Komoditas : Bawang Putih

1. AU: Rosen,-C.J.; Tong,-C.B.S.
TI: Yield, dry matter partitioning, and storage quality of hardneck garlic as affected by soil amendments and scape removal.
SO: HortScience. Alexandria, Va. : The American Society for Horticultural Science. Dec 2001. v. 36 (7) p. 1235-1239.
LA: English
DE: allium-sativum. crop-yield. dry-matter-distribution. storage-quality. stems-. sandy-loam-soils. soil-organic-matter. soil-fertility. manures-. fertilizers-. application-rates. composts-. weight-. minnesota-.
AB: Two on-farm field studies were conducted in 1996 and repeated in 1997 to determine the effects of soil amendments and scape (flower stalk) removal on yield, dry matter partitioning, and storage quality of hardneck garlic (Allium sativum L.). One study site was on a loamy sand soil with low organic matter and fertility and the other site was on a sandy loam soil with high organic matter and fertility. Soil amendment treatments tested at both sites were: 1) no amendment, 2) composted manure, and 3) inorganic fertilizer according to soil test recommendations. A fourth treatment, dried, composted turkey-manure-based fertilizer, was included at the low organic matter site. Scapes were removed at the curled stage from plants in half of the harvest rows. Scapes from the remainder of the harvest row plants were allowed to mature until harvest. In 1997, bulbs from each treatment were stored at 0 to 3 degrees C or 19 to 21 degrees C for 6 months. Soil amendment treatments had no effect on total garlic bulb yield, dry mass partitioning, or stored bulb weight loss at the sandy loam, high organic matter site. Manure compost, fertilizer, and composted turkey manure soil amendments reduced the yield of smaller bulbs compared with the control at the loamy sand, low organic matter site. The proportion of bulbs >5 cm was highest with the manure compost treatment. At the low organic matter site, scape removal resulted in a 15% increase in bulb yield and an increase in bulb size compared with leaving scapes on until harvest (P = 0.05). At the high organic matter site, scape removal increased bulb yield by 5% (P = 0.10). Scape removal increased dry matter partitioning to the bulbs, but had no effect on total.
(scape + shoot + bulb) aboveground dry matter production. The increase in bulb dry mass when scapes were removed was offset by an increase in scape dry mass when scapes were left on. Bulb weight loss in storage was less at 0 to 3 degrees C than 19 to 21 degrees C. Soil amendments only affected bulb storage quality at the loamy sand, low soil organic matter site. The effect of scape removal on bulb weight loss was nonsignificant at either location.

2. AU: Kang,-N.S.; Moon,-E.Y.; Cho,-C.G.; Pyo,-S.
TI: Immunomodulating effect of garlic component, allicin, on murine peritoneal macrophages.
SO: Nutr-res. New York, N.Y. : Elsevier Science Inc. Apr 2001. v. 21 (4) p. 617-626.
LA: English
DE: garlic-. allium-sativum. plant-extracts. macrophages-. dosage-effects. tumor-necrosis-factor. nitric-oxide. hydrogen-peroxide. interleukins-. phagocytosis-. mice-. animal-models.
AB: Macrophages play an important role in host defenses against tumors by killing them and produce secretory products, which were resulted in the protection against bacterial, virus infection and malignant cell growth. Allicin, the major component of Garlic (

Allium sativum) was examined for the ability to induce secretory and cellular responses in murine peritoneal macrophages. When macrophages were treated with various doses (1, 10, 100 ng/ml) of allicin for 20 hr, allicin induced tumoricidal activity and increased the production of tumor necrosis factor (TNF-alpha), and nitric oxide (NO) in a dose-dependent manner. However, there was a little alteration on phagocytosis and the production of hydrogen peroxide (H2O2), interleukin-1 (IL-1), and IL-6. These results indicate that NO and TNF-alpha are likely major mediators of tumoricidal activity in allicin-treated macrophages. Taken together our data suggest that allicin is an efficient immunomodulator of macrophage secretory and cellular activities, showing a differential effect on production of cytokines and cytotoxic molecules.

3. AU: Platel,-K.; Srinivasan,-K.
TI: Studies on the influence of dietary spices on food transit time in experimental rats.
SO: Nutr-res. New York, N.Y. : Elsevier Science Inc. Sept 2001. v. 21 (9) p. 1309-1314.
LA: English
DE: diet-. curcumin-. capsaicin-. piper-nigrum. ginger-. cuminum-cyminum. fenugreek-. mustard-. fennel-. coriandrum-sativum. mentha-. garlic-. onions-. ferula-assa-foetida. trachyspermum-ammi. spices-. transit-time. rats-. animal-models.
AB: In an animal experiment, the influence of several spices included in the diet, on food transit time was examined. Groups of adult female Wistar rats were maintained for 6 weeks on diets containing (g%): Curcumin (0.5), Capsaicin (0.015), Piperine (0.02), Ginger (0.05), Cumin (1.25), Fenugreek (2.0), Mustard (0.25), Asafoetida (0.25), Ajowan (0.2), Fennel (0.5), Coriander (2.0), Mint (1.0), Garlic (0.5), and Onion (2.0). On the last day, food transit time was monitored by including ferric oxide (0.5%) in the diet as an un-absorbable marker. Time of excretion of colored faeces was noted following time of consumption of the diet with the marker. In general, all the test spices except fenugreek and mustard produced a significant shortening of the food transit time. This influence was more prominent in the case of spices--ginger, ajowan, cumin, piperine, coriander and capsaicin.

4. AU: Morcos,-N.C.; Camilo,-K.
TI: Acute and chronic toxicity study of fish oil and garlic combination.
SO: Int-j-vitam-nutr-res. Bern : Hogrefe & Huber Publishers. Sept 2001 . v. 71 (5) p. 306-312.
LA: English
DE: fish-oils. toxicity-. garlic-. food-supplements. oral-administration. blood-lipids. metabolism-. histology-. rats-. animal-models. dosage-. duration-. long-term-experiments. triacylglycerols-. cholesterol-. low-density-lipoprotein. feed-intake. erythrocyte-count. renal-function. thyroid-function. prothrombin-. high-density-lipoprotein. liver-function.
AB: The purpose of this study is to evaluate the acute and chronic toxicology of oral intake of fish oil (omega-3 fatty acid) and garlic combination food supplements. These supplements were proven to have beneficial effects on the lipid profile. Therefore, it is important to evaluate the potential long-term effects of fish oil and garlic combination supplements on the biochemistry of organ structure and function. The hypothesis to be tested was that acute and chronic high-dose supplements of fish oil and garlic may not adversely affect organ histology but may influence certain

metabolic activities. A double-blind, placebo-controlled study was carried out using 28 Sprague Dawley rats separated into a placebo group (16 rats) and a supplement group (12 rats). The supplement group received the ingredients in chow inserts at a dosage that was equivalent to three times the maximum safe daily dosage for fish oil and the usual daily dosage for garlic (the maximum safe daily dosage recommended by the United States Food And Drug Administration for a 70-kg human is a total of 3 g/day intake of EPA and DHA omega-3 fatty acids from conventional and dietary sources. The usual daily garlic usage is garlic powder = 1200 mg). The study was conducted over a period of 12 months with evaluations performed at baseline, 2 months, 6 months, and 12 months. Results confirm the expected acute triglyceride, total cholesterol and LDL suppression at these higher dosages in the supplement group. Acutely and chronically, there were no differences in external appearance, level of activity, daily food consumption, blood cell count, kidney function, thyroid function, prothrombin time (PT), and.
activated partial prothrombin time (PTT), which remained within normal ranges in the supplement group. Organ histology remained unchanged. Although during the chronic toxicity period the triglyceride and LDL suppression persisted, it was noted that total cholesterol and HDL levels increased. The increase in cholesterol and HDL in the supplement group during chronic toxicity periods is simultaneous with loss of suppression of plasma levels of other liver function marker enzymes, ALT and AST, which are not involved in cholesterol synthesis. This possibly suggests that other liver enzymes involved in cholesterol synthesis, such as HMG-co A reductase, follow a similar escape from suppression.

5. AU: Groot,-H.-de.
TI: Garlic plant named 'Angelique'.
SO: US-pat-Plant. [Washington, D.C. : U.S. Patent and Trademark Office, 1976-. Dec 11, 2001. (12,272) 3 p.
LA: English
DE: cultivars-. patents-. bulbs-. planting-stock. earliness-. high-yielding-varieties. usa-. netherlands-.
AB: A new and distinct cultivar of garlic plant named 'Angelique', characterized by the presence of flower scape, bigger-sized bulbs, vigorous foliage that develops quicker and has more volume than comparative cultivars, arrangement and size of the cloves, earlier harvesting period and greater plant height.

