tonya Khan, Gerhard Brauer, Ethnoveterinary medicines used to treat endoparasites and stomach problems in pigs and pets in British Columbia, Canada, Veterinary Parasitology, Volume 148, Issues 3-4, 30 September 2007, Pages 325-340, ISSN 0304-4017, DOI: 10.1016/j.vetpar.2007.06.014.
(http://www.sciencedirect.com/science/article/B6TD7-4P5RM4R-3/2/4ae25da71964adb293300e82cd0f82dc)
Abstract:
This paper documents the medicinal plants used to treat endoparasites and stomach problems in dogs, cats and pigs in British Columbia, Canada. Ethnoveterinary data was collected over a 6-month period in 2003. The majority of the information on pets came from 2 naturopaths, 10 herbalists, 5 dog trainers, breeders and pet shop owners, 9 holistic veterinarians and 6 of 27 organic farmers. Two pig farmers joined the study in the final stages. The following plants were used as anthelmintics: Artemisia cina O. Berg and C.F. Schmidt, Artemisia vulgaris L., Artemisia annua, Calendula officinalis L., Echinacea purpurea (L.) Moench (all Asteraceae), Mentha piperita L. and Salvia officinalis L. (Lamiaceae) (Allium sativum L. (Alliaceae), Cucurbita pepo L. (Cucurbitaceae), Eugenia caryophyllata Thunb (Myrtaceae), Gentiana lutea L. (Gentianaceae), Hydrastis canadensis L. (Ranunculaceae), Juglans nigra L. (Juglandaceae), Olea europaea L. (Oleaceae) and Ruta graveolens L. (Rutaceae)). Stomach problems were treated with: Achillea millefolium L. (Asteraceae), Aloe vera (L.) Burm. f. (Asphodelaceae), Elytrigia repens (L.) Desv. ex Nevski (Poaceae), Frangula purshiana (DC.) Cooper (Rhamnaceae), Juniperus communis L. (Cupressaceae), Melissa officinalis L. and M. piperita L. (Lamiaceae), Petroselinum crispum L. (Apiaceae), Plantago major L. and Plantago ovata Forssk. (Plantaginaceae) Rumex crispus L. and Rumex obtusifolius L. (Polygonaceae), Ulmus fulva Michx. (Ulmaceae) and Zingiber officinalis Roscoe (Zingiberaceae). There is insufficient information available to assess the anthelmintic efficacies of C. officinalis, Salvia officinalis, Eugenia caryophyllata and O. europaea; the other plants have mid- to high-level validity for their ethnoveterinary uses.
Keywords: British Columbia; Ethnoveterinary medicine; Pets; Endoparasites; Stomach problems

T.A. Ajith, V. Nivitha, S. Usha, Zingiber officinale Roscoe alone and in combination with [alpha]-tocopherol protect the kidney against cisplatin-induced acute renal failure, Food and Chemical Toxicology, Volume 45, Issue 6, June 2007, Pages 921-927, ISSN 0278-6915, DOI: 10.1016/j.fct.2006.11.014.
(http://www.sciencedirect.com/science/article/B6T6P-4MFSP1B-2/2/def7f5168eff95dee9b1d788d47d12b6)
Abstract:
Oxidative stress due to abnormal production of reactive oxygen molecules (ROM) is believed to be involved in the etiology of toxicities of many xenobiotics. Evidences suggested that ROM is involved in the nephrotoxicity of a widely used synthetic anticancer drug cisplatin. The nephroprotective effects of ethanol extract of Zingiber officinale alone and in combination with vitamin E ([alpha]-tocopherol) were evaluated using cisplatin (single dose of 10 mg/kg body wt, i.p) induced acute renal damage in mice. The results of the study indicated that Z. officinale significantly and dose dependently protected the nephrotoxicity induced by cisplatin. The serum urea and creatinine levels in the cisplatin alone treated group were significantly elevated ($P < 0.01$) with respect to normal group of animals. The levels were reduced in the Z. officinale (250 and 500 mg/kg, p.o) plus cisplatin, vitamin E (250 mg/kg) plus cisplatin, and Z. officinale (250 mg/kg) with vitamin E plus vitamin E treated groups. The renal antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) activities and level of reduced glutathione (GSH) were declined; level of malondialdehyde (MDA) was elevated in the cisplatin alone treated group. The activities of SOD, CAT GPx and level of GSH were elevated and level of MDA declined significantly ($P < 0.05$) in the Z. officinale (250 and 500 mg/kg) plus cisplatin and Z. officinale (250 mg/kg) with vitamin E plus cisplatin treated groups. The protective effect of Z. officinale (250 mg/kg body wt) was found to be better than that of vitamin E (250 mg/kg body wt). The results also demonstrated that combination of Z. officinale (250 mg/kg) with vitamin E (250 mg/kg) showed a better protection compared to their 250 mg/kg alone treated groups. This study concluded that ethanol extract of Z. officinale alone and in combination with vitamin E partially ameliorated cisplatin-induced nephrotoxicity. This protection is mediated either by preventing the cisplatin-induced decline of renal antioxidant defense system or by their direct free radical scavenging activity.
Keywords: Antioxidant; Free radicals; Nephrotoxicity; Zingiber officinale

Mahuya Bandyopadhyay, Runu Chakraborty, Utpal Raychaudhuri, A process for preparing a natural antioxidant enriched dairy product (Sandesh), LWT - Food Science and Technology, Volume 40, Issue 5, June 2007, Pages 842-851, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.05.007.
(http://www.sciencedirect.com/science/article/B6WMV-4KFMMN5-1/2/9cfadb798df774029acbfa62c48735b9)
Abstract:
The antioxidant activities of beet (Beta vulgaris), mint (Mentha spicata L.) and ginger (Zingiber officinale L.) alone or in combination were assessed after their fortification in sandesh (a heat desiccated product of coagulated milk protein mass) using Randox's total antioxidant level determining chemicals and ultimately it was compared with the synthetic antioxidants like TBHQ, BHA and BHT. Addition of beet or mint alone in sandesh showed lower antioxidant level than the addition of ginger alone. However, combination of beet with ginger showed highest antioxidant level among the natural sources and value was almost equal to TBHQ (200 mg kg-1). Besides, the suitable stage and form of addition of these herbs in sandesh were also investigated using the Randox's antioxidant level evaluating chemical. Among the four forms of herbs such as paste, tray-dried powder, freeze-dried powder and solvent extracted form, addition of solvent extracted form in sandesh showed highest antioxidant level than any other form. Similarly, addition of all

these herbs at final stage of sandesh preparation showed highest antioxidant level than their addition at the initial stage of sandesh preparation. Comparative evaluations of the proximate composition of herbal sandesh with the control sandesh showed that herbal sandesh were more or less similar with control sandesh except in fat and moisture content. But according to sensory characteristics, sandesh containing beet, ginger or combination of beet with ginger or mint was more acceptable to panelist than control sandesh. Results of the study indicate that herbal sandesh is more value added health food than control sandesh.
Keywords: Randox's chemical; Total antioxidant level; Solvent extraction; Sandesh; Sensory evaluation

Yogeshwer Shukla, Madhulika Singh, Cancer preventive properties of ginger: A brief review, Food and Chemical Toxicology, Volume 45, Issue 5, May 2007, Pages 683-690, ISSN 0278-6915, DOI: 10.1016/j.fct.2006.11.002.
(http://www.sciencedirect.com/science/article/B6T6P-4MB4DV4-2/2/7b3ab0cf0967f473032e55d3ef7468dc)
Abstract:
Ginger, the rhizome of Zingiber officinalis, one of the most widely used species of the ginger family, is a common condiment for various foods and beverages. Ginger has a long history of medicinal use dating back 2500 years. Ginger has been traditionally used from time immemorial for varied human ailments in different parts of the globe, to aid digestion and treat stomach upset, diarrhoea, and nausea. Some pungent constituents present in ginger and other zingiberaceous plants have potent antioxidant and anti-inflammatory activities, and some of them exhibit cancer preventive activity in experimental carcinogenesis. The anticancer properties of ginger are attributed to the presence of certain pungent vallinoids, viz. [6]-gingerol and [6]-paradol, as well as some other constituents like shogaols, zingerone etc. A number of mechanisms that may be involved in the chemopreventive effects of ginger and its components have been reported from the laboratory studies in a wide range of experimental models.
Keywords: Ginger; Cancer; Chemoprevention; 6-Gingerol; 6-Paradol

Nunchanok Nanthachai, Benjamas Ratanachinakorn, Manit Kosittrakun, Randolph M. Beaudry, Absorption of 1-MCP by fresh produce, Postharvest Biology and Technology, Volume 43, Issue 3, March 2007, Pages 291-297, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2006.10.003.
(http://www.sciencedirect.com/science/article/B6TBJ-4MS9R56-1/2/183e542054815ea5f9475313a6b78c95)
Abstract:
The capacity of various types of fresh produce to absorb gaseous 1-methylcyclopropene (1-MCP) was compared. The produce, which included potato, parsnip, ginger, green bean, asparagus, tangerine, key lime, melon, apple, plantain, leaf lettuce, and mango, was placed in 1, 2, and 10 L glass jars, depending on the size of produce. 1-MCP gas was added to the headspace at an initial concentration of approximately 10 [mu]l l-1. Gas concentrations were measured after 2, 4, 6, 8, 10 and 24 h. The concentration of 1-MCP in empty jars was stable for the 24 h holding period. All produce absorbed 1-MCP, but the rate of sorption differed markedly. The 1-MCP loss data was fitted with an exponential decay curve to determine the initial rate of sorption and the time to 50% decline in concentration (t1/2). Under the conditions of the experiment, the initial rate of loss (% h-1) and the t1/2 varied by as much as 30-fold between commodities. The initial rate of 1-MCP sorption ([mu]l h-1) for each commodity was found to correlate with the fresh weight, dry matter, insoluble dry matter (IDM), and water weight, but not soluble dry matter. The strongest correlation (r2 = 0.44) was with insoluble dry matter; this relationship was improved if insoluble dry matter was divided by the shortest radius of the organ (r2 = 0.63) to adjust for the length of the diffusion path. The correlation between the rate of sorption and insoluble dry matter content is consistent with previously published data suggesting that cellulosic materials possess a high affinity for 1-MCP.