6. AU: Zhang,-X.H.; Lowe,-D.; Giles,-P.; Fell,-S.; Connock,-M.J.; Maslin,-D.J.
TI: Gender may affect the action of garlic oil on plasma cholesterol and glucose levels of normal subjects.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. May 2001. v. 131 (5) p. 1471-1478.
LA: English
DE: garlic-. powders-. plant-oils. dietary-fat. sex-differences. blood-plasma. blood-lipids. cholesterol-. blood-sugar. cholesterol-metabolism. carbohydrate-metabolism. supplements-. antioxidants-. diet-. experimental-diets. lipoproteins-. triacylglycerols-. risk-factors. men-. women-.
AB: Early trials of garlic preparations on blood lipids mainly supported a lipid-lowering effect, whereas later well-designed garlic tablet trials were mainly entirely null. However, enteric simulation tests suggest that this discordance may result from ineffective delivery of bioactive agents from the brands of garlic

powder (GP) and cyclodextrin-bound garlic oil (GO) tablets tested in some recent negative trials. In contrast, enteric simulation tests show that the preformed bioactive agents present in " traditional" gelatin capsules of GO are efficiently released, although such capsules have rarely been investigated in lipid-lowering trials. It was hypothesized that gelatin capsules of GO given to normal subjects would improve specified coronary heart disease risk factors. Effects of a GP preparation were also investigated. Subjects (n = 51; men and women, mean age 27 y) were randomly assigned to receive either 8.2 mg/d of GO (allyl sulfides) or placebo for 11 wk. Another 27 subjects received garlic powder (GP) of similar biopotential (7.8 mg allicin/d). Outcome measures were 95% confidence intervals (CI) between GO and placebo groups for differences between baseline and subsequent sample times. Men and women combined showed no significant differences save for an improved total antioxidant capacity at 6 wk (P = 0.01). Hence, no benefit from GO after 11 wk is one plausible conclusion. However, there were significant differences in effect of GO between men and women for HDL cholesterol (HDL-C) (P = 0.004) and total cholesterol (TC)/HDL-C (P = 0.003). Women showed favorable effects in terms of CHD risk factors (i.e., increases in HDL-C and reductions in TC/HDL-C).
whereas men had small adverse effects. There was a significant difference in the GO effect for glucose (P = 0.006), with a reduction seen for men and an increase for women. The gender effects were unexpected and such analyses were not planned in advance. Confirmation of these findings with larger numbers of subjects would have importance for the use of garlic against CHD and for the design of future garlic studies.

7. AU: Chen,-W.W.; Yang,-J.J.; Tsai,-C.W.; Wu,-J.J.; Sheen,-L.Y.; Ou,-C.C. ; Li,-C.K.
TI: Dietary fat and garlic oil independently regulate hepatic cytochrome P450 2B1 and the placental form of glutathione S-transferase expression in rats.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. May 2001. v. 131 (5) p. 1438-1443.
LA: English
DE: garlic-. plant-oils. dietary-fat. diet-. liver-. cytochrome-p-450. glutathione-transferase. experimental-diets. gene-expression. maize-oil. fish-oils. dosage-effects. supplements-. fatty-acids. phospholipids-. enzyme-activity. synergism-. weight-. body-weight. drug-metabolism. rats-. animal-models.
AB: The individual and combined effects of dietary fat and garlic oil on two drug-metabolizing enzymes, cytochrome P450 2B1 and the placental form of glutathione (GSH) S-transferase (PGST), in rat liver were examined in this study. Rats were fed a low corn oil, high corn oil or high fish oil diet and received various amount of garlic oil (0, 30, 80, 200 mg/kg body) orally three times per week for 6 wk. The fat energy in the low and high fat diets accounted for 11.6 and 45.7% of total energy, respectively. Final body weights did not differ among the three dietary fat groups and were not affected by garlic oil treatment. The fatty acid profile in hepatic phospholipids revealed higher eicosapentaenoic acid [20:5(n-3)] and docosahexaenoic acid [22:6(n-3)] levels in the fish oil-fed group than in the low and high corn oil-fed groups (P < 0.05). In contrast, the corn oil-fed groups had greater hepatic phospholipid arachidonic acid [20:4(n-6)] levels (P < 0.05). Both dietary fat and garlic oil significantly affected hepatic cytochrome 7-pentoxyresorufin O-dealkylase (PROD) activity and GST activity toward ethacrynic acid. Rats fed the high fish oil diet

had 85 and 51% higher PROD activity compared with those fed the low or the high corn oil diet, respectively ($P < 0.05$). The GST activity in the high fish oil and the high corn oil groups was 33 and 18% higher than that in the low corn oil group ($P < 0.05$), respectively, and the GST activity in rats fed the high fish oil diet was higher than in those fed the high corn oil diet ($P < 0.05$). Garlic oil dose-dependently increased GST activity. No interaction between dietary fat and garlic oil on PROD or GST activity was noted.

Northern and Western blot analysis revealed that dietary fish oil increased both cytochrome P450 2B1 and PGST mRNA and protein levels. Cytochrome P450 2B1 and PGST mRNA and protein levels were also dose-dependently increased by garlic oil treatment. The effects of garlic oil and dietary fat on P450 2B1 and PGST mRNA and protein expression were independent. These results indicate that dietary fat and garlic oil independently modulate expression at transcriptional and/or post-transcriptional stages.

8. AU: Renwick,-J.A.A.; Zhang,-W.; Haribal,-M.; Attygalle,-A.B.; Lopez,-K. D.
TI: Dual chemical barriers protect a plant against different larval stages of an insect.
SO: J-chem-ecol. New York, N.Y. : Plenum Publishing Corporation. Aug 2001. v. 27 (8) p. 1575-1583.
LA: English
DE: alliaria-petiolata. pest-resistance. plant-composition. antifeedants-. pieris-napi. cyanogenic-glycosides. flavonoids-.
AB: The host plants of the native American butterfly, Pieris napi oleracea, include most wild mustards. However, garlic mustard, Alliaria petiolata, a highly invasive weed that was introduced from Europe, appears to be protected from this insect. Although adults will oviposit on the plant, most larvae of P. n. oleracea do not survive on garlic mustard. We used feeding bioassays with different larval stages of the insect to monitor the isolation and identification of two bioactive constituents that could explain the natural resistance of this plant. A novel cyanopropenyl glycoside (1), alliarinoside, strongly inhibits feeding by first instars, while a flavone glycoside (2), isovitexin-6"-D-beta-glucopyranoside, deters later instars from feeding. Interestingly, the first instars are insensitive to 2, and the late instars are little affected by 1. Furthermore, differential effects of dietary experience on insect responses suggest that 1 acts through a mechanism of post-ingestive inhibition, whereas 2 involves gustatory deterrence of feeding.

9. AU: Verhagen,-H.; Hageman,-G.J.; Rauma,-A.L.; Versluis-de-Haan,-G.; Herwijnen,-M.H.M.-van.; Groot,-J.-de.; Torronen,-R.; Mykkanen,-H.
TI: Biomonitoring the intake of garlic via urinary excretion of allyl mercapturic acid.
SO: Br-j-nutr. London, U.K. : CAB International. Aug 2001. v. 86 (Suppl. 1) p. S111-S114.
LA: English
DE: garlic-. monitoring-. urine-. excretion-. metabolites-. biological-indicators. biochemical-markers. intake-. supplements-. finland-.
AB: Allium vegetables (onions, leeks, chives) and in particular garlic have been claimed to have health-promoting potential. This study was conducted to get insight into the perspectives for monitoring the intake of garlic by a biomarker approach. Chemically, the biomarker results from exposure to gamma-glutamyl-S-allyl-L-cysteine, which is first hydrolysed by gamma-glutamine-transpeptidase resulting in the formation of

S-allyl-L-cysteine. The latter compound is subsequently acetylated by acetyltransferase into S-allyl-mercapturic acid (ALMA) and excreted into urine. The mercapturic acid was measured in urine using gas chromatography with mass spectrometry. Thus the intake of garlic was determined to check the compliance of garlic intake in a placebo-controlled intervention study. Results indicate that S-allyl-mercapturic acid could be detected in 15 out of 16 urine samples of garlic supplement takers, indicating good compliance. In addition, the intake of garlic was also monitored in a cross-section study of vegans versus controls in Finland, in which no differences in garlic consumption nor in ALMA output were recorded between vegans and controls. These data indicate good possibilities for further studies in the field of biomarkers to investigate the putative chemopreventive effects of garlic and garlic-containing products.

10. AU: Leonard,-S.W.; Hardin,-K.; Leklem,-J.E.
TI: Vitamin B-6 content of spices.
SO: J-food-compos-anal. Orlando, Fla. : Academic Press. Apr 2001. v. 14 (2) p. 163-167.
LA: English
DE: spices-. food-composition. vitamin-content. pyridoxine-. leaves-. seeds-. sources-. nutrient-content.
AB: The vitamin B-6 content of 42 spices was measured in duplicate using a microbiological assay. There was a wide range of values for these 42 spices (0.10-4.02 mg/100 g). Relatively high sources were the red pepper spices such as chili, cayenne, and paprika (2.45-4.02 mg/100 g), garlic (2.94 mg/100 g), and certain leaves such as basil, bay leaf, dill weed, oregano, rosemary, sage, and tarragon (1.71-2.69 mg/100 g). The seeds were relatively low sources (0.21-0.89 mg/100 g). One teaspoon (5 g) per day of some of the spices which could be considered relatively better sources of vitamin B-6, could contribute anywhere from 0.1 to 0.2 mg of vitamin B-6 (5-10% of the current RDA for vitamin B-6) to the overall daily dietary consumption of the vitamin.

11. AU: Oi,-Y.; Imafuku,-M.; Shishido,-C.; Kominato,-Y.; Nishimura,-S.; Iwai,-K.
TI: Garlic supplementation increases testicular testosterone and decreases plasma corticosterone in rats fed a high protein diet.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Aug 2001. v. 131 (8) p. 2150-2156.
LA: English
DE: dietary-protein. casein-. protein-intake. garlic-. supplements-. testes-. testosterone-. corticosterone-. blood-plasma. rats-. animal-models. diet-. experimental-diets. dosage-effects. powders-. urine-. excretion-. ketosteroids-. nitrogen-balance. protein-metabolism. anabolism-. organic-sulfur-compounds. lh-. hormone-secretion. feces-. nitrogen-content. body-weight. liver-. kidneys-. adipose-tissue. weight-. creatinine-. arginase-.
AB: The effects of garlic supplementation on protein metabolism were investigated by measuring testis testosterone and plasma corticosterone in rats fed diets with different protein levels. In Experiment 1, rats were fed experimental diets with different protein levels (40, 25 or 10 g/100 g casein) with or without 0.8 g/100 g garlic powder. After 28 d of feeding, testosterone contents in the testis were significantly higher and plasma corticosterone concentrations were significantly lower in rats fed 40 and 25% casein diets with garlic powder than in those fed the same diets without garlic powder. Urinary excretion of 17-ketosteroid (an index of testosterone), nitrogen balance and hepatic arginase

activity were significantly higher in rats fed the 40% casein diet with garlic powder than in the 40% casein controls. In Experiment 2, the effect of diallyldisulfide (a major volatile sulfur-containing compound in garlic) on the secretion of luteinizing hormone (LH) from the pituitary gland, which regulates testosterone production in the testis, was investigated in anesthetized rats. Plasma LH concentration increased dose dependently after administration of diallyldisulfide ($P < 0.01$, $r = 0.558$). These results suggest that dietary supplementation with 0.8 g/100 g garlic alters hormones associated with protein anabolism by increasing testicular testosterone and decreasing plasma corticosterone in rats fed a high protein diet.

12. AU: Miean,-K.H.; Mohamed,-S.
TI: Flavonoid (Myricetin, quercetin, kaempferol, luteolin, and apigenin) content of edible tropical plants.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. June 2001. v. 49 (6) p. 3106-3112.
LA: English
DE: edible-species. tropics-. fruit-. vegetables-. flavonoids-. quercetin-. kaempferol-. chemical-composition. malaysia-.
AB: Studies were conducted on the flavonoids (myricetin, quercetin, kaempferol, luteolin, and apigenin) contents of 62 edible tropical plants. The highest total flavonoids content was in onion leaves (1497.5 mg/kg quercetin, 391.0 mg/kg luteolin, and 832.0 mg/kg kaempferol), followed by Semambu leaves (2041.0 mg/kg), bird chili (1663.0 mg/kg), black tea (1491.0 mg/kg), papaya shoots (1264.0 mg/ kg), and guava (1128.5 mg/kg). The major flavonoid in these plant extracts is quercetin, followed by myricetin and kaempferol. Luteolin could be detected only in broccoli (74.5 mg/kg dry weight), green chili (33.0 mg/kg), bird chili (1035.0 mg/kg), onion leaves (391.0 mg/kg), belimbi fruit (202.0 mg/kg), belimbi leaves (464.5 mg/kg), French bean (11.0 mg/kg), carrot (37.5 mg/kg) , white radish (9.0 mg/kg), local celery (80.5 mg/kg), limau purut leaves (30.5 mg/kg), and dried asam gelugur (107.5 mg/kg). Apigenin was found only in Chinese cabbage (187.0 mg/kg), bell pepper (272.0 mg/kg), garlic (217.0 mg/kg), belimbi fruit (458.0 mg/kg), French peas (176.0 mg/kg), snake gourd (42.4 mg/kg), guava (579.0 mg/kg), wolfberry leaves (547.0 mg/kg), local celery (338.5 mg/kg), daun turi (39.5 mg/kg), and kadok (34.5 mg/kg). In vegetables, quercetin glycosides predominate, but glycosides of kaempferol, luteolin, and apigenin are also present. Fruits contain almost exclusively quercetin glycosides, whereas kaempferol and myricetin glycosides are found only in trace quantities.

13. AU: Dovas,-C.I.; Hatziloukas,-E.; Salomon,-R.; Barg,-E.; Shiboleth,-Y.; Katis,-N.I.
TI: Incidence of viruses infecting Allium spp. in Greece.
SO: Eur-j-plant-pathol. Dordrecht ; Boston : Kluwer Academic Publishers, c1994-. Sept 2001. v. 107 (7) p. 677-684.
LA: English
DE: allium-sativum. allium-cepa. allium-porrum. allium-ascalonicum. allium-. wild-relatives. incidence-. plant-viruses. disease-prevalence. leek-yellow-stripe-potyvirus. onion-yellow-dwarf-potyvirus. shallot-latent-carlavirus. turnip-mosaic-potyvirus. polymerase-chain-reaction. elisa-. identification-. symptoms-. greece-.
AB: A survey identified viruses infecting garlic, leek and onion crops and wild Allium species in Greece. Virus identification was based on ELISA, immunoelectron microscopy, and occasionally on RT-PCR.

Samples of cultivated Allium species were collected from five districts, whereas samples of twenty-seven wild Allium species were also collected from all over Greece. Onion yellow dwarf virus (OYDV) and Leek yellow stripe virus (LYSV) were identified in 98.5% and 83.7% of all samples, respectively, and were found in all regions. Allexiviruses were also detected in all regions and their incidence ranged from 62.5% to 70.5% (depending on region and type of allexivirus). Garlic common latent virus (GCLV) was detected in samples from Arcadia (97.6%) and Evia (18.0%) and in one field in Larissa (23.0%). Shallot latent virus (SLV) was found only in two areas (Evros and Theva) and in fields planted with imported propagative material, from Iran and China. The incidence of virus-like symptoms in leek crops ranged from 10.0% to 90.0% in different regions and fields and all symptomatic plants were found to be infected by LYSV. Onion yellow dwarf virus was only found in seven symptomatic onion samples from southern Greece. Allium ampeloprasum spp. ampeloprasum and Allium flavum, were the only wild Allium species found to be infected with LYSV. Finally Turnip mosaic virus (TuMV) was found in A. sphaerocephalon, A. guttatum, A. subhirsutum, and A. neapolitanum.

14. AU: Finley,-J.W.; Ip,-C.; Lisk,-D.J.; Davis,-C.D.; Hintze,-K.J.; Whanger,-P.D.
TI: Cancer-protective properties of high-selenium broccoli.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. May 2001. v. 49 (5) p. 2679-2683.
LA: English
DE: sprouts-. broccoli-. selenium-. mineral-content. protection-. mammary-gland-neoplasms. colon-. neoplasms-. carcinogenesis-. n-methyl-n-nitrosourea-. rats-.
AB: Selenium (Se) from high-Se garlic reduces the incidence of chemically induced mammary tumors, and Se from high-Se broccoli reduces colon cancer. However, the ability of Se from high-Se broccoli to protect against mammary cancer has not been tested. Also, the sprout form of broccoli contains many secondary plant compounds that are known to reduce cancer risk, but the anticarcinogenic activity of broccoli sprouts has not been investigated. The present studies examined the ability of high-Se broccoli or high-Se broccoli sprouts to protect against chemically induced mammary or colon cancer. In one experiment, Sprague-Dawley rats that consumed diets containing 3.0 microgram of Se/g supplied as high-Se broccoli had significantly fewer mammary tumors than rats fed 0.1 microgram of Se as selenite with or without the addition of regular broccoli. In the second experiment, Fisher F-344 rats fed 2.0 microgram of Se/g of diet supplied as either high-Se broccoli florets or high-Se broccoli sprouts had significantly fewer aberrant colon crypts than rats fed 0.1 or 2 microgram of Se/g of diet supplied as selenite with or without the addition of low-Se broccoli. These data demonstrate that the cancer-protective effect of Se in high-Se broccoli extends to mammary cancer and the protective forms of broccoli against colon cancer include high-Se broccoli sprouts.