Keywords: 1-Methylcyclopropene; Fresh produce; Sorption; Insoluble dry matter

F. Petrij, M. Mettler, V. Bruckmann, K. van Veen, Recessive yellow in the Mongolian gerbil (Meriones unguiculatus), Journal of Experimental Animal Science, Volume 43, Issue 4, 26 February 2007, Pages 319-327, ISSN 0939-8600, DOI: 10.1016/j.jeas.2006.09.006.
(http://www.sciencedirect.com/science/article/B7GW2-4M936GT-1/2/167c1f0153943bcc687a285fee823ddc)
Abstract:
A new autosomal recessive coat color mutant in the Mongolian gerbil (Meriones unguiculatus) is described: recessive yellow. On the dorsal side the mutant has a rich yellow to ginger color. Ventrally it shows the typical creamy white belly of a wild-type Mongolian gerbil. The dorsal yellow hairs have short black tips, and a light olive green base. A clear demarcation line between dorsal and ventral color is present. Crosses between recessive yellow animals and multiple homozygous recessive tester animals (a/a; cchm/cchm; g/g; p/p) resulted only in animals of an agouti (wild-type) phenotype, showing that the new allele is not allelic with any of the known coat color mutations in the Mongolian gerbil. Molecular studies showed that the new mutant is caused by a missence mutation at the extension (E) locus. On a non-agouti background (a/a; e/e) mutant animals look like a dark wild-type agouti. In contrast to wild-type agouti it shows yellow pigmentation and dark ticking at the ventral side, resulting in the absence of a demarcation line. Since black pigment is present in both the agouti and non-agouti variant (A/A; e/e and a/a; e/e), we conclude that recessive yellow in the Mongolian gerbil is non-epistatic to agouti. Additionally we describe a second mutation at the same locus leading to a similar phenotype, however without black pigment and diminishing yellow pigment during life. Fertility and viability of both new mutants are within normal range. The extension (E) gene is known to encode the melanocortin 1 receptor (MC1R). Interestingly, this is the only gene that is known to account for substantial variation in skin and hair color in humans. Many different mutations are known of which some are associated with higher skin cancer incidence.
Keywords: Mongolian gerbil; Meriones; Coat color; Extension locus; Melanocortin 1 Receptor (MC1R); Recessive yellow; Fading recessive yellow

J. A.M. Janz, P.C.H. Morel, B.H.P. Wilkinson, R.W. Purchas, Preliminary investigation of the effects of low-level dietary inclusion of fragrant essential oils and oleoresins on pig performance and pork quality, Meat Science, Volume 75, Issue 2, February 2007, Pages 350-355, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.027.
(http://www.sciencedirect.com/science/article/B6T9G-4KPNB57-3/2/a29be901f2c36b75e66fffffbf08d84d)
Abstract:
Since the tissue characteristics of monogastric species are readily influenced by the composition of the feeds they consume, the objectives of this preliminary study were to assess the performance of finisher pigs on diets containing 0.05% of essential oils or oleoresins of rosemary, garlic, oregano, or ginger, and to determine the effect of these diets on pork quality. The pigs preferred the garlic-treated diet, and feed intake and average daily gain were significantly increased although no difference in feed efficiency was observed. Carcass and meat quality attributes were unchanged by dietary treatment, although a tendency towards reduction of lipid oxidation was noted in oregano-fed pork. Sensory panelists were unable to detect a flavour/aroma difference between treated and control pork. These results indicate that a higher level of dietary supplementation may be required in order to effect observable differences in pork characteristics.
Keywords: Pigs; Essential oils; Oleoresins; Rosemary; Oregano; Garlic; Ginger; Pork quality; Sensory evaluation

Jin-Li Huang, Lai-Liang Cheng, Zhen-Xian Zhang, Molecular cloning and characterization of violaxanthin de-epoxidase (VDE) in Zingiber officinale, Plant Science, Volume 172, Issue 2, February 2007, Pages 228-235, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2006.08.013.
(http://www.sciencedirect.com/science/article/B6TBH-4KXVB5H-2/2/e8685c63e5dd161f5c487b8ac81060e9)
Abstract:
Ginger (Zingiber officinale Rosc.), an important horticultural crop in tropical Southeast Asia, is prone to photoinhibition under intense sunlight and grows well at low light intensity. Violaxanthin de-epoxidase (VDE) as the key enzyme of xanthophyll cycle plays an important role in protecting photosynthesis apparatus from the damage of excessive light. In this study, a full length (2000 bp) cDNA encoding violaxanthin de-epoxidase (GVDE) (GenBank accession no. AY876286) was cloned from ginger using RT-PCR and 5', 3' rapid amplification of cDNA ends (RACE). The expression patterns of GVDE in response to light were characterized. GVDE has a 1431 bp open reading frame and the predicted polypeptide contains 476 amino acids with the molecular mass of 53.7 kDa. Northern blot analysis showed that the GVDE was mainly expressed in leaves. GVDE mRNA level increased as the illumination time prolonged under high light. For determining the GVDE function, its antisense sequence was inserted into tobacco plants via EHA105. PCR-Southern blot analysis confirmed the integration of antisense GVDE in the tobacco genome. Chlorophyll fluorescence measurements showed that, transgenic plants had lower values of non-photochemical quenching (NPQ) and the maximum efficiency of PSII photochemistry (Fv/Fm) compared with the untransformed controls under high light. The size of xanthophyll cycle pigment pool (V + A + Z) and the ratio of (A + Z)/(V + A + Z) were lower in T-VDE tobacco plants than in control, indicating that GVDE was suppressed in antisense T-VDE tobacco. These results showed that VDE plays a major role in alleviating photoinhibition.
Keywords: Ginger; VDE; Antisense vector; Northern blot; NPQ; (A + Z)/(V + A + Z)

Ali Taghizadeh Afshari, Alireza Shirpoor, Amirabbas Farshid, Ramin Saadatian, Yousef Rasmi, Ehsan Saboory, Behrooz Ilkhanizadeh, Abdolamir Allameh, The effect of ginger on diabetic nephropathy, plasma antioxidant capacity and lipid peroxidation in rats, Food Chemistry, Volume 101, Issue 1, 2007, Pages 148-153, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.01.013.
(http://www.sciencedirect.com/science/article/B6T6R-4JDMVDB-6/2/cf9f86e4137b5e38d7fe488cc14996b6)
Abstract:
Oxidative stress is a major factor in the pathogenesis of diabetic complications. We studied the effects of ginger powder on nephropathy induced by diabetes, and measured changes in plasma antioxidant capacity and lipid peroxidation.
Wistar rats weighing 250 +/- 20 g were treated with STZ 60 mg/kg. Rats were divided into 3 groups (n = 8) of non-diabetic, diabetic non-treated and diabetic treated with ginger powder. The diabetic treated with ginger group received ginger at 5% of their consumed food daily.
After 8 weeks the rats were anaesthetized with 10% chloral hydrate. Blood samples were collected from the heart of each rat and kidneys were removed and kept in 10% formalin buffer. Plasma and red blood cells were separated. Plasma antioxidant capacity by the FRAP method and red blood cells malondialdehyde (MDA) as an indictor of lipids peroxidation, were measured. After sectioning and staining of renal samples, they were studied for focal cell proliferation and glomerular and tubular structural changes.
The MDA levels in diabetic rats treated with ginger were significantly lower than in the other groups ($P < 0.01$). Plasma antioxidant capacity in ginger treated rats were higher than in the first two groups. Diabetes induced nephropathies were also lower in the ginger treated group.
This study demonstrates that ginger causes a decrease in lipid peroxidation, an increase of plasma antioxidant capacity and a reduction in renal nephropathy.
Keywords: Ginger; Nephropathy; Diabetes; Rat; Lipid peroxidation; Antioxidant

I. Stoilova, A. Krastanov, A. Stoyanova, P. Denev, S. Gargova, Antioxidant activity of a ginger extract (Zingiber officinale), Food Chemistry, Volume 102, Issue 3, 2007, Pages 764-770, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.06.023.
(http://www.sciencedirect.com/science/article/B6T6R-4KXDWRG-1/2/df00035b24a5526a23d0e5e804776349)
Abstract:
The antioxidant effect and the total phenols of ginger extract were studied. The total phenols of the alcohol extract were found to be 870.1 mg/g dry extract. 2,2-Diphenyl-1-picril hydrazyl radical (DPPH) scavenging reached 90.1% and exceeded that of butylated hydroxytoluene (BHT), the IC50 concentration for inhibition of DPPH was 0.64 [mu]g/ml. The antioxidant activity in a linoleic acid/water emulsion system determined by means of thiobarbituric acid reactive substances (TBARS) was highest at 37 [degree sign]C - 73.2%, and 71.6% when the formation of conjugated dienes was inhibited. At 80 [degree sign]C the antioxidant activity at the highest concentration of a ginger extract was less efficient: 65.7% for conjugated dienes formation and 68.2% for TBARS. The ginger extract inhibited the hydroxyl radicals 79.6% at 37 [degree sign]C and 74.8% at 80 [degree sign]C, which showed a higher antioxidant activity than quercetin. The IC50 concentration for inhibiting OH at 37 [degree sign]C was slower than that at 80 [degree sign]C - 1.90 and 2.78 [mu]g/ml, respectively. The ginger extract chelated Fe3+ in the solution.
Keywords: Zingiber officinale; Ginger extract; CO2 extract; DPPH; OH; Chelating capacity

Katsunari Ippoushi, Atsuko Takeuchi, Hidekazu Ito, Hideki Horie, Keiko Azuma, Antioxidative effects of daikon sprout (Raphanus sativus L.) and ginger (Zingiber officinale Roscoe) in rats, Food Chemistry, Volume 102, Issue 1, 2007, Pages 237-242, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.04.046.
(http://www.sciencedirect.com/science/article/B6T6R-4KBVX22-2/2/1e4d3eef815b398243c200b9d28404e8)
Abstract:
The antioxidative effects of vegetables are expected to prevent carcinogenesis. The intake of daikon sprout (Japanese name 'kaiware-daikon', Raphanus sativus L.) or ginger (Zingiber officinale Roscoe) significantly decreased the concentration of urinary thiobarbituric acid-reactive substances (TBARS) in rats as compared with those before the intake. Moreover, the intake of these vegetables reduced urinary 8-hydroxy-2'-deoxyguanosine (8-OHdG) levels in lipopolysaccharide (LPS)-treated rats as compared with those fed a basal diet only. These results show that these vegetables suppress lipid peroxidation and the formation of malonaldehyde, and protect DNA from LPS-induced oxidative damage in rats. The suppression of lipid peroxidation and oxidative DNA damage in rats by the intake of daikon sprout or ginger indicates that these vegetables have an antioxidative effect in vivo which could be related to the prevention of carcinogenesis.
Keywords: Raphanus sativus L.; Zingiber officinale Roscoe; Daikon sprout; Ginger; Antioxidative effect; Rat

Sharin Ruslay, Faridah Abas, Khozirah Shaari, Zurina Zainal, Maulidiani, Hasnah Sirat, Daud Ahmad Israf, Nordin H. Lajis, Characterization of the components present in the active fractions of health gingers (Curcuma xanthorrhiza and Zingiber zerumbet) by HPLC-DAD-ESIMS, Food Chemistry, Volume 104, Issue 3, 2007, Pages 1183-1191, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.067.
(http://www.sciencedirect.com/science/article/B6T6R-4N1JRV7-1/2/d695a9f63932b42aebb6149a1e26df39)
Abstract:

Curcuma xanthorrhiza and Zingiber zerumbet are two of the most commonly used ingredients in Indo-Malaysian traditional medicines, health supplements and tonics. Recently, a number of products derived from the aqueous extracts of these species have appeared in the market in the form of spray-dried powder packed in sachet or bottle. On-line high performance liquid chromatography, coupled with diode array detection and electrospray ion trap tandem mass spectroscopy (HPLC-DAD-ESI-MSn), was used to analyze the components in the antioxidant-active fractions from the rhizomes of these species. Three components were identified from C. xanthorrhiza, including bisdemethoxycurcumin (1), demethoxycurcumin (2) and curcumin (3). The active fraction from Z. zerumbet consisted of five components, including kaempferol 3-O-rhamnoside (4), compound 5 [kaempferol 3-O-(2''-O-acetyl)rhamnoside (5a) or kaempferol 3-O-(3''-O-acetyl)rhamnoside (5b)], kaempferol 3-O-(4''-O-acetyl)rhamnoside (6), kaempferol 3-O-(3'',4''-O-diacetyl)rhamnoside (7) and kaempferol 3-O-(2'',4''-O-diacetyl)rhamnoside (8). To confirm their identities, the components from Z. zerumbet were isolated conventionally and were analyzed by spectroscopic techniques as well as by comparison with literature data.
Keywords: Curcuma xanthorrhiza; Zingiber zerumbet; Traditional medicines; Health supplements; Tonics; Antioxidant activity; LC-DAD-ESIMS