15. AU: Lawson,-L.D.; Wang,-Z.J.
TI: Low allicin release from garlic supplements: a major problem due to the sensitivities of alliinase activity.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. May 2001. v. 49 (5) p. 2592-2599.
LA: English
DE: garlic-. food-supplements. protective-coatings. organic-sulfur-compounds. release-. lyases-. enzyme-activity. solubility-.

ingestion-. man-.
AB: Most garlic supplements are standardized on allicin potential and are enteric-coated to prevent gastric acid inactivation of the allicin-producing enzyme, alliinase. To determine whether these products release the claimed amount of allicin under simulated gastrointestinal conditions, USP dissolution method 724A for drug release was applied to all 24 known brands of enteric-coated tablets. It was found that nearly all brands employed effective coatings and that they met their claims for allicin potential when crushed and suspended in water. However, all brands except one gave low dissolution allicin release, with 83% of the brands releasing less than 15% of their potential. The low allicin release was found to be due to both impaired alliinase activity, mostly caused by tablet excipients, and to slow tablet disintegration, which also impairs alliinase activity. Only when tablets had high alliinase activity and disintegrated rapidly did they show high allicin release. The ability of USP 724A to estimate allicin release in vivo was validated by monitoring breath levels of the allicin metabolite, allyl methyl sulfide. In conclusion, garlic powder supplements should no longer be standardized on allicin potential, but rather on dissolution allicin release.

16. AU: Spigelski,-D.; Jones,-P.J.H.
TI: Efficacy of garlic supplementation in lowering serum cholesterol levels.
SO: Nutr-rev. Washington, D.C.: International Life Sciences Institute--ILSI Press. July 2001. v. 59 (7) p. 236-242.
LA: English
DE: man-. garlic-. food-supplements. blood-lipids. cholesterol-. efficacy-. evaluation-. risk-reduction. cardiovascular-diseases. risk-factors. blood-pressure. viscosity-. blood-plasma. platelets-. dietary-fat. dosage-. formulations-. literature-reviews.
AB: Previous studies using garlic have found alterations on a number of cardiovascular disease (CVD) risk factors including blood pressure, plasma viscosity, platelet activity, and serum lipid levels. The latest clinical research suggests that consumption of garlic powder does not play a significant role in lowering plasma lipid levels when in conjunction with a low-fat, low-cholesterol diet. Additional well-controlled, long-term studies that explore dosage and preparation type are necessary to confirm the efficacy of garlic in lowering cholesterol levels and to fully understand garlic's potential role in CVD.

17. AU: Karasaki,-Y.; Tsukamoto,-S.; Mizusaki,-K.; Sugiura,-T.; Gotoh,-S.
TI: A garlic lectin exerted an antitumor activity and induced apoptosis in human tumor cells.
SO: Food-res-int. Oxford : Elsevier Science Ltd. 2001. v. 34 (1) p. 7-13.
LA: English
DE: garlic-. lectins-. medicinal-properties. neoplasms-. cell-lines. apoptosis-. cytotoxicity-. dna-. growth-.
AB: Cytotoxic effects of a lectin prepared from garlic (Allium sativum-L) bulbs on human tumor cells were studied. The lectin strongly reduced the growth and DNA synthesis of human tumor cells in a time- and a dose-dependent manner. By contrast, a soybean lectin showed only a weak inhibitory effect on growth and DNA synthesis of tumor cells. Furthermore, the garlic lectin induced apoptosis in the cells at a low concentration. The antitumor activity of garlic lectin may provide a rational basis for its effectiveness observed in clinical applications.

18. AU: Gupta,-N.; Porter,-T.D.
TI: Garlic and garlic-derived compounds inhibit human squalene monooxygenase.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. June 2001. v. 131 (6) p. 1662-1667.
LA: English
DE: garlic-. squalene-. plant-extracts. cholesterol-. biosynthesis-. oxygenases-. inhibition-. enzyme-inhibitors. solubility-. organic-sulfur-compounds. selenium-. enzyme-activity.
AB: Although extracts of garlic inhibit cholesterol biosynthesis in cultured hepatocytes, the inhibitory components of garlic and the site or sites of inhibition in the cholesterol biosynthetic pathway have not been established. To elucidate potential mechanisms of inhibition, we examined the effect of fresh garlic extract and 16 water- or lipid-soluble compounds derived from garlic on purified recombinant human squalene monooxygenase. Squalene monooxygenase catalyzes the second and likely rate-limiting step in the downstream pathway for cholesterol biosynthesis. A 50% inhibitory concentration (IC50) of squalene epoxidation was achieved with 1 g/L of fresh garlic extract; of the 16 garlic compounds tested, only selenocystine (IC50 = 65 micromol/L), S-allylcysteine (IC50 = 110 micromol/L), alliin (IC50 = 120 micromol/L), diallyl trisulfide (IC50 = 195 micromol/L), and diallyl disulfide (IC50 = 400 micromol/L) substantially inhibited the enzyme. Kinetic analysis showed that the inhibition by garlic and by these compounds was slow and irreversible, suggestive of covalent binding to the enzyme; the ability of thiol-containing compounds such as glutathione and 2,3-dimercaptopropanol to prevent and reverse the inhibition indicated that the garlic compounds were reacting with sulfhydryl groups on the protein. Dithiols were better reversal agents than monothiols, further suggesting that these inhibitors bind to the proposed vicinal sulfhydryls present on this enzyme. These results indicate that squalene monooxygenase may be one of the target enzymes through which garlic inhibits cholesterol biosynthesis.

19. AU: Groot,-H.-de.
TI: Garlic plant named 'Cindy'.
SO: US-pat-Plant. [Washington, D.C. : U.S. Patent and Trademark Office, 1976-. Aug 21, 2001. (12,061) 3 p.
LA: English
DE: allium-sativum. cultivars-. patents-. bulbs-. planting-stock. earliness-. high-yielding-varieties. usa-. netherlands-.
AB: Abstract: A new and distinct cultivar of Garlic plant named 'Cindy' characterized by the early harvesting of the plant, high yield of bulbs, healthy vegetation, presence of flower scape, distinctive bulb form and size, vigorous foliage that develops quicker and has more volume than comparative cultivars, and distinctive color of the bulb and cloves.

20. AU: Ayabe,-M.; Sumi,-S.
TI: A novel and efficient tissue culture method--"stem-disc dome culture"--for producing virus-free garlic (Allium sativum L.).
SO: Plant-cell-rep. Berlin : Springer-Verlag. Sept 2001. v. 20 (6) p. 503-507.
LA: English
DE: allium-sativum. stems-. tissue-cultures. pathogen-elimination. biochemical-techniques. explants-. culture-media. shoot-tip-culture. rooting-. shoots-. symptoms-. immunoassay-. polymerase-chain-reaction. detection-. vascular-system. regenerative-ability.

plant-viruses.
AB: Using our previously reported stem-disc culture method as a basis, we have developed an efficient tissue culture method, "stem-disc dome (SD-Dome) culture", to eliminate viruses from infected garlic plants. Fifteen to 25 dome-shaped structures that formed on stem-disc explants from a single garlic clove were excised and maintained on phytohormone-free Linsmaier and Skoog medium, as in the usual shoot-tip culture. These excised dome-shaped structures grew independently into more than 5-cm-long shoots, rooted after 8 weeks, and were successfully transplanted to soil. The resulting plants showed no viral symptoms on their leaves, even when cloves of garlic plants with severe mosaic and yellow streak symptoms were used for the cultures. Examinations of virus infection in three generations of the progenies using the direct tissue blotting immunoassay and reverse transcription polymerase chain reaction showed that viruses were excluded during culture. Microscopic observations of transverse sections of tissues in different developmental stages during stem-disc culture--dome-shaped structures, shoot buds, and shoots--suggested that the elimination of viruses may be correlated with the stage of development and organization of vascular-bundle structures.

21. AU: Ahmed,-J.; Shivhare,-U.S.
TI: Thermal kinetics of color change, rheology, and storage characteristics of garlic puree/paste.
SO: J-food-sci. Chicago, Ill. : Institute of Food Technologists. June/ July 2001. v. 66 (5) p. 754-757.
LA: English
DE: garlic-. pastes-. color-. rheological-properties. temperature-. food-storage. plasticity-. flow-. duration-.
AB: Kinetics of color change of garlic puree at selected temperatures and rheological behavior and effects of packaging materials and storage temperatures on color of garlic paste were investigated. Results indicated that color change during thermal processing of garlic puree followed first-order reaction kinetics with an activation energy of 13.78 kJ/mol. Garlic paste behaved as a pseudoplastic material and flow activation energy at 100 rpm equaled 13.30 kJ/mol. Both temperature and duration of storage had effect (P less than or equal to 0.05) on total color of garlic paste. Degreening of garlic paste was observed during storage at 25 degrees C and complete degreening occurred at about 48 to 52 d. Storage of garlic paste at 5 degrees C enhanced greening.

22. AU: Kannar,-D.; Wattanapenpaiboon,-N.; Savige,-G.S.; Wahlqvist,-M.L.
TI: Hypocholesterolemic effect of an enteric-coated garlic supplement.
SO: J-Am-Coll-Nutr. New York, NY : American College of Nutrition. June 2001. v. 20 (3) p. 225-231.
LA: English
DE: adults-. garlic-. food-supplements. hypercholesterolemia-. herbal-drugs. coatings-. drug-therapy. dietary-fat. low-density-lipoprotein. blood-lipids. cholesterol-. high-density-lipoprotein. triacylglycerols-. efficacy-.
AB: Objective: To evaluate the hypocholesterolemic effect of an enteric-coated garlic supplement standardized for allicin-releasing potential in mild to moderate hypercholesterolemic patients. Methods: A double-blind randomized, placebo-controlled intervention study was conducted in 46 hypercholesterolemic subjects who had failed or were not compliant with drug therapy. Each subject was given dietary counseling to lower fat intake and enteric-coated Australian garlic powder tablets with 9.6 mg allicin-releasing potential or matching

placebo tablets. Results: After 12 weeks, the garlic supplement group (n = 22) had a significant reduction in total cholesterol (TC, -0.36 mmol/L, -4.2%) and LDL-cholesterol (LDL-C, -0.44 mmol/L, -6.6%) while the placebo group (n = 24) had a non-significant increase in TC (0.13 mmol/L, 2.0%) and LDL-C (0.18 mmol/L, 3.7%). HDL-cholesterol was significantly increased in the placebo group (0.09 mmol/L, 9.1%), compared to the garlic group (-0.02 mmol/L, -0. 9%), and no significant difference in triglycerides or in LDL/HDL ratio was observed between groups. Conclusions: The study demonstrates that enteric-coated garlic powder supplements with 9.6 mg allicin releasing potential may have value in mild to moderate hypercholesterolemic patients when combined with a low fat diet. Taken with other evidence, the efficacy of garlic for lipoprotein metabolism might require allicin bioavailability to be enhanced through the use of, for example, an enteric-coated dose form. If this is the case, the possibility remains that greater hypocholesterolemic efficacy may be evident at a higher allicin dose. Also noteworthy in this study was a small reduction in energy intake with garlic.
compared with placebo, attributable to reduction in fat, carbohydrate and alcohol intakes. This may also have contributed to the effects on blood lipids. This study suggests that garlic supplementation has a cholesterol-lowering effect, which may be mediated by direct action of a biologically active compound or compounds and in part through the effect on food and nutrient intake.

23. AU: Kritzman,-A.; Lampel,-M.; Raccah,-B.; Gera,-A.
TI: Distribution and transmission of Iris yellow spot virus.
SO: Plant-dis. [St. Paul, Minn., American Phytopathological Society]. Aug 2001. v. 85 (8) p. 838-842.
LA: English
DE: allium-cepa. disease-transmission. spatial-distribution. tomato-spotted-wilt-virus-group. experimental-infections. thrips-tabaci. coat-proteins. amino-acid-sequences. israel-.
AB: Iris yellow spot virus (IYSV), a new tospovirus associated with a disease in onion (Allium cepa) that is known to growers in Israel as "straw bleaching," was identified and further characterized by host range, serology, electron microscopy, and molecular analysis of the nucleocapsid gene. The transmissibility of IYSV by Thrips tabaci and Frankliniella occidentalis was studied. IYSV was efficiently transmitted by T. tabaci from infected to healthy onion seedlings and leaf pieces. Two biotypes of F. occidentalis, collected from two different locations in Israel, failed to transmit the virus. Surveys to relate the incidence of thrips populations to that of IYSV were conducted in onion fields. They revealed that the onion thrips T. tabaci was the predominant thrips species, and that its incidence was strongly related to that of IYSV. Forty-five percent of the thrips population collected from IYSV-infected onion and garlic fields in Israel transmitted the virus. IYSV was not transmitted to onion seedlings from infected mother plants through the seed, and was not located in bulbs of infected plants.

24. AU: Li,-G.; Quiros,-C.F.
TI: Sequence-related amplified polymorphism (SRAP), a new marker system based on a simple PCR reaction: its application to mapping and gene tagging in Brassica.
SO: Theor-appl-genet. Berlin; Springer-Verlag. Aug 2001. v. 103 (2/3) p. 455-461.
LA: English

DE: brassica-oleracea-var.-viridis. brassica-oleracea-var.-italica. crops-. biochemical-techniques. gene-tagging. polymerase-chain-reaction. open-reading-frames.

AB: We developed a simple marker technique called sequence-related amplified polymorphism (SRAP) aimed for the amplification of open reading frames (ORFs). It is based on two-primer amplification. The primers are 17 or 18 nucleotides long and consist of the following elements. Core sequences, which are 13 to 14 bases long, where the first 10 or 11 bases starting at the 5' end, are sequences of no specific constitution ("filler" sequences), followed by the sequence CCGG in the forward primer and AATT in the reverse primer. The core is followed by three selective nucleotides at the 3' end. The filler sequences of the forward and reverse primers must be different from each other and can be 10 or 11 bases long. For the first five cycles the annealing temperature is set at 35 degrees C. The following 35 cycles are run at 50 degrees C. The amplified DNA fragments are separated by denaturing acrylamide gels and detected by autoradiography. We tested the marker technique in a series of recombinant inbred and doubled-haploid lines of Brassica oleracea L. After sequencing, approximately 45% of the gel-isolated bands matched known genes in the Genbank database. Twenty percent of the SRAP markers were co-dominant, which was demonstrated by sequencing. Construction of a linkage map revealed an even distribution of the SRAP markers in nine major linkage groups, not differing in this regard to AFLP markers. We successfully tagged the glucosinolate desaturation gene BoGLS-ALK with these markers. SRAPs were also easily amplified in other crops such as potato, rice, lettuce, Chinese cabbage (Brassica rapa L.), rapeseed (Brassica napus L.), garlic, apple, citrus, and celery. We also amplified cDNA isolated from different tissues.
of Chinese cabbage, allowing the fingerprinting of these sequences.

25. AU: Karpinska,-M.; Borowski,-J.; Danowska-Oziewicz,-M.

TI: The use of natural antioxidants in ready-to-serve food.

SO: Food-chem. Oxford : Elsevier Science Limited. Jan 2001. v. 72 (1) p. 5-9.

LA: English

DE: prepared-foods. turkey-meat. antioxidants-. food-composition. species-. sensory-evaluation. food-storage-losses. stability-. storage-quality. culinary-herbs. lipid-peroxidation. sage-. capsicum-frutescens. black-pepper. garlic-. origanum-vulgare. iodine-value. malonaldehyde-. aroma-. flavor-.

AB: Research material constituted minced meat balls prepared from mechanically deboned turkey meat. The effect of natural antioxidants, which are contained in selected spices, on sensory quality and storage stability of products was investigated. Sage and a mixture of spices (sage, red pepper, black pepper, garlic and marjoram) were used as sources of antioxidants. Products were fried in a medium layer of soybean oil and then stored in a refrigerator for 4 days. The results of the experiment showed the effect of product composition on the intensity of oxidation processes in the lipid fraction of the products. Addition of sage and the mixture of spices retarded the process of oxidation. Sage proved to be more effective than the mixture of spices.

26. AU: Jarial,-M.S.

TI: Toxic effect of garlic extracts on the eggs of Aedes aegypti (Diptera: Culicidae): a scanning electron microscopic study.

SO: J-med-entomol. Lanham, Md. : The Entomological Society of America.

May 2001. v. 38 (3) p. 446-450.
LA: English
DE: aedes-aegypti. ova-. morphology-. ultrastructure-. scanning-electron-microscopy. garlic-. vegetable-extracts. toxic-extracts. toxicity-. hatching-. viability-. inhibition-. vector-control.
AB: The surface features of the eggs of Aedes aegypti (L.) and the effect of garlic extracts on their hatching were studied by scanning electron microscopy. The exochorion and endochorion layers of the eggshells display an essentially pentagonal reticulation. The exochorion meshwork exhibits large and small papillae interconnected by horizontal struts. At higher magnification, the large papillae show aeropyles on their rough surface. Eggs hatched in deionized water undergo complete fracture near the anterior poles producing free shell caps. In contrast, eggs placed in 6% reconstituted Kyolic garlic extract are only partially fractured, display attached shell caps, and the larvae remain trapped within the shells. In the natural garlic bulb extract, the eggs show no fracture lines in their shells. No larvae were observed either alive or dead in the garlic extracts, suggesting the embryos were disabled before they could escape from their eggshells as viable larvae. It is concluded that aqueous extracts of garlic inhibit hatching of Aedes eggs. Thus, compounds in garlic may be beneficial in the control of mosquitoes.