Jimaima Lako, V. Craige Trenerry, Mark Wahlqvist, Naiyana Wattanapenpaiboon, Subramanium Sotheeswaran, Robert Premier, Phytochemical flavonols, carotenoids and the antioxidant properties of a wide selection of Fijian fruit, vegetables and other readily available foods, Food Chemistry, Volume 101, Issue 4, 2007, Pages 1727-1741, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.01.031.
(http://www.sciencedirect.com/science/article/B6T6R-4JDVP74-7/2/f52d41842afdc962f6a8ccfa011209e8)
Abstract:
Frequent consumption of fruits and vegetables is associated with a lowered risk of cancer, heart disease, hypertension and stroke. This has been attributed to the presence of various forms of phytochemicals and antioxidants present in the foods, e.g. carotenoids and polyphenol compounds including flavonoids and anthocyanins. Seventy Fiji grown fruits and vegetables, and some other commonly consumed products, were analysed for their total antioxidant capacity (TAC), total polyphenol content (TPP), total anthocyanin content (TAT) as well as the major flavonol and carotenoid profiles. These data will be used to estimate the phytochemical and antioxidant intake of the Fijian population and will be a useful tool in future clinical trials.
Green leafy vegetables had the highest antioxidant capacity, followed by the fruits and root crops. A number of herbs also exhibited high antioxidant capacity. Ipomoea batatas (sweet potato) leaves have the highest TAC (650 mg/100 g) and are rich in TPP (270 mg/100 g), quercetin (90 mg/100 g) and [beta]-carotene (13 mg/100 g). Moringa oleifera (drumstick) leaves also have a high TAC (260 mg/100 g) and are rich in TPP (260 mg/100 g), quercetin (100 mg/100 g), kaempferol (34 mg/100 g) and [beta]-carotene (34 mg/100 g). Curcuma longa (turmeric ginger) has a high TAC (360 mg/100 g), TPP (320 mg/100 g) and is rich in fisetin (64 mg/100 g), quercetin (41 mg/100 g) and myricetin (17 mg/100 g). Zingiber officinate (white ginger) also has a high TAC (320 mg/100 g) and TPP (200 mg/100 g). Zingiber zerumbet (wild ginger), a widely used herb taken before meals is the richest source of kaempferol (240 mg/100 g).
Keywords: Phytochemicals; Flavonols; Carotenoids; Antioxidant capacity; Food; Fiji

Patricia A. Sharpe, Michelle L. Granner, Joan M. Conway, Barbara E. Ainsworth, Mirela Dobre, Availability of Weight-Loss Supplements: Results of an Audit of Retail Outlets in a Southeastern City, Journal of the American Dietetic Association, Volume 106, Issue 12, December 2006, Pages 2045-2051, ISSN 0002-8223, DOI: 10.1016/j.jada.2006.09.014.
(http://www.sciencedirect.com/science/article/B758G-4MDGN86-S/2/95a854386cca7a37617c042e6fe2357b)

Abstract:
The sale of nonprescription weight-loss products accounts for millions of dollars spent by Americans trying to lose weight, yet there is little evidence for effectiveness and there are multiple safety concerns. The purpose of this study was to determine what products, and ingredients within products, were available at retail outlets in a metropolitan area. A purposive sampling strategy identified 73 retail outlets. An audit form was used to collect information from product labels. The audit identified 402 products containing 4,053 separate ingredients. The mean number of ingredients per product was 9.9+/-8.96 (range=1 to 96). A database search was conducted regarding evidence for effectiveness, safety precautions, and side effects for the 10 ingredients that appeared most often across products. Modest evidence of effectiveness exists for green tea (Camellia sinensis), chromium picolinate, and ma huang (Ephedra major). For the remaining seven (ginger root [Zingiber officinale], guarana [Paullinia cupana], hydroxycitric acid [Garcinia cambogia], white willow [Salix alba], Siberian ginseng [Eleutherococcus senticosus], cayenne [Capsicum annuum], and bitter orange/zhi shi [Citrus aurantium]), inadequate or negative evidence exists. Although precautions and contraindications were found for all 10 ingredients, the strongest concerns in the literature appear for ma huang, bitter orange, and guarana. Our audit revealed numerous weight-loss products available to consumers, yet there is little evidence to support the effectiveness of the top 10 ingredients identified and many potential adverse reactions; therefore, food and nutrition professionals should discuss dietary supplement use with their clients.

Jirawan Oonmetta-aree, Tomoko Suzuki, Piyawan Gasaluck, Griangsak Eumkeb, Antimicrobial properties and action of galangal (Alpinia galanga Linn.) on Staphylococcus aureus, LWT - Food Science and Technology, Volume 39, Issue 10, December 2006, Pages 1214-1220, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.06.015.
(http://www.sciencedirect.com/science/article/B6WMV-4GV98DP-4/2/16c2481a63ac2c1a7bbc3dbc293073fb)
Abstract:
The ethanol extracts of the Zingiberaceae family (galangal, ginger, turmeric and krachai) were evaluated for antimicrobial action on Staphylococcus aureus 209P and Escherichia coli NIHJ JC-2 by using an agar disc diffusion assay. The galangal extract had the strongest inhibitory effect against S. aureus. The minimum inhibitory concentration (MIC) of the galangal extract was 0.325 mg/ml and the minimum bactericidal concentration (MBC) at 1.3 mg/ml using the broth dilution method. Transmission electron microscopy clearly demonstrated that the galangal extract caused both outer and inner membrane damage, and cytoplasm coagulation. The disruption of the cytoplasmic membrane properties was determined by the releasing of cell materials including nucleic acid which absorbed UV/VIS spectrophotometer at 260 nm. The major compound of the extract was d,l-1'-acetoxychavicol acetate which was identified by GC-MS and NMR.
Keywords: Galangal; Antimicrobial activity; Membrane damage; Staphylococcus aureus

Vasudev Garg, S.K. Mendiratta, Studies on tenderization and preparation of enrobed pork chunks in microwave oven, Meat Science, Volume 74, Issue 4, December 2006, Pages 718-726, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2006.06.003.
(http://www.sciencedirect.com/science/article/B6T9G-4KGPPPD-1/2/9852e8430d7474ea44f449706df9300b)
Abstract:
This study was conducted to develop technology for tenderization and production of enrobed pork chunks in a microwave oven. Meat chunks from shoulder cuts of pork were cured in a solution containing salt, sodium tripolyphosphate and sugar for 48 h at 4 +/- 1 [degree sign]C, enrobed with cream based batter and cooked in a microwave oven at 900 MHz. These enrobed chunks (control) were compared with tenderized (treated) enrobed chunks, for which 7.5% cucumis extract, 9% ginger extract and 0.50% papain powder were incorporated in the standard curing solution. Ginger

and papain treatments caused significant (P < 0.01) increases in the moisture content and pH of the cooked products compared to the control and cucumis treated samples. Shear force values were significantly (P < 0.01) lower and overall acceptability scores were significantly (P < 0.01) higher in all treated samples compared to the control. During storage at 4 +/- 1 [degree sign]C, the moisture contents and sensory qualities decreased, but TBARS values and microbial counts increased significantly (P < 0.01). Although all products were acceptable up to 15 days of storage, the ginger treated samples had significantly (P < 0.01) lower TBARS and microbial loads and higher sensory attributes than the control, cucumis and papain treated samples. The magnitude of the storage changes were less and acceptability ranking was higher for the ginger treated samples compared with the others. The results indicated that microwaves could be used for the preparation of enrobed pork chunks. The overall acceptability and shelf life of microwave cooked enrobed pork chunk can be further improved using ginger extract in the curing solution.
Keywords: Pork; Enrobed chunks; Microwave cooking; Tenderization; Proteolytic enzymes

A. Zinedine, C. Brera, S. Elakhdari, C. Catano, F. Debegnach, S. Angelini, B. De Santis, M. Faid, M. Benlemlih, V. Minardi, M. Miraglia, Natural occurrence of mycotoxins in cereals and spices commercialized in Morocco, Food Control, Volume 17, Issue 11, November 2006, Pages 868-874, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2005.06.001.
(http://www.sciencedirect.com/science/article/B6T6S-4GSJR29-1/2/002ee3fadface32d067df0982c7440bd)
Abstract:
Sixty samples of cereals (20 of corn, 20 of barley, and 20 of wheat) and 55 samples of spices (14 of paprika, 12 of ginger, 14 of cumin, and 15 of pepper) purchased from popular markets of Rabat and Sale in Morocco were analyzed for mycotoxins.
Cereals samples were all analyzed for ochratoxin A (OTA). The average levels of contamination were 1.08, 0.42, and 0.17 [mu]g/kg for corn, wheat, and barley, respectively. Samples of corn were also analyzed for zearalenone (ZEA) and fumonisin B1 (FB1) the average contaminations were 14 and 1930 [mu]g/kg, respectively. Co-occurrence of OTA, FB1, and ZEA was also checked. Spices samples were analyzed only for aflatoxins (AFs) and the average contaminations found for aflatoxin B1 (AFB1) were 0.09, 0.63, 2.88 and 0.03 [mu]g/kg for black pepper, ginger, red paprika and cumin, respectively. The higher level of contamination was found in red paprika (9.68 [mu]g/kg).
The present report is the first one ever drafted on the natural co-occurrence of OTA, FB1 and ZEA in cereals and on the occurrence of AFs in spices from Morocco.
Keywords: Mycotoxins; Occurrence; Morocco

Baby Sabulal, Mathew Dan, Anil John J, Rajani Kurup, Nediyamparambu Sukumaran Pradeep, Renju Krishna Valsamma, Varughese George, Caryophyllene-rich rhizome oil of Zingiber nimmonii from South India: Chemical characterization and antimicrobial activity, Phytochemistry, Volume 67, Issue 22, November 2006, Pages 2469-2473, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2006.08.003.
(http://www.sciencedirect.com/science/article/B6TH7-4KWK15D-6/2/e5192bd78275063552f3efd247fcea93)
Abstract:
Volatile oil from the rhizomes of Zingiber nimmonii (J. Graham) Dalzell was isolated, characterized by analytical gas chromatography and gas chromatography-mass spectroscopy. Sixty-five constituents accounting for 97.5% of the oil were identified. Z. nimmonii rhizome oil is a unique caryophyllene-rich natural source with isomeric caryophyllenes, [beta]-caryophyllene (42.2%) and [alpha]-humulene ([alpha]-caryophyllene, 27.7%), as its major constituents along with traces of isocaryophyllene. The rhizome oil contained 71.2% sesquiterpenes, 14.2% oxygenated sesquiterpenes, 8.9% monoterpenes, 1.9% oxygenated monoterpenes and 1.3% non-terpenoid

constituents. The antimicrobial activity of the oil was tested against human and plant pathogenic bacteria and fungi. The oil showed significant inhibitory activity against the fungi, Candida glabrata, C. albicans and Aspergillus niger and the bacteria Bacillus subtilis and Pseudomonas aeruginosa. No activity was observed against the fungus Fusarium oxysporum.
Keywords: Zingiber nimmonii; Zingiberaceae; Essential oil; Chemical composition; [beta]-caryophyllene; [alpha]-humulene; Antimicrobial activity