27. AU: Ahmed,-J.; Pawanpreet.; Shivhare,-U.S.
TI: Physico-chemical and storage characteristics of garlic paste.
SO: J-food-process-preserv. Trumbull, Conn. : Food & Nutrition Press Inc. Apr 2001. v. 25 (1) p. 15-23.
LA: English
DE: garlic-. food-pastes. sodium-chloride. salt-. citric-acid. color-. plant-pigments. food-processing. heat-treatment. rheological-properties. food-storage. storage-life. food-contamination. microbial-contamination. bacteria-. lactobacillus-. coliform-bacteria. yeasts-. fungi-.
AB: A processed paste with a total solids and pH value of 33% and 4.1, respectively was prepared from fresh garlic by addition of 10% sodium chloride (w/w) and citric acid. Appearance of green pigment (in terms of the Hunter color -a* value) was noticed in the product during preparation. Paste was thermally processed at 70, 80 or 90C, respectively for 15 min. Greening of paste decreased with increase in temperature. Rheological data revealed that garlic paste behaved as a psuedo-plastic fluid with a flow behavior and consistency index of 0.14 and 279 Pa.s(n), respectively. The paste was analyzed periodically for color and microbiological counts. The product was found to be shelf stable at 25C for a period of at least 6 months. The green coloration decreased significantly ($p < 0.05$) during storage.

28. AU: Hong,-S.I.; Kim,-D.M.
TI: Storage quality of chopped garlic as influenced by organic acids and high-pressure treatment.
SO: J-sci-food-agric. West Sussex : John Wiley & Sons Limited. Mar 2001 . v. 81 (4) p. 397-403.
LA: English
DE: garlic-. storage-quality. pressure-treatment. citric-acid. ascorbic-acid. acid-treatment. color-. ph-. catechol-oxidase. enzyme-activity. food-processing. cutting-. glucose-.
AB: The storage quality of chopped garlic from bulbs in both dormant and dormancy-terminated states with or without citric and/or ascorbic acids was investigated. The chopped garlic plus acids was also treated under high hydrostatic pressure (600 MPa, 1 min).

Quality attributes of processed garlic during storage at 10 degrees C were evaluated in terms of colour, pH, polyphenol oxidase (PPO) activity, glucose content and viable cell count. Overall, the combined treatments with organic acids and high pressure conferred the best storage stability of chopped garlic, but the results depended on the physiological state of the raw garlic bulbs. For garlic from dormant bulbs, addition of citric acid rather than ascorbic acid or a mixture of the two inhibited browning more effectively. However, garlic from dormancy-terminated bulbs, treated with organic acids or high pressure, turned green and then yellowish-brown or brown. While the PPO activities of chopped garlic treated with organic acids or high hydrostatic pressure were reduced nearly to zero, other possible factors may affect the discolouration of chopped garlic. Concerning microbiological stability, the total viable cells in chopped garlic decreased significantly during storage owing to its own antimicrobial activity and the synergistic effect of high pressure.

29. AU: Koike,-S.T.; Smith,-R.F.; Davis,-R.M.; Nunez,-J.J.; Voss,-R.E.
TI: Characterization and control of garlic rust in California.
SO: Plant-dis. [St. Paul, Minn., American Phytopathological Society]. June 2001. v. 85 (6) p. 585-591.
LA: English
DE: allium-sativum. allium-cepa. allium-porrum. allium-schoenoprasum. allium-ampeloprasum. puccinia-allii. rust-diseases. fungus-control. outbreaks-. yield-losses. experimental-infections. fungal-spores. host-range. hosts-of-plant-diseases. tebuconazole-. azoxy-compounds. application-date. cultivars-. genetic-variation. disease-resistance. california-.
AB: In 1998, a devastating outbreak of rust disease severely damaged the garlic crop in California, resulting in yield losses of 51% and an economic loss of 27% to the industry. The disease also occurred in 1999 and 2000, indicating that rust may have become an annual problem in some parts of the state. The presence of urediniospores, two-celled teliospores, and telial paraphyses indicated that the pathogen was Puccinia allii. Isolates from garlic infected onion and chives, but not leek, elephant garlic, or shallot in inoculation experiments. Garlic cloves obtained from diseased plants were planted under controlled conditions, but the resulting plants did not develop rust. Fungicide trials were conducted for 3 years and showed that none of the currently registered materials gave satisfactory control. However, tebuconazole and azoxystrobin provided good protection against rust if sprayed at 10-day intervals. A variety trial of 34 garlic cultivars and selections was planted, inoculated, and evaluated for resistance to rust. Although there was variability in rust severity among the selections, acceptable levels of resistance were not observed in any cultivar.

30.AU: Unal,-R.; Fleming,-H.P.; McFeeters,-R.F.; Thompson,-R.L.; Breidt,-F.-Jr.; Giesbrecht,-F.G.
TI: Novel quantitative assays for estimating the antimicrobial activity of fresh garlic juice.
SO: J-food-prot. Des Moines, Iowa : International Association of Milk, Food and Environmental Sanitarians. Feb 2001. v. 64 (2) p. 189-194.
LA: English
DE: garlic-. vegetable-juices. antibacterial-properties. bioassays-. gram-positive-bacteria. gram-negative-bacteria. escherichia-coli. storage-. sulfonates-. food-preservatives.

AB: Novel agar diffusion and broth dilution assays were developed for quantitatively estimating the antimicrobial activity of fresh garlic juice. Bacteria found to be inhibited by garlic juice in agar diffusion assay included two gram-positive and five gram-negative species. Leuconostoc mesenteroides was not inhibited. Escherichia coli B-103 (HB101, with pJH101, ampicillin resistant, 100 microgram ml-1) was inhibited and chosen as the standard culture for quantitative assays. The agar diffusion assay was based on the slope ratio method, where the slope of dose response for garlic juice was divided by the slope of dose response for methylmethane thiosulfonate (MMTSO2). Juice from fresh garlic varied in activity between 1.76 and 2.31 microgram of MMTSO2 per mg of garlic juice. The activity of juice decreased during 11 months of storage of garlic cloves at 5 degrees C from 2.31 to less than 0.1 microgram of MMTSO2 per mg of juice. The broth dilution assay also used the E. coli B-103 culture, which permitted selective enumeration of this bacterium when 100 microgram ml-1 of ampicillin was incorporated into the enumerating agar. Selective enumeration was essential since the garlic juice was not sterile and, thus, contained natural flora. Growth of E. coli was unaffected by 0.1%, delayed by 0.25%, and completely inhibited at 0.5 and 2% garlic juice in broth during 24 h of incubation at 37 degrees C. The minimum inhibition concentration of garlic juice by broth dilution assay was, thus, estimated to be 0.5%, which is equivalent to 3.46 microgram of MMTSO2 per mg of garlic juice by the agar diffusion assay.

31. AU: Xu,-Y.
TI: Perspectives on the 21st century development of functional foods: bridging Chinese medicated diet and functional foods.
SO: Int-j-food-sci-technol. Oxford : Blackwell Scientific Ltd. Mar 2001 . v. 36 (3) p. 229-242.
LA: English
DE: health-foods. nutritive-value. food-products. herbal-drugs. biochemistry-. traditional-medicines. plant-composition. medicinal-properties. panax-pseudoginseng. garlic-. mushrooms-. traditional-medicine. literature-reviews. china-.
AB: Functional foods, also known as nutraceuticals, medical foods or nutritional foods, are driving food markets around the world and are expected to be one of the emerging trends for the food industry in the new millennium. The concept of functional foods is rooted in a tradition, particularly in Asia, where people have always believed that a balanced diet and some herbal foods are therapeutic. However, while extensive studies in biochemistry and immunology, as well as clinical trials, have been conducted on selected functional foods or ingredients, the scientific features of most traditional herbals remain almost unknown. However, the fastest growing food market in the United States is that of herbal-based nutraceuticals such as ginseng, garlic and medical mushrooms. This review describes different aspects of functional foods and the Chinese medicated diet on the basis of current knowledge, discusses the building blocks for the science of functional foods and proposes a possible way to fuse a Chinese medicated diet into functional foods.

32. AU: Singh,-B.; Falahee,-M.B.; Adams,-M.R.
TI: Synergistic inhibition of Listeria monocytogenes by nisin and garlic extract.
SO: Food-microbiol. London ; Orlando : Academic Press, c1984-. Apr 2001 . v. 18 (2) p. 133-139.
LA: English

DE: listeria-monocytogenes. nisin-. garlic-. extracts-. mixtures-. antibacterial-properties. strain-differences. storage-. food-preservation. mutants-. resistance-. chickpeas-. foods-. ph-. temperature-.

AB: Minimum Inhibitory Concentrations (MICs) were determined for nisin and an aqueous garlic extract (AGE) for six strains of Listeria monocytogenes, including a nisin-resistant mutant. When used in combination in broth a synergistic effect was observed between nisin and AGE in all strains. Increasing the pH reduced the activity of both nisin and garlic. During storage of the aqueous garlic extract at 4 degrees C and at 20 degrees C for 14 days, the MIC increased over the first 8 days but remained stable thereafter indicating at least two antimicrobial components, one of which was relatively stable. Aqueous garlic extract was not appreciably bactericidal although there was a positive interaction with nisin in terms of its bactericidal effect in broth at 4 degrees C. The effect of combining nisin and garlic in a food system, hummus, was also studied. Sub-MIC combinations of AGE and nisin were effective at preventing listerial growth and did enhance the slight bactericidal effect of nisin. The results indicate that combined use of nisin with garlic could help overcome problems of nisin resistance in Gram-positive organisms. Such interactions could also be a significant factor in traditional lactic fermented foods where garlic is an ingredient.

33. AU: Ross,-Z.M.; O'Gara,-E.A.; Hill,-D.J.; Sleightholme,-H.V.; Maslin,-D.J.

TI: Antimicrobial properties of garlic oil against human enteric bacteria: evaluation of methodologies and comparisons with garlic oil sulfides and garlic powder.

SO: Appl-environ-microbiol. Washington : American Society for Microbiology. Jan 2001. v. 67 (1) p. 475-480.

LA: English

DE: garlic-. essential-oils. powders-. sulfides-organic. antibacterial-properties. gram-negative-bacteria. gram-positive-bacteria.

AB: The antimicrobial effects of aqueous garlic extracts are well established but those of garlic oil (GO) are little known. Methodologies for estimating the antimicrobial activity of GO were assessed and GO, GO sulfide constituents, and garlic powder (GP) were compared in tests against human enteric bacteria. Test methodologies were identified as capable of producing underestimates of GO activity. Antimicrobial activity was greater in media lacking tryptone or cysteine, suggesting that, as for allicin, GO effects may involve sulfhydryl reactivity. All bacteria tested, which included both gram-negative and -positive bacteria and pathogenic forms, were susceptible to garlic materials. On a weight-of-product basis, 24 h MICs for GO (0.02 to 5.5 mg/ml, 62 enteric isolates) and dimethyl trisulfide (0.02 to 0.31 mg/ml, 6 enteric isolates) were lower than those for a mixture of diallyl sulfides (0.63 to 25 mg/ml, 6 enteric isolates) and for GP, which also exhibited a smaller MIC range (6.25 to 12.5 mg/ml, 29 enteric isolates). Viability time studies of GO and GP against Enterobacter aerogenes showed time- and dose-dependent effects. Based upon its thiosulfinate content, GP was more active than GO against most bacteria, although some properties of GO are identified as offering greater therapeutic potential. Further exploration of the potential of GP and GO in enteric disease control appears warranted.

34. AU: Mahady,-G.B.

TI: Global harmonization of herbal health claims.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1120S-1123S.
LA: English
DE: herbal-drugs. medicinal-plants. supplements-. labeling-. turnover-. quality-. safety-. efficacy-. international-cooperation. who-. usage-. monographs-.
AB: Over the past decade, herbal medicine has become a topic of increasing global importance, with both medical and economic implications. In developing countries, as much as 80% of the indigenous populations depends on traditional systems of medicine and medicinal plants as their primary source of healthcare. Within the European Community, herbal medicines represent an important share of the pharmaceutical market, with annual sales in the range of US $7 billion. In the United States, the sale of herbal products has skyrocketed from $200 million in 1988 to > $3.3 billion in 1997. Such widespread use of botanicals throughout the world has raised serious questions concerning the quality, safety and efficacy of these products. Thus, accurate scientific assessment of herbal medicine is a prerequisite for global harmonization of herbal health claims. In 1995, as part of its overall global strategy of "Health for All" and due to numerous requests from the member states, the Traditional Medicine Program of the WHO began the extensive task of reviewing the world's scientific literature of commonly used herbal medicines and publishing this information in monographs. The WHO monographs are technical reviews of the quality, safety and efficacy of commonly used herbal medicines and are intended primarily to harmonize the proper use of herbal medicines throughout the world.

35. AU: Staba,-E.J.; Lash,-L.; Staba,-J.E.
TI: A commentary on the effects of garlic extraction and formulation on product composition.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1118S-1119S.
LA: English
DE: garlic-. supplements-. extraction-. food-processing-quality. food-composition. chemical-composition. allium-sativum. freeze-drying. drying-. distillation-. macerating-. organic-sulfur-compounds. amino-acid-derivatives. adverse-effects. odors-. digestive-tract. standardization-. quality-controls. safety-.
AB: The garlic (Allium sativa L.) bulb has been used as a food and condiment for centuries throughout the entire world and in Egypt for perhaps 5000 years. Since the passage of the Dietary Supplement Health and Education Act (DSHEA) of 1994 by the U.S. Congress, it has been claimed that garlic dietary supplements possess health benefits. Support for this claim is not the primary objective of this publication. The primary objective of this article is to demonstrate that the prediction of a potential health benefit(s) from garlic is largely dependent on the process used to produce a product.

36. AU: Hathcock,-J.
TI: Dietary supplements: how they are used and regulated.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1114S-1117S.
LA: English
DE: supplements-. regulations-. food-legislation. nutrition-labeling. labeling-. safety-. federal-government. history-. nutritive-value. toxicity-. food-additives. generally-recognized-as-safe-list. ingredients-. foods-. drugs-. literature-reviews.
AB: Overall use of nutrient and botanical dietary supplements (DS) has

increased for years across all major categories. Many DS are simply taken as part of a healthy lifestyle, but some are used to reduce risk of or modulate risk factors for specific chronic diseases, such as heart disease (vitamin E, folic acid, garlic), cancer (selenium, vitamin E, garlic) and certain birth defects (folic acid). Other DS are used for short-term benefits such as sleep management (valerian, melatonin) and enhanced physical performance (pyruvate, creatine). DS are regulated under food law, but with certain provisions that apply only to DS. Thus, DS are eligible for Food and Drug Administration (FDA)-authorized health claims under the Nutrition and Labeling Education Act (NLEA). Health claims have already been authorized for folic acid and calcium, but not for several others. In 1994, when the Dietary Supplement Health and Education Act (DSHEA) was passed, it expanded and clarified the definition of DS, specified additional requirements for safety and provided for four types of claims of nutritional support. These include prevention of classic nutritional deficiencies, structure or function (S/F) effects, mechanisms for S/F effects and general well-being. Although S/F effects result from both foods and drugs, representation that a product will treat, cure, mitigate or diagnose a disease is reserved for drugs. Therefore, the wording of S/F claims for DS has become a difficult issue in the proposed DS labeling regulations.

37. AU: Hoshino,-T.; Kashimoto,-N.; Kasuga,-S.
TI: Effects of garlic preparations on the gastrointestinal mucosa.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1109S-1113S.
LA: English
DE: garlic-. food-processing-quality. dehydration-. powders-. boiling-. plant-extracts. intestinal-mucosa. supplements-. damage-. trauma-. inflammation-. abrasion-. epithelium-. adverse-effects. coatings-. organic-sulfur-compounds. amino-acid-derivatives. stomach-. ileum-. dogs-. animal-models.
AB: The effects of garlic preparations, including dehydrated raw garlic powder (RGP), dehydrated boiled garlic powder (BGP) and aged garlic extract (AGE), on the gastric mucosa were determined using a newly established endoscopic air-powder delivery system, which can deliver solid materials directly into the stomach. Among the three preparations, RGP caused severe damage, including erosion. BGP also caused reddening of the mucosa, whereas AGE did not cause any undersirable effects. The safety of enteric-coated garlic products was also determined. Direct administration of pulverized enteric-coated products on the gastric mucosa caused reddening of the mucosa. When an enteric-coated tablet was administered orally, it caused loss of epithelial cells at the top of crypts in the ileum. These results suggest that caution be used with regard to safety and effectiveness when choosing a garlic preparation because some preparations may have undesirable effects, including gastrointestinal problems.

38. AU: Sivam,-G.P.
TI: Protection against Helicobacter pylori and other bacterial infections by garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1106S-1108S.
LA: English
DE: garlic-. infections-. protection-. disease-prevention. helicobacter-pylori. vegetable-juices. allium-. bacterial-diseases. antibacterial-properties. organic-sulfur-compounds. medical-

treatment. supplements-. medicinal-plants. human-nutrition-research. food-research. medical-research.