Xiaoqiang Ma, David R. Gang, Metabolic profiling of in vitro micropropagated and conventionally greenhouse grown ginger (Zingiber officinale), Phytochemistry, Volume 67, Issue 20, October 2006, Pages 2239-2255, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2006.07.012.
(http://www.sciencedirect.com/science/article/B6TH7-4KVXHRW-2/2/8a811521da97fcdcf7f45b65252da39b)
Abstract:
Ginger is an important medicinal and culinary herb, known worldwide for its health promoting properties. Because ginger does not reproduce by seed, but is clonally propagated via rhizome division and replanting, it is susceptible to accumulation and transmittance of pathogens from generation to generation. In addition, such propagation techniques lead to slow multiplication of particularly useful stocks. We have developed an in vitro propagation method to alleviate these problems. Metabolic profiling, using GC/MS and LC-ESI-MS, was used to determine if chemical differences existed between greenhouse grown or in vitro micropropagation derived plants. Three different ginger lines were analyzed. The constituent gingerols and gingerol-related compounds, other diarylheptanoids, and methyl ether derivatives of these compounds, as well as major mono- and sesquiterpenoids were identified. Principal component analysis and hierarchical cluster analysis revealed chemical differences between lines (yellow ginger vs. white ginger and blue ring ginger) and tissues (rhizome, root, leaf and shoot). However, this analysis indicated that no significant differences existed between growth treatments (conventional greenhouse grown vs. in vitro propagation derived plants). Further statistical analyses (ANOVA) confirmed these results. These findings suggest that the biochemical mechanisms used to produce the large array of compounds found in ginger are not affected by in vitro propagation.
Keywords: Zingiber officinale; Zingerbraceae; Ginger; Metabolic profiling; Terpenoids; Gingerols; Diarylheptanoids

Maria del Carmen Ramirez-Ahumada, Barbara N. Timmermann, David R. Gang, Biosynthesis of curcuminoids and gingerols in turmeric (Curcuma longa) and ginger (Zingiber officinale): Identification of curcuminoid synthase and hydroxycinnamoyl-CoA thioesterases, Phytochemistry, Volume 67, Issue 18, September 2006, Pages 2017-2029, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2006.06.028.
(http://www.sciencedirect.com/science/article/B6TH7-4KKFPCB-2/2/1e8fcf1afb9dca07f2839e88e33d2aa9)
Abstract:
Members of the Zingiberaceae such as turmeric (Curcuma longa L.) and ginger (Zingiber officinale Rosc.) accumulate at high levels in their rhizomes important pharmacologically active metabolites that appear to be derived from the phenylpropanoid pathway. In ginger, these compounds are the gingerols; in turmeric these are the curcuminoids. Despite their importance, little is known about the biosynthesis of these compounds. This investigation describes the identification of enzymes in the biosynthetic pathway leading to the production of these bioactive natural products. Assays for enzymes in the phenylpropanoid pathway identified the corresponding enzyme activities in protein crude extracts from leaf, shoot and rhizome tissues from ginger and turmeric. These enzymes included phenylalanine ammonia lyase, polyketide synthases, p-coumaroyl shikimate transferase, p-coumaroyl quinate transferase, caffeic acid O-methyltransferase, and caffeoyl-CoA O-methyltransferase, which were evaluated because of their potential roles in controlling production

of certain classes of gingerols and curcuminoids. All crude extracts possessed activity for all of these enzymes, with the exception of polyketide synthases. The results of polyketide synthase assays showed detectable curcuminoid synthase activity in the extracts from turmeric with the highest activity found in extracts from leaves. However, no gingerol synthase activity could be identified. This result was explained by the identification of thioesterase activities that cleaved phenylpropanoid pathway CoA esters, and which were found to be present at high levels in all tissues, especially in ginger tissues. These activities may shunt phenylpropanoid pathway intermediates away from the production of curcuminoids and gingerols, thereby potentially playing a regulatory role in the biosynthesis of these compounds.
Keywords: Polyketide synthase; Phenylpropanoid pathway; Rhizome; Acyltransferase; Phenylalanine ammonia lyase; O-methyltransferase; Medicinal plant

Michael McMahon, Fiona Regan, Helen Hughes, The determination of total germanium in real food samples including Chinese herbal remedies using graphite furnace atomic absorption spectroscopy, Food Chemistry, Volume 97, Issue 3, August 2006, Pages 411-417, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.05.018.
(http://www.sciencedirect.com/science/article/B6T6R-4GSJRCS-1/2/cb40de0914656654e2e6d4e15ac173b2)
Abstract:
This paper outlines the development of a method for the determination of total germanium in foodstuffs utilising graphite furnace atomic absorption. It was found that by varying the drying times interferences could be minimised. Metals including calcium, cobalt, copper, magnesium, nickel, lead and zinc were tested for potential interferences. It was found experimentally that none of the listed metals interfered with this method. The optimal furnace conditions were determined to be; drying for 80 s (85 [degree sign]C for 30 s, 95 [degree sign]C for 40 s and 120 [degree sign]C for 10 s), ashing at 700 [degree sign]C for 8 s and atomisation at 2600 [degree sign]C for 3.3 s followed by a tube clean for 2 s at 2800 [degree sign]C and a lamp current of 5 mA for analysis at 265.2 nm. The method was found to have a linear range of 3.3-125 [mu]g/l with a limit of detection and a characteristic mass of 0.051 and 0.053 ng germanium, respectively. The samples chosen for analysis include vegetables, fruit juices, Chinese herbal remedies and over the counter formulations. It was found that the aloe vera tablet, ginseng tablet and ginger tablet contained 20.83, 5.48 and 9.96 [mu]g/g. Other foods found to contain germanium were potato, garlic and carrot, having 1.85, 2.79 and 0.60 [mu]g/g of germanium. The food found to contain the highest concentration of germanium was Soya mince having 9.39 [mu]g/g.
Keywords: Germanium; Metal; Food; Graphite furnace atomic absorption spectroscopy; Complementary medicine; Herbal remedies; Acid digestion

Hongliang Jiang, Zhengzhi Xie, Hyun Jo Koo, Steven P. McLaughlin, Barbara N. Timmermann, David R. Gang, Metabolic profiling and phylogenetic analysis of medicinal Zingiber species: Tools for authentication of ginger (Zingiber officinale Rosc.), Phytochemistry, Volume 67, Issue 15, Rod Croteau Special Issue, Part 1, August 2006, Pages 1673-1685, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2005.08.001.
(http://www.sciencedirect.com/science/article/B6TH7-4H87GHT-1/2/720991eb6badc5f3fb07276e76708450)
Abstract:
Phylogenetic analysis and metabolic profiling were used to investigate the diversity of plant material within the ginger species and between ginger and closely related species in the genus Zingiber (Zingiberaceae). In addition, anti-inflammatory data were obtained for the investigated species. Phylogenetic analysis demonstrated that all Zingiber officinale samples from different geographical origins were genetically indistinguishable. In contrast, other Zingiber species were significantly divergent, allowing all species to be clearly distinguished using this analysis. In the

metabolic profiling analysis, the Z. officinale samples derived from different origins showed no qualitative differences in major volatile compounds, although they did show some significant quantitative differences in non-volatile composition, particularly regarding the content of [6]-, [8]-, and [10]-gingerols, the most active anti-inflammatory components in this species. The differences in gingerol content were verified by HPLC. The metabolic profiles of other Zingiber species were very different, both qualitatively and quantitatively, when compared to Z. officinale and to each other. Comparative DNA sequence/chemotaxonomic phylogenetic trees showed that the chemical characters of the investigated species were able to generate essentially the same phylogenetic relationships as the DNA sequences. This supports the contention that chemical characters can be used effectively to identify relationships between plant species. Anti-inflammatory in vitro assays to evaluate the ability of all extracts from the Zingiber species examined to inhibit LPS-induced PGE2 and TNF-[alpha] production suggested that bioactivity may not be easily predicted by either phylogenetic analysis or gross metabolic profiling. Therefore, identification and quantification of the actual bioactive compounds are required to guarantee the bioactivity of a particular Zingiber sample even after performing authentication by molecular and/or chemical markers.
Keywords: Zingiber officinale; Zingiberaceae; Ginger; Authentication; Metabolic profiling GC/MS; HPLC; Gingerols; Anti-inflammatory; TrnL-F; Rps16

Iris Hinneburg, H.J. Damien Dorman, Raimo Hiltunen, Antioxidant activities of extracts from selected culinary herbs and spices, Food Chemistry, Volume 97, Issue 1, July 2006, Pages 122-129, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.03.028.
(http://www.sciencedirect.com/science/article/B6T6R-4G7DY3V-2/2/9f94de844852f6ea6af2a9e9da9c77d9)
Abstract:
Recently, interest in plant-derived food additives has grown, mainly because synthetic antioxidants suffer from several drawbacks. Furthermore, plant extracts have been shown to possess health-promoting properties. In the present study, hydrodistilled extracts from basil, laurel, parsley, juniper, aniseed, fennel, cumin, cardamom, and ginger were assessed for their total phenol content, and antioxidant (iron(III) reduction, inhibition of linoleic acid peroxidation, iron(II) chelation, 1,1-diphenyl-2-picrylhydrazyl radical-scavenging and inhibition of hydroxyl radical-mediated 2-deoxy-d-ribose degradation, site and nonsite-specific) activities. The extracts from basil and laurel possessed the highest antioxidant activities except for iron chelation. Although parsley showed the best performance in the iron chelation assay, it was less effective at retarding the oxidation of linoleic acid. In the linoleic acid peroxidation assay, 1 g of the basil and laurel extracts were as effective as 177 and 212 mg of trolox, respectively. Thus, both extracts are promising alternatives to synthetic substances as food ingredients with antioxidant activity.
Keywords: Antioxidant activity; Culinary spices; Hydrodistilled extracts; Basil; Laurel; Parsley; Juniper; Aniseed; Fennel; Cumin; Cardamom; Ginger

Sangita Shukla, V.K. Singh, D.K. Singh, The effect of single, binary, and tertiary combination of few plant derived molluscicides alone or in combination with synergist on different enzymes in the nervous tissues of the freshwater snail Lymnaea (Radix) acuminata (Lamark), Pesticide Biochemistry and Physiology, Volume 85, Issue 3, July 2006, Pages 167-173, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2006.01.003.
(http://www.sciencedirect.com/science/article/B6WP8-4JDMTPV-2/2/e9b1c3eb890d4cbcf071c2a197095517)
Abstract:
The effect of single, binary, and tertiary combination of few plant derived molluscicides alone or in combination with synergist on different enzymes (acetylcholinesterase--AChE, lactic dehydrogenase--LDH, and acid/alkaline phosphatase--ACP/ALP in the nervous tissue of the freshwater snail Lymnaea acuminata were studied. Sublethal in vivo 24 h exposure to 40 and 80%

of LC50 of Azadirachta indica oil (AI), oleoresin of Zingiber officinale (OL), Cedrus deodara oil (CD), Allium sativum (AS), and Polianthes tuberosa (PT) bulb powder singly, their binary combination of AI + OL, AS + CD, AS + PT, CD + OL, CD + PT, OL + PT, and tertiary combination of these binary combinations with the synergist piperonyl butoxide (PB) or MGK-264 significantly altered the activity of these enzymes. Tertiary combination with PB or MGK was very effective. Combination of CD + PT + MGK was more effective against AChE whereas, the combination of CD + OL + PB, CD + AS + PB, and CD + PT + PB were more effective against LDH, ACP, and ALP, respectively.
Keywords: Plant molluscicides; Enzymes; Acetylcholinesterase; Lactic dehydrogenase; Phosphatases; Piperonyl butoxide; MGK-264; Lymnaea acuminata

M.C. Dias, A.L.T. Spinardi-Barbisan, M.A.M. Rodrigues, J.L.V. de Camargo, E. Teran, L.F. Barbisan, Lack of chemopreventive effects of ginger on colon carcinogenesis induced by 1,2-dimethylhydrazine in rats, Food and Chemical Toxicology, Volume 44, Issue 6, June 2006, Pages 877-884, ISSN 0278-6915, DOI: 10.1016/j.fct.2005.11.015.
(http://www.sciencedirect.com/science/article/B6T6P-4J49VDD-1/2/5d3133613b4da22de62748a5ea06d881)
Abstract:
Ginger (Zingiber officinale Roscoe) has been proposed as a promising candidate for cancer prevention. Its modifying potential on the process of colon carcinogenesis induced by 1,2-dimethylhydrazine (DMH) was investigated in male Wistar rats using the aberrant crypt foci (ACF) assay. Five groups were studied: Groups 1-3 were given four s.c. injections of DMH (40 mg/kg b.w.) twice a week, during two weeks, whereas Groups 4 and 5 received similar injections of EDTA solution (DMH vehicle). After DMH-initiation, the animals were fed a ginger extract mixed in the basal diet at 0.5% (Group 2) and 1.0% (Groups 3 and 4) for 10 weeks. All rats were killed after 12 weeks and the colons were analyzed for ACF formation and crypt multiplicity. The rates of cell proliferation and apoptosis were also evaluated in epithelial colonic crypt cells. Dietary consumption of ginger at both dose levels did not induce any toxicity in the rats, but ginger meal at 1% decreased significantly serum cholesterol levels ($p < 0.038$). Treatment with ginger did not suppress ACF formation or the number of crypts per ACF in the DMH-treated group. Dietary ginger did not significantly change the proliferative or apoptosis indexes of the colonic crypt cells induced by DMH. Thus, the present results did not confirm a chemopreventive activity of ginger on colon carcinogenesis as analyzed by the ACF bioassay and by the growth kinetics of the colonic mucosa.
Keywords: Dimethylhydrazine; Aberrant crypt foci; Colon carcinogenesis; Ginger; Chemoprevention

Rishi K. Tyagi, Anuradha Agrawal, Akkara Yusuf, Conservation of Zingiber germplasm through in vitro rhizome formation, Scientia Horticulturae, Volume 108, Issue 2, 10 April 2006, Pages 210-219, ISSN 0304-4238, DOI: 10.1016/j.scienta.2006.01.018.
(http://www.sciencedirect.com/science/article/B6TC3-4JD0YHC-1/2/37fbe3a1933dd72a8e73f0f9cc80b08b)
Abstract:
The effects of various concentrations of maleic hydrazide (MH; 2, 4, 6, 8 mg/l) and three light treatments (16-h, 24-h, 0-h) on in vitro rhizome formation and conservation of ginger (Zingiber officinale Rosc. cv. Rio de Janeiro) were studied. In vitro rhizome formation occurred in all the above treatments. Addition of MH (2-8 mg/l) to the control medium (CM) comprising Murashige and Skoog's (1962) salts, 9% sucrose, 0.8% agar-agar, 0.1 mg/l [alpha]-naphthaleneacetic acid (NAA), 1 mg/l N6-benzyladenine (BA), did not show any significant positive effects on rhizome formation as well as survival of cultures. A significant effect of light treatments was observed on survival of cultures but not on rhizome formation. More than 50% cultures survived up to 14

months on CM under 16-h and 24-h light conditions as compared to 20% cultures on same medium incubated under dark. A total of 33 genotypes of cultivated and wild species of Zingiber were subsequently tested for conservation through in vitro rhizome formation on CM under 16-h light condition. All genotypes produced rhizomes of varying size with numbers ranging from 3 to 15 per culture and were conserved for at least 12 months; some genotypes could be conserved even up to 16-20 months. Viability of rhizomes was determined by in vitro regeneration of shoots upon subculture and their subsequent establishment in soil. Following the protocol described in the present paper, some 160 genotypes of cultivated and wild species of Zingiber, collected from different geographical regions of India, are being conserved at In Vitro Genebank of National Bureau of Plant Genetic Resources, New Delhi.
Keywords: Ginger; Maleic hydrazide; Micro-rhizome; Multiplication; Slow growth; Storage; Tissue culture

Mara E.M. Braga, Silvania R.M. Moreschi, M. Angela A. Meireles, Effects of supercritical fluid extraction on Curcuma longa L. and Zingiber officinale R. starches, Carbohydrate Polymers, Volume 63, Issue 3, 3 March 2006, Pages 340-346, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2005.08.055.
(http://www.sciencedirect.com/science/article/B6TFD-4J3WSC9-1/2/7d281b9c1cae49b31b4ad7bb90cba67b)
Abstract:
Ginger and turmeric tubers have approximately 45 and 40% of starch, respectively. These starches were analyzed before and after ginger and turmeric were subjected to supercritical fluid extraction to obtain oleoresin and essential oil. The starches were isolated and analyzed with respect to purity, amylose/amylopectin content, X-ray pattern, viscosity, swelling factor, granule morphology by scanning electron microscopy, gelatinization temperature by differential scanning calorimetry and turbidity. Supercritical fluid extraction process did not alter the starchy matrix showing small physical rearrangement of the starch molecules; this effect was more intense in the ginger starch, as observed by X-ray diffraction. The ginger starch became less resistant, in other words, there was a starchy structure relaxing after supercritical fluid extraction, evidenced by the lower setback value in the gelatinization process and nonetheless, it did not alter the granule morphology as observed by microscopy. This study reveals similar characteristics of these starches with commercial starches, indicating their potential for industrial applications.
Keywords: Curcuma longa L.; Ginger; Starch; Supercritical fluid extraction; Turmeric; Zingiber officinale R.

Barbara Lohse, Jodi L. Stotts, Jennifer R. Priebe, Survey of Herbal Use by Kansas and Wisconsin WIC Participants Reveals Moderate, Appropriate Use and Identifies Herbal Education Needs, Journal of the American Dietetic Association, Volume 106, Issue 2, February 2006, Pages 227-237, ISSN 0002-8223, DOI: 10.1016/j.jada.2005.10.033.
(http://www.sciencedirect.com/science/article/B758G-4J4HD07-D/2/33434eca453ffb1f30601046d1fc8b04)
Abstract: Objective
To examine herbal use by a sample of low-income, nutritionally vulnerable children.Design
Caregivers completed a survey of child and caregiver herbal usage practices.Subjects/setting
A convenience sample of 2,562 caregivers to children participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Kansas and Wisconsin who were attending a WIC clinic was selected. WIC project selection was random, with stratification for geographic and ethnic representation.Statistical Analyses Performed
Herbal usage profiles were described with measures of central tendency. Groups were compared with a two-tailed independent t test and [chi]2 for continuous and categorical variables, respectively.Results

Child herbal use was reported on 917 surveys, representing 1,363 children ranging in age from 1 week to 17.5 years; 820 were younger than age 5 years. Herb use was greater among Latino children (48.4% vs 31.4%) and caregivers (43.4% vs 37.2%). Caregivers had a mean age of 27.8+/-8.32 years and 38.8% (n=994) denoted using herbs. Herbs most commonly used by children were aloe vera, chamomile, garlic, peppermint, lavender, cranberry, ginger, echinacea, and lemon. Reasons for herbal use paralleled recommendations. Family (78.9%) and friends (32.9%) were predominant information sources. Herbs with safety issues, such as St John's wort, dong quai, and kava were used. Herbal use characteristics did not differ between states, but were unique for Latino clients.Conclusions
Herbal use by WIC children is mostly congruent with known indications; however, practices with potential to harm urge herbal education in WIC clinics, especially for Latinos.

M. Busquet, S. Calsamiglia, A. Ferret, C. Kamel, Screening for effects of plant extracts and active compounds of plants on dairy cattle rumen microbial fermentation in a continuous culture system, Animal Feed Science and Technology, Volumes 123-124, Part 2, 7 December 2005, Pages 597-613, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2005.03.008.
(http://www.sciencedirect.com/science/article/B6T42-4G5BJJJ-1/2/fe39cf4cd94d55fe61b0fc7b9cd69c20)
Abstract:
Eight dual-flow continuous culture fermenters were used to study effects of plant extracts (Experiment 1) and active compounds of plants (Experiment 2) on rumen microbial fermentation. Each experiment consisted in two replicated periods of 9 days. Fermenters were fed 95 g dry matter (DM)/day in three feedings of a 600 g/kg (DM basis) alfalfa hay and 400 g/kg concentrate (178 g/kg crude protein, CP; 325 g/kg neutral detergent fibre, NDF diet), and maintained at constant temperature (38.5 [degree sign]C), pH 6.4, and solid (0.05/h) and liquid (0.10/h) dilution rates. Both experiments included a negative control with no extract (CTR) and a positive control with monensin (MON). Treatments in Experiment 1 were: Trigonella foenum graecum, Juniperus oxycedrus, Syzygium aromaticum (CLO), Anethum graveolens, Zingiber officinale, and Melaleuca alternifolia. Treatments in Experiment 2 were: benzyl salicylate, anethol, carvacrol (CAR), cinnamaldehyde (CIN), eugenol, and d-carvone. During the adaptation period (i.e., days 1 through 7), samples for ammonia N and volatile fatty acid (VFA) concentrations were collected 2 h after feeding. On days 8 and 9, samples for VFA (2 h after feeding), and large peptide (LPep), small peptide plus amino acid (SPepAA), and ammonia N concentrations (0, 2, 4, 6 and 8 h after feeding) were also collected. During the adaptation period of Experiments 1 and 2, total VFA and ammonia N concentrations were not affected by treatments. During the first 6 days of fermentation in Experiments 1 and 2, MON resulted in lower acetate and higher propionate proportions compared with CTR. However, these differences disappeared after day 6. On days 6 and 7, CLO in Experiment 1 resulted in lower acetate, and higher butyrate, proportions compared with CTR. On day 7, the proportion of acetate was lower in CIN in Experiment 2 compared with CTR. After the adaptation period, CLO resulted in lower acetate, and higher propionate, proportions compared with CTR. The LPep N concentration was higher in CLO compared with CTR, suggesting that CLO reduced peptidolytic activity of rumen microorganisms. In Experiment 2, the LPep N concentration was lower in CAR, and MON resulted in lower SPepAA N concentrations and higher ammonia N concentrations compared with CTR, suggesting that MON stimulated deamination activity of rumen microorganisms. Results indicate that ruminal microbes may adapt to additives within 7 days. However, some plant extracts modified rumen microbial fermentation patterns and may allow manipulation of ruminal fermentation under current commercial practices.
Keywords: Rumen fermentation; Plant extracts; Protein degradation

Yinghua Guo, Zhenxian Zhang, Establishment and plant regeneration of somatic embryogenic cell suspension cultures of the Zingiber officinale Rosc., Scientia Horticulturae, Volume 107, Issue 1, 1 December 2005, Pages 90-96, ISSN 0304-4238, DOI: 10.1016/j.scienta.2005.07.003.
(http://www.sciencedirect.com/science/article/B6TC3-4H100C1-2/2/fe81faf341655f73cc85a3e87ed5bb05)
Abstract:
Somatic embryogenic cell suspension cultures of four ginger cultivars were established. Somatic embryogenic calli were induced from ginger shoot tips on MS agar medium supplemented with 1.0 mg l-1 2,4-D and 0.2 mg l-1 Kn, which contained only half concentration of NH4NO3. Rapid-growing and well-dispersed suspension cultures were established by subculturing this kind of callus in the same liquid MSN medium. The suspension cultures (about 1-2 mm in diameter) were placed on the MSN agar medium for callus proliferation. Thereafter embryogenic callus (1.5 cm2) was transferred to solid media (MS + 0.2 mg l-1 2,4-D + 5.0 mg l-1 BA + 3% sucrose + 0.7% agar). Somatic embryos produced shoots and roots, and shoots developed into complete plantlets on solid MS medium supplemented with 3.0 mg l-1 BA and 0.1 mg l-1 NAA. The relationship between the DW of suspension cultures and pH changes in medium is also discussed. The suspension cultures still kept their vitalities after subculture for 8 months.
Keywords: Ginger; Embryogenic suspension culture; Somatic embryogenesis; Plant regeneration

Veena Prajapati, A.K. Tripathi, K.K. Aggarwal, S.P.S. Khanuja, Insecticidal, repellent and oviposition-deterrent activity of selected essential oils against Anopheles stephensi, Aedes aegypti and Culex quinquefasciatus, Bioresource Technology, Volume 96, Issue 16, November 2005, Pages 1749-1757, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.01.007.
(http://www.sciencedirect.com/science/article/B6V24-4FJXN56-7/2/91dc68aa24f5e2944c69d1995dac9b67)
Abstract:
Essential oils extracted from 10 medicinal plants were evaluated for larvicidal, adulticidal, ovicidal, oviposition-deterrent and repellent activities towards three mosquito species; Anopheles stephensi, Aedes aegypti and Culex quinquefasciatus. The essential oils of Juniperus macropoda and Pimpinella anisum were highly effective as both larvicidal and ovicidal. The essential oil of P. anisum showed toxicity against 4th instar larvae of A. stephensi and A. aegypti with equivalent LD95 values of 115.7 [mu]g/ml, whereas it was 149.7 [mu]g/ml against C. quinquefasciatus larvae. Essential oils of Zingiber officinale and Rosmarinus officinalis were found to be ovicidal and repellent, respectively towards the three mosquito species. The essential oil of Cinnamomum zeylanicum resulted into highest repellent (RD95) values of 49.6, 53.9 and 44.2 mg/mat against A. stephensi, A. aegypti and C. quinquefasciatus, respectively apart from oviposition-deterrent potential.
Keywords: Anopheles stephensi; Aedes aegypti; Culex quinquefasciatus; Essential oils; Oviposition-deterrence; Repellent; Insecticidal

B.S. Bennedsen, D.L. Peterson, Amy Tabb, Identifying defects in images of rotating apples, Computers and Electronics in Agriculture, Volume 48, Issue 2, August 2005, Pages 92-102, ISSN 0168-1699, DOI: 10.1016/j.compag.2005.01.003.
(http://www.sciencedirect.com/science/article/B6T5M-4FV357G-1/2/d14bd932c414043568a0e05426f6df4a)
Abstract:
An experimental machine vision system was used to identify surface defects on apples, including bruises. Images were captured through two optical filters at 740 and 950 nm, respectively. In the ensuing grey scale images, defects appeared as dark areas, however, so did shadows and parts of the stem/calyx area. This paper reports a novel approach to locate the defects and eliminate other dark areas. The method is based on rotating the apples in front of the camera while multiple

images are acquired. Dark areas, which are found at the same position, relative to the apple, during the rotation, represent defects, while other dark areas, which change shape and/or position from one frame to the next, are not classified as defects. In a test using 54 Pink Lady apples with 56 defects, the system successfully detected 52, or 92% while providing two false positive. In another test with Ginger Gold Apples, where the rotation technique was combined with images of the stem and calyx regions, 90% of the defects were detected with no false positives.
Keywords: Apple; Defects; Image processing; Sorting

Gianni Sacchetti, Silvia Maietti, Mariavittoria Muzzoli, Martina Scaglianti, Stefano Manfredini, Matteo Radice, Renato Bruni, Comparative evaluation of 11 essential oils of different origin as functional antioxidants, antiradicals and antimicrobials in foods, Food Chemistry, Volume 91, Issue 4, August 2005, Pages 621-632, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.06.031.
(http://www.sciencedirect.com/science/article/B6T6R-4DDXRSS-2/2/bd4092a677684f8440adc13d52599579)
Abstract:
Eleven essential oils, namely, Cananga odorata (Annonaceae), Cupressus sempervirens (Cupressaceae), Curcuma longa (Zingiberaceae), Cymbopogon citratus (Poaceae), Eucalyptus globulus (Myrtaceae), Pinus radiata (Pinaceae), Piper crassinervium (Piperaceae), Psidium guayava (Myrtaceae), Rosmarinus officinalis (Lamiaceae), Thymus x citriodorus (Lamiaceae) and Zingiber officinale (Zingiberaceae), were characterized by means of GC and GC-MS and evaluated for their food functional ingredient related properties. These properties were compared to those of Thymus vulgaris essential oil, used as a reference ingredient. Antioxidant and radical-scavenging properties were tested by means of 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay, [beta]-carotene bleaching test and luminol-photochemiluminescence (PCL) assay. In the DPPH assay, C. odorata, C. citratus, R. officinalis and C. longa showed major effectiveness, with a radical inhibition ranging from 59.6 +/- 0.42-64.3 +/- 0.45%. In the [beta]-carotene bleaching test, C. odorata (75.5 +/- 0.53%), R. officinalis (81.1 +/- 0.57%) and C. longa (72.4 +/- 0.51%) gave the best inhibition results. Similar results were obtained for the same essential oils in the PCL assay. Antimicrobial properties were obtained on five food-spoilage yeasts: Candida albicans ATCC 48274, Rhodotorula glutinis ATCC 16740, Schizosaccharomyces pombe ATCC 60232, Saccharomyces cerevisiae ATCC 2365, Yarrowia lypolitica ATCC 16617 . C. citratus and T. x citriodorus were the most effective against the tested strains. Suggestions on relationships between chemical composition and biological activities are outlined.
Keywords: Cananga odorata; Cupressus sempervirens; Curcuma longa; Cymbopogon citratus; Eucalyptus globulus; Pinus radiata; Piper crassinervium; Psidium guayava; Rosmarinus officinalis; Thymus x citriodorus; Zingiber officinale; Thymus vulgaris; Antioxidant activity; Photochemiluminescence; Antimicrobial activity

Shivanand D. Jolad, R. Clark Lantz, Guan Jie Chen, Robert B. Bates, Barbara N. Timmermann, Commercially processed dry ginger (Zingiber officinale): Composition and effects on LPS-stimulated PGE2 production, Phytochemistry, Volume 66, Issue 13, July 2005, Pages 1614-1635, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2005.05.007.
(http://www.sciencedirect.com/science/article/B6TH7-4GJK8D8-1/2/386bbbf2a59ce52ffbff4f506c899ed9)
Abstract: Graphical abstract
Direct analysis of partially purified fractions of commercially processed dry ginger extract by GC-MS resulted in the identification of 115 compounds including 31 new compounds and 3 others previously unreported from ginger.
Using techniques previously employed to identify ginger constituents in fresh organically grown Hawaiian white and yellow ginger varieties, partially purified fractions derived from the silica gel column chromatography and HPLC of a methylene chloride extract of commercially processed dry

ginger, Zingiber officinale Roscoe, Zingiberaceae, which demonstrated remarkable anti-inflammatory activity, were investigated by gas chromatography-mass spectrometry. In all, 115 compounds were identified, 88 with retention times (Rt) >21 min and 27 with <21 min. Of those 88 compounds, 45 were previously reported by us from fresh ginger, 12 are cited elsewhere in the literature and the rest (31) are new: methyl [8]-paradol, methyl [6]-isogingerol, methyl [4]-shogaol, [6]-isoshogaol, two 6-hydroxy-[n]-shogaols (n = 8 and 10), 6-dehydro-[6]-gingerol, three 5-methoxy-[n]-gingerols (n = 4, 8 and 10), 3-acetoxy-[4]-gingerdiol, 5-acetoxy-[6]-gingerdiol (stereoisomer), diacetoxy-[8]-gingerdiol, methyl diacetoxy-[8]-gingerdiol, 6-(4'-hydroxy-3'-methoxyphenyl)-2-nonyl-2-hydroxytetrahydropyran, 3-acetoxydihydro-[6]-paradol methyl ether, 1-(4'-hydroxy-3'-methoxyphenyl)-2-nonadecen-1-one and its methyl ether derivative, 1,7-bis-(4'-hydroxy-3'-methoxyphenyl)-5-methoxyheptan-3-one, 1,7-bis-(4'-hydroxy-3'-methoxyphenyl)-3-hydroxy-5-acetoxyheptane, acetoxy-3-dihydrodemethoxy-[6]-shogaol, 5-acetoxy-3-deoxy-[6]-gingerol, 1-hydroxy-[6]-paradol, (2E)-geranial acetals of [4]- and [6]-gingerdiols, (2Z)-neral acetal of [6]-gingerdiol, acetaldehyde acetal of [6]-gingerdiol, 1-(4-hydroxy-3-methoxyphenyl)-2,4-dehydro-6-decanone and the cyclic methyl orthoesters of [6]- and [10]-gingerdiols. Of the 27 Rt < 21 min compounds, we had found 5 from fresh ginger, 20 others were found elsewhere in the literature, and two are new: 5-(4'-hydroxy-3'-methoxyphenyl)-pent-2-en-1-al and 5-(4'-hydroxy-3'-methoxyphenyl)-3-hydroxy-1-pentanal. Most of the short Rt compounds are probably formed by thermal degradation during GC (which mimics cooking) and/or commercial drying. The concentrations of gingerols, the major constituents of fresh ginger, were reduced slightly in dry ginger, while the concentrations of shogaols, the major gingerol dehydration products, increased.
Keywords: Zingiber officinale; Zingiberaceae; Ginger; Rhizomes; Ginger derivatives

Ute Schweiggert, Klaus Mix, Andreas Schieber, Reinhold Carle, An innovative process for the production of spices through immediate thermal treatment of the plant material, Innovative Food Science & Emerging Technologies, Volume 6, Issue 2, June 2005, Pages 143-153, ISSN 1466-8564, DOI: 10.1016/j.ifset.2004.11.006.
(http://www.sciencedirect.com/science/article/B6W6D-4FR8PPD-1/2/8f5157f32bd46dbd3116e70dc62baaff)
Abstract:
An innovative process for the production of spices was developed on pilot-plant scale. Immediately after harvest, fresh chili and green pepper (fruits), ginger (rhizomes), and coriander (whole plant) were blanched and subjected to coarse and fine grinding prior to lyophilization. Alternatively, thermal treatment was applied after processing the fresh plant material into a paste. Microbiological assays revealed low counts of aerobic germs, aerobic spore forming bacteria, Escherichia coli, coliforms, Staphylococcus aureus, Bacillus cereus, yeasts and moulds, and sulfite reducing clostridia. Salmonella as well as aflatoxins were not detected in any of the products. Because the spice powders obtained were generally characterized by improved color, in contrast to conventional spice processing, early inactivation of endogenous enzymes may have prevented degradation of plant pigments and browning.Industrial relevance
Spices are common sources for microbial contaminations with special concern in minimally processed products. Sterilization of spices has been shown to adversely affect product quality criteria and ionizing or UV radiation have been met with consumer resistance. Pasteurization/sterilization or blanching as thermal processes effective in reducing microbial loads and inactivating enzymes. However, loss of volatiles could not be prevented in the process presented and needs to be tackled prior to industrial scale use.
Keywords: Spices; Green pepper; Chili; Ginger; Coriander; Color; Volatile oils; Pungency; Microbial load

Paulo T.V. Rosa, M. Angela A. Meireles, Rapid estimation of the manufacturing cost of extracts obtained by supercritical fluid extraction, Journal of Food Engineering, Volume 67, Issues 1-2, IV

Iberoamerican Congress of Food Engineering (CIBIA IV), March 2005, Pages 235-240, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.05.064.
(http://www.sciencedirect.com/science/article/B6T8J-4D98JSG-D/2/548d98d28fd5b0fdbe783d188e0e47b8)
Abstract:
In spite of the scientific knowledge and the large availability of raw materials having sufficient quality and cost, there is no industrial supercritical fluid extraction unit in any of the South American countries. Supercritical fluid extraction is associated with high investment costs; nowadays, an easy method for technical-economical evaluation of supercritical fluid process is not available. Thus, a simple method to estimate the cost of manufacturing of extracts by supercritical fluid technology is presented. The manufacturing costs of clove bud oil and ginger oleoresin were estimated using the procedure proposed. The production of clove bud oil was economically feasible at the quoted extraction condition; its manufacturing cost approximately a fourth of the market price. The manufacturing cost of ginger oleoresin was close to its selling price at the extraction condition considered. This is mainly due to the strong influence of the investment on the cost of manufacturing ginger extracts by supercritical extraction due to the requirement of long extraction times. Nonetheless, some other characteristics of the ginger oleoresin such as the quantity and the availability of gingerols and shogaols should be considered. Additionally, further process parameter studies directed to the increase of the extraction rates should be considered before disregarding the supercritical fluid extraction as a viable process.
Keywords: Supercritical extraction; Natural products; Manufacturing cost; Clove oil; Ginger oleoresin

Mekonnen Tsegaye, Eden Ephraim, Mogessie Ashenafi, Behaviour of Escherichia coli O157:H7 during the fermentation of Datta and Awaze, traditional Ethiopian fermented condiments, and during product storage at ambient and refrigeration temperatures, Food Microbiology, Volume 21, Issue 6, December 2004, Pages 743-751, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.02.003.
(http://www.sciencedirect.com/science/article/B6WFP-4D3W9F4-G/2/d7d34870c6076cc7d03fa8351abed6e8)
Abstract:
The survival of E. coli O157:H7 in fermenting foods and its prolonged survival in refrigerated fermented foods is documented. This prompted the study to evaluate survival of E. coli O157:H7 during the fermentation of Datta and Awaze, traditional Ethiopian condiments. Datta was prepared by wet milling a variety of spices along with green or red chilli and fermenting it by lactic acid bacteria. Awaze is a slurry made of red pepper, garlic and ginger to which various other spices were added and fermented by lactic acid bacteria (LAB) and yeasts. The Datta or Awaze slurry was separately inoculated with three strains of E. coli O157:H7 and the fermentation was allowed to proceed at ambient (20-25[degree sign]C) temperatures for 7 days. When fermenting Datta or Awaze was initially inoculated at low inoculum level (3 log cfu/g), the test strains were not recovered after 24 h of fermentation. At higher initial inoculum level (6 log cfu/g), however, counts of the test strains in Datta at day 7 were less by about 1.5 log unit than the initial inoculum level. In fermenting Awaze, all test strains were completely eliminated in 7 days. The pH of the fermenting green and red Datta was reduced from 5.2 to 4.4 and that of Awaze dropped from 4.9 to 3.8 during this time. In another experiment, the fermented products were separately inoculated with the E. coli O157:H7 test strains at levels of 6 log cfu/g and incubated at ambient and refrigeration (4[degree sign]C) temperatures for 7 days. In fermented Datta, two of the three strains were not recovered by enrichment after 6 days of storage at ambient temperatures. In fermented Awaze, all strains were below countable levels at day 5, but could still be recovered by enrichment at day 7. At refrigeration storage, counts of the test strains in Datta and Awaze products were <3 log cfu/g at day 7. The inhibition of our E. coli O157:H7 test strains in Datta and Awaze may be due to the

antimicrobial activity of spices and other metabolites produced by LAB which may be effective at low pH.
Keywords: E. coli O157:H7; Condiments; Fermentation

T. Dzudie, C. P. Kouebou, J. J. Essia-Ngang, C. M. F. Mbofung, Lipid sources and essential oils effects on quality and stability of beef patties, Journal of Food Engineering, Volume 65, Issue 1, November 2004, Pages 67-72, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2003.12.004.
(http://www.sciencedirect.com/science/article/B6T8J-4BNVWPD-1/2/e0268665891dee884f953ee48a3b8008)
Abstract:
The effects of addition of animal fats (beef and pork fat), vegetable oils (ground-nut and maize oils) at a 20% level and essential oils (ginger and basilica essential oils) at a 0.2% level on the quality and stability of beef patties were investigated. The inclusion of animal fats and vegetable oils in the formulations significantly ($P<0.05$) decreased the moisture and the protein contents but increased the fat content of the beef patties. While the highest pH values were found in the beef patties formulated with beef and pork fats, the lowest water holding capacity and the highest cooking losses were observed with the patties containing vegetable oils. The storage time significantly affected thiobarbituric acid (TBA) values. Formulations containing maize oil and essential oils showed the best characteristics in relation to oxidative and microbial stability with the lowest values for TBA and the lowest microbial loads when compared with the other samples.
Keywords: Beef; Patties; Animal fats; Vegetable oils; Essential oils; Quality; Stability

B. M. Naveena, S. K. Mendiratta, A. S. R. Anjaneyulu, Tenderization of buffalo meat using plant proteases from Cucumis trigonus Roxb (Kachri) and Zingiber officinale roscoe (Ginger rhizome), Meat Science, Volume 68, Issue 3, November 2004, Pages 363-369, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.04.004.
(http://www.sciencedirect.com/science/article/B6T9G-4CKNMCV-1/2/fab843f98464b9dde7bee9abc09bb693)
Abstract:
This study was conducted to develop a method for improving tenderness and overall qualities of tough buffalo meat using plant proteolytic enzymes from Cucumis trigonus Roxb (Kachri) and Zingiber officinale roscoe (Ginger rhizome). Their tenderizing efficacy was compared with the most popular enzyme papain. 3 x 3 x 3 cm chunks from Biceps femoris muscles of spent Murrah buffaloes (4-5 years age) were marinated with distilled water (control), 2% (w/w) powdered cucumis extract, 5% (w/v) ginger extract or 0.2% (w/w) papain for 48 h at 4 [degree sign]C and subjected to various physico-chemical, histological and sensory evaluations. An increase ($p<0.01$) in collagen solubility, sarcoplasmic and myofibrillar protein solubility, and reduction ($p<0.01$) in shear force values were observed in all enzyme-treated samples compared to control. Electrophoretic pattern of muscle proteins also revealed extensive proteolysis and reduction in number of protein bands in all treated samples. Improvement ($p<0.01$) in flavor, juiciness, tenderness and overall acceptability scores were observed in all enzyme-treated samples compared to controls. Ginger extract-treated meat samples received better scores for appearance, flavor, tenderness and overall acceptability. From these results, it is shown that ginger and cucumis can be used as an effective alternative to papain.
Keywords: Buffalo meat; Tenderization; Proteolytic enzymes

Yoshimasa Nakamura, Chiho Yoshida, Akira Murakami, Hajime Ohigashi, Toshihiko Osawa, Koji Uchida, Zerumbone, a tropical ginger sesquiterpene, activates phase II drug metabolizing enzymes, FEBS Letters, Volume 572, Issues 1-3, 13 August 2004, Pages 245-250, ISSN 0014-5793, DOI: 10.1016/j.febslet.2004.07.042.

(http://www.sciencedirect.com/science/article/B6T36-4D01KRS-1/2/a07429e600249f6097216cfafdc03e71)
Abstract:
Zerumbone (ZER), a sesquiterpene compound occurring in tropical ginger Zingiber zerumbet Smith, has been implicated as one of the promising chemopreventive agents against colon and skin cancer. In the present study, we investigated the phase II detoxification enzymes induction of ZER using a cultured rat normal liver epithelial cell line. Exposure of RL34 cells to ZER resulted in the significant induction of glutathione S-transferase, while the reduced analogues of ZER ([alpha]-humulene and 8-hydroxy-[alpha]-humulene) did not show any inducing effect. Therefore, the electrophilic property, characterized by the reactivity with intracellular nucleophiles including protein sulfhydryls as well as low molecular weight thiols, at the 8-position [alpha],[beta]-unsaturated carbonyl group plays an important role in the induction of phase II enzymes. ZER induced nuclear localization of the transcription factor Nrf2 that binds to antioxidant response element (ARE) of the phase II enzyme genes, suggesting that ZER is a potential activator of the Nrf2/ARE-dependent detoxification pathway. This is consistent with the observation that ZER potentiated the gene expression of several Nrf2/ARE-dependent phase II enzyme genes, including [gamma]-glutamylcysteine synthetase, glutathione peroxidase, and hemeoxygenase-1. The present study also implied the antioxidant role of this detoxification system activation by ZER in the neutralization of lipid peroxidation in hepatocytes, providing a new insight for cancer prevention.
Keywords: Glutathione S-transferase; Zerumbone; Glutathione; Electrophile; Antioxidant; Cancer prevention; Detoxification; [alpha],[beta]-unsaturated carbonyl; RL34

J. Nguefack, V. Leth, P. H. Amvam Zollo, S. B. Mathur, Evaluation of five essential oils from aromatic plants of Cameroon for controlling food spoilage and mycotoxin producing fungi, International Journal of Food Microbiology, Volume 94, Issue 3, 1 August 2004, Pages 329-334, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2004.02.017.
(http://www.sciencedirect.com/science/article/B6T7K-4C82CF4-5/2/c783260eb6953bf62764adc14270fb02)
Abstract:
Five essential oils (EO) extracted from Cymbopogon citratus, Monodora myristica, Ocimum gratissimum, Thymus vulgaris and Zingiber officinale were investigated for their inhibitory effect against three food spoilage and mycotoxin producing fungi, Fusarium moniliforme, Aspergillus flavus and Aspergillus fumigatus. Five strains of each fungus were tested. The agar dilution technique was used to determine the inhibitory effect of each EO on the radial growth of the fungus, and a dose response was recorded. The EO from O. gratissimum, T. vulgaris and C. citratus were the most effective and prevented conidial germination and the growth of all three fungi on corn meal agar at 800, 1000 and 1200 ppm, respectively. Moderate activity was observed for the EO from Z. officinale between 800 and 2500 ppm, while the EO from M. myristica was less inhibitory. These effects against food spoilage and mycotoxin producing fungi indicated the possible ability of each essential oil as a food preservative. A comparative test on the preservative ability of the EO from O. gratissimum and potassium sorbate against A. flavus at pH 3.0 and 4.5 showed that the EO remained stable at both pH, whereas the efficacy of potassium sorbate was reduced at higher pH. We concluded that the EO from O. gratissimum is a potential food preservative with a pH dependent superiority against potassium sorbate, and these are novel scientific information.
Keywords: Essential oils; Food preservatives; Fungi; Growth inhibition; Radial growth

B. N. Panja, S. Chaudhuri, Exploitation of soil arbuscular mycorrhizal potential for AM-dependent mandarin orange plants by pre-cropping with mycotrophic crops, Applied Soil Ecology, Volume 26, Issue 3, July 2004, Pages 249-255, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2003.12.007.

(http://www.sciencedirect.com/science/article/B6T4B-4BMTPPS-5/2/679d3f331d5d3ad67ddd2127e800d429)
Abstract:
Results of a nursery study on the effect of short season pre-cropping with differently mycotrophic herbaceous crops on growth of arbuscular mycorrhiza-dependent mandarin orange plants at an early stage after transplantation are presented. The study was carried out with eroded, low nutrient, acidic, brown forest soil of the North-Eastern Himalayan region of India. Mandarin orange seedling plants at 180 days after transplantation showed variation in shoot growth response to single season pre-cropping with seven different crops--maize, Paspalum millet, soybean, onion, tomato, mustard and ginger and two non-cropped fallow treatments--non-weeded and weeded fallows. Net growth benefit to the orange plants due to the different pre-crops and the non-weeded fallow treatment over the weeded fallow treatment plants showed highly significant positive correlation with mycorrhizal root mass of the orange plants as it varied due to the different pre-crop treatments. Net growth benefit due to the pre-crops and weeds varied between 0 and 50% depending upon the mycorrhizal root mass of the pre-crops and weeds, AMF spore number and infective inoculum density of the pre-cropped soils. These pre-crop variables individually and cumulatively contributed to the highly significant positive correlation between the AMF potential of the pre-cropped soils and growth of mandarin orange plants through their effect on mycorrhizal root mass development (i.e. extent of mycorrhization) of the mandarin orange plants. The results show that choice of a pre-crop from the available options practised by the farmers, grown even for a short season can substantially alter the inherent AMF potential of soils to significantly influence the performance of the mycorrhiza-dependent orange plant. The relationship between soil mycorrhizal potential left by a pre-crop and mycorrhizal benefit drawn by the succeeding AM responsive plant can be taken advantage of in the exploitation of native AMF potential of soils for growth and nutrition management of crops in low nutrient, low input-output systems of production.
Keywords: Arbuscular mycorrhiza; Low input sustainable agriculture (LISA); Citriculture; Ecological agriculture

Shivanand D. Jolad, R.Clark Lantz, Aniko M. Solyom, Guan Jie Chen, Robert B. Bates, Barbara N. Timmermann, Fresh organically grown ginger (Zingiber officinale): composition and effects on LPS-induced PGE2 production, Phytochemistry, Volume 65, Issue 13, July 2004, Pages 1937-1954, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2004.06.008.
(http://www.sciencedirect.com/science/article/B6TH7-4CX00WH-1/2/8f4db01da14991c296d287129d71d5a1)
Abstract:
Gas chromatography in conjunction with mass spectrometry, a technique previously employed to analyze non-volatile pungent components of ginger extracts modified to trimethylsilyl derivatives, was applied successfully for the first time to analyze unmodified partially purified fractions from the dichloromethane extracts of organically grown samples of fresh Chinese white and Japanese yellow varieties of ginger, Zingiber officinale Roscoe (Zingiberaceae). This analysis resulted in the detection of 20 hitherto unknown natural products and 31 compounds previously reported as ginger constituents. These include paradols, dihydroparadols, gingerols, acetyl derivatives of gingerols, shogaols, 3-dihydroshogaols, gingerdiols, mono- and diacetyl derivatives of gingerdiols, 1-dehydrogingerdiones, diarylheptanoids, and methyl ether derivatives of some of these compounds. The thermal degradation of gingerols to gingerone, shogaols, and related compounds was demonstrated. The major constituent in the two varieties was [6]-gingerol, a chemical marker for Z. officinale. Mass spectral fragmentation patterns for all the compounds are described and interpreted. Anti-inflammatory activities of silica gel chromatography fractions were tested using an in vitro PGE2 assay. Most of the fractions containing gingerols and/or gingerol derivatives showed excellent inhibition of LPS-induced PGE2 production.
Keywords: Zingiber officinale; Zingiberaceae; Ginger; Rhizomes; Ginger derivatives

M. Noor Azian, A. A. Mustafa Kamal, M. Nurul Azlina, Changes of cell structure in ginger during processing, Journal of Food Engineering, Volume 62, Issue 4, May 2004, Pages 359-364, ISSN 0260-8774, DOI: 10.1016/S0260-8774(03)00251-6.
(http://www.sciencedirect.com/science/article/B6T8J-498TX71-4/2/7960f828761d8fdefed0b070488669a3)
Abstract:
The purpose of this study was to examine the histological changes of cell structure in ginger during pre-treatment, steaming under pressure and solvent extraction of the oleoresin. The effects of pre-treatment on ginger were studied using fresh ginger, dried ginger, fresh ginger blanched at three different times (5, 10 and 15 min) at atmospheric pressure. Steaming of dried ginger prior to steam distillation was said to hasten the process. The effects of steaming dried ginger with varied durations (30 min, 1 h and 2 h) and under varied pressures (0.3, 0.6 and 0.9 bar gauge) were also studied. Ginger oleoresin was obtained through solvent extraction. The effects of solvent extraction on ginger tissues, dried and fresh were observed after 3 h of extraction. The tissues were stained with Saffranin and Fast Green. The histological analysis was done using a light microscopy (LM) and had revealed some important information about the changes in the cell's structure. Through LM studies, it was confirmed that drying was a vital procedure for pre-treatment to speed up processing time. The reconstruction of parenchyma cell walls was observed after 30 min of steaming, which prolonged the steam distillation time and 3 h of solvent extraction time was insufficient for the extraction of the oleoresin.
Keywords: Histological; Ginger; Oil cell; Oleoresin; Processes

Jianping Ma, Xiaoling Jin, Li Yang, Zhong-Li Liu, Diarylheptanoids from the rhizomes of Zingiber officinale, Phytochemistry, Volume 65, Issue 8, April 2004, Pages 1137-1143, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2004.03.007.
(http://www.sciencedirect.com/science/article/B6TH7-4C47HH4-6/2/746cddb4eaf8ed5e59e125f13dd375cc)
Abstract:
Seven new diarylheptanoids, i.e., (3S,5S)-3,5-diacetoxy-1,7-bis(4-hydroxy-3-methoxyphenyl)heptane, (3R,5S)-3-acetoxy-5-hydroxy-1,7-bis(4-hydroxy-3-methoxyphenyl)heptane, (3R,5S)-3,5-dihydroxy-1-(4-hydroxy-3,5-dimethoxyphenyl)-7-(4-hydroxy-3-methoxyphenyl)heptane, (5S)-5-acetoxy-1,7-bis(4-hydroxy-3-methoxyphenyl)heptan-3-one, 5-hydroxy-1-(3,4-dihydroxy-5-methoxyphenyl)-7-(4-hydroxy-3-methoxyphenyl)heptan-3-one, 5-hydroxy-1-(4-hydroxy-3-methoxyphenyl)-7-(3,4-dihydroxy-5-methoxy-phenyl)heptan-3-one and 1,5-epoxy-3-hydroxy-1-(4-hydroxy-3,5-dimethoxyphenyl)-7-(4-hydroxy-3-methoxyphenyl)heptane were isolated from the rhizomes of Chinese ginger (Zingiber officinale Roscoe), along with 25 known compounds, i.e., 8 diarylheptanoids, 14 gingerol analogs, a diterpene and 2 steroids. Their structures were elucidated by spectroscopic and chemical methods.
Keywords: Ginger; Zingiber officinale; Zingiberaceae; Diarylheptanoid

A. J. Gracie, P. H. Brown, R. J. Clark, Study of some factors affecting the growth and development of myoga (Zingiber mioga Roscoe), Scientia Horticulturae, Volume 100, Issues 1-4, 19 March 2004, Pages 267-278, ISSN 0304-4238, DOI: 10.1016/j.scienta.2003.08.016.
(http://www.sciencedirect.com/science/article/B6TC3-49XPJ5X-1/2/f1f468219b7103c1609746b94cfc64bd)
Abstract:
In order to optimise production of the edible flower buds produced by myoga (Zingiber mioga Roscoe) a greater understanding of the growth and development of the plant and factors influencing flower initiation and development are required. The vegetative growth phase in myoga was characterised by a distinct period of pseudostem development from the planted rhizome piece

followed by an extended period of rhizome growth from both the base of pseudostems and the planted rhizome piece. The transition from pseudostem formation to the initiation of rhizome growth occurred at the same time as the dry weight of the planted rhizome piece ceased to decline. Flower bud initiation and development occurred over an extended period, beginning soon after the commencement of new rhizome growth and ending prior to foliage senescence. Flower buds were observed at the terminal meristem of first, second, third and fourth order rhizomes. Increasing temperatures stimulated both increased vegetative growth and flower bud initiation and development. Low flower bud yields recorded under conditions of low temperature were the result of reduced rate of floral initiation and not abortion of flower buds. Increased shading of plants grown under glasshouse conditions resulted in reduced flower bud yield and similarly the response resulted from decreased initiation rather than abortion.
Keywords: Flower buds; Rhizome; Pseudostem; Shade; Temperature

Al Moaruf Olukayode Ajasa, Muibat Olabisi Bello, Asiata Omotayo Ibrahim, Isiaka Ajani Ogunwande, Nureni Olayide Olawore, Heavy trace metals and macronutrients status in herbal plants of Nigeria, Food Chemistry, Volume 85, Issue 1, March 2004, Pages 67-71, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2003.06.004.
(http://www.sciencedirect.com/science/article/B6T6R-49V3GS9-5/2/e784432f411e7b1d887ae766686cda3c)
Abstract:
The concentration levels (ppm) of selected toxic trace metals (Fe, Mn, Cu, Pb and Zn) and macronutrients (Na, K, Mg and Ca), along with P, were estimated in some of the important herbal plants of the southwest part of Nigeria. The atomic absorption spectrophotometer was employed for the estimation conducted on 10 plant species collected from different locations within Ogbomoso. The plants were Anacardium occidentale, Azadirachta indica, Butyrospermum paradoxum, Mangifera indica, Morinda lucida, Ocimum canum, Solanum erianthum, Solanum torvum, Zingiber officinale and Hyptis suaveolens. The metal contents in the samples were found at different levels. The highest mean levels (ppm) of Zn (35.1+/-0.01) and Cu (24.4+/-0.01) were found in Hyptis suaveolens while those of Mn (685+/-0.02) and Ca (51[punctuation space]340+/-21) were found in Morinda lucida. The result also showed that Ocimum canum had the highest amounts of K (36[punctuation space]600+/-350), P (3700+/-35) and Fe (241+/-0.05). Anacardium occidentale had the highest concentration of Na (613+/-0.60) while Azadirachta indica had the highest mean concentrations of Pb (0.49+/-0.03) and Mg (5630+/-12).
Keywords: Medicinal plants; Metal contents; Microwave dissolution; Atomic absorption spectrophotometer