AB: Louis Pasteur was the first to describe the antibacterial effect of onion and garlic juices. Historically, garlic has been used worldwide to fight bacterial infections. Allium vegetables, particularly garlic (Allium sativum L.) exhibit a broad antibiotic spectrum against both gram-positive and gram-negative bacteria. Noteworthy results published include the following: 1) raw juice of garlic was found to be effective against many common pathogenic bacteria-intestinal bacteria, which are responsible for diarrhea in humans and animals; 2) garlic is effective even against those strains that have become resistant to antibiotics; 3) the combination of garlic with antibiotics leads to partial or total synergism; 4) complete lack of resistance has been observed repeatedly; 5) even toxin production by microorganisms is prevented by garlic. Helicobacter pylori (H. pylori) is a bacterium implicated in the etiology of stomach cancer and ulcers. The incidence of stomach cancer is lower in populations with a high intake of allium vegetables. We have demonstrated in vitro that H. pylori is susceptible to garlic extract at a fairly moderate concentration. Even some antibiotic-resistant H. pylori strains are susceptible to garlic. Clinical trials are necessary to explore the possibility of using garlic as a low-cost remedy for eradicating H. pylori.

39. AU: Numagami,-Y.; Ohnishi,-S.T.

TI: S-allylcysteine inhibits free radical production, lipid peroxidation and neuronal damage in rat brain ischemia.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1100S-1105S.

LA: English

DE: garlic-. organic-sulfur-compounds. amino-acid-derivatives. oxidation-. lipid-peroxidation. neurons-. damage-. brain-. ischemia-. movement-. memory-. water-content. infarction-. size-. dosage-effects. free-radicals. rats-. animal-models.

AB: The efficacy of S-allylcysteine (SAC) as a free radical scavenger was studied using rat brain ischemia models. In a middle cerebral artery occlusion model, preischemic administration of SAC had the following effects: it improved motor performance and memory impairment and reduced water content and the infarct size. In a transient global ischemia model, the time course of free radical (alkoxyl radical) formation as studied by electron paramagnetic resonance (EPR) spectroscopy and alpha-phenyl-N-tert-butylnitrone (PBN) was biphasic; the first peak occurred at 5 min and the second at 20 min after reperfusion. Although SAC did not attenuate the first peak, it did affect the second peak, which is related to lipid peroxidation. The lipid peroxidation as estimated by thiobarbituric acid reactive substances (TBARS) increased significantly at 20 min after reperfusion. SAC decreased TBARS to the levels found without ischemia. These results suggest that SAC could have beneficial effects in brain ischemia and that the major protective mechanism may be the inhibition of free radical-mediated lipid peroxidation.

40. AU: Sumi,-S.I.; Tsuneyoshi,-T.; Matsuo,-H.; Yoshimatsu,-T.

TI: Isolation and characterization of the genes up-regulated in isolated neurons by aged garlic extract (AGE).

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1096S-1099S.

LA: English

DE: garlic-. plant-extracts. genes-. gene-expression. regulation-.

neurons-. isolation-. characterization-. suppression-. apoptosis-. hippocampus-. messenger-rna. complementary-dna. cloning-. transcription-. nucleotide-sequences. rats-. fetus-. animal-protein.

AB: Aged garlic extract (AGE) produces neurotrophic effects on cultured fetal rat hippocampal neurons. These studies examined the molecular events triggered by AGE that might account for a suppression of neuronal cell death. Genes differentially expressed by the addition of AGE in primary cultured hippocampal neurons isolated from fetal rat brain were screened using mRNA differential display. Four cDNA clones were significantly enhanced at their transcriptional level; they were designated as #24, #110, #153 and #155. Quantitative reverse transcription polymerase chain reaction (RT-PCR), as well as dot-blot hybridization combined with RT-PCR, confirmed that the transcription from these four genes was elevated at least twofold, particularly the mRNA of #153, which was increased > 20 times 72 h after the addition of AGE. A homology search of the respective cDNA sequences in the DNA database revealed that #153 is an alpha2-microglobulin-related protein (alpha2MRP) gene. The others genes were not identified. Induction of the alpha2MRP gene expression occurred within 24 h after addition of AGE. These findings suggest a possible mechanism by which AGE may regulate gene expression and bring about a neurotrophic effect. Further, our results suggest that alpha2MRP may function at the initial step of the molecular events triggered by AGE and play an important role in the survival of hippocampal neurons.

41. AU: Nishiyama,-N.; Moriguchi,-T.; Morihara,-N.; Saito,-H.

TI: Ameliorative effect of S-allylcysteine, a major thioallyl constituent in aged garlic extract, on learning deficits in senescence-accelerated mice.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1093S-1095S.

LA: English

DE: garlic-. organic-sulfur-compounds. amino-acid-derivatives. mental-ability. learning-disabilities. aging-. elderly-. memory-. senescence-. supplements-. diet-. experimental-diets. avoidance-conditioning. antibody-formation. mice-. animal-models.

AB: This study examined the effect of S-allylcysteine (SAC), a major thioallyl compound found in aged garlic extract, on the memory deficit and age-related changes of senescence-accelerated mice. Senescence-accelerated prone P8 mice fed a diet supplemented with 40 mg SAC/kg diet for 8 mo had a significantly attenuated decrease in the conditioned avoidance response compared with those not given SAC. In the elevated plus-maze test using senescence-accelerated prone P10 mice, the percentage of time spent on the open arm was greater compared with the senescence-resistant control mice. Chronic dietary treatment with 40 mg SAC/kg diet decreased the time in the open arm in senescence-accelerated prone P10 mice. These studies suggest that diet supplementation with SAC may reduce age-related learning disabilities and cognitive disorders in senescence-accelerated mice.

42. AU: Ohnishi,-S.T.; Ohnishi,-T.

TI: In vitro effects of aged garlic extract and other nutritional supplements on sickle erythrocytes.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1085S-1092S.

LA: English

DE: garlic-. plant-extracts. supplements-. sickle-cell-anemia. in-vitro. erythrocytes-. cell-membranes. ascorbic-acid. vitamin-e. organic-sulfur-compounds. amino-acid-derivatives. zinc-. blood-plasma. antioxidants-. intake-. dosage-effects. patients-.

AB: In the circulation of sickle cell anemia patients, a certain population of erythrocytes has an elevated density. These abnormally dense cells are believed to be at the root of the painful crisis and anemia of the patients. We have developed an in vitro method for the preparation of these heavier erythrocytes by a repeated deoxy-oxy cycling of erythrocytes from sickle cell anemia patients. By using this method, we studied whether certain nutritional supplements would inhibit the formation of dense cells in vitro. It was found that aged garlic extract (AGE) as well as its components with antioxidant activity, i.e., S-allylcysteine and Nalpha-(1-deoxy-D-fructos-1-yl)-L-arginine (fructosyl arginine), inhibited the formation of dense cells in vitro. Vitamin C, vitamin E and the spin-trapping agents, 5-diethoxyphophoryl-5-methyl-1-pyrroline-N-oxide and alpha-(4-pyridyl-1-oxide)-N-t-butylnitrone were all found to inhibit the formation of dense cells in vitro. These results suggest that, when extremely stretched sickle-shaped cells are formed by the repeated deoxy-oxy cycling, the erythrocyte membrane becomes susceptible to oxidative injury by reactive oxygen species. The protection of the erythrocyte membrane from such an oxidative injury would prevent the membranes from becoming leaky to the calcium ion, thus inhibiting the activation of the calcium-activated potassium efflux channel and the formation of dense cells. We also developed a new ex vivo method of studying the possible efficacy of antioxidants taken orally on the dense cell formation in sickle cell patients. It involved the use of blood plasma taken from a healthy donor (with normal hemoglobin) of AB.
blood type who had consumed different types of antioxidants orally. By suspending sickle erythrocytes in such plasma and exposing them to the deoxy-oxy cycling, the degree of dense cell formation was determined. The degree of inhibition in vitro by antioxidants taken orally may be related to their efficacy in inhibiting dense cell formation in the patients. On the basis of these in vivo and ex vivo studies, we propose that a cocktail of antioxidants would have beneficial effects in lessening the incidence and severity of crisis and reducing anemia in sickle cell disease.

43. AU: Kasuga,-S.; Uda,-N.; Kyo,-E.; Ushijima,-M.; Morihara,-N.; Itakura,-Y.

TI: Pharmacologic activities of aged garlic extract in comparison with other garlic preparations.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1080S-1084S.

LA: English

DE: garlic-. plant-extracts. vegetable-juices. heat-treatment. dehydration-. powders-. food-processing-quality. hypogonadism-. acetaldehyde-. toxic-substances. neoplasms-. growth-. cell-lines. organic-sulfur-compounds. sexual-behavior. intromission-. spermatogenesis-. natural-killer-cells. spleen-cells. cytotoxicity-. immune-response. rats-. animal-models.

AB: We investigated the pharmacologic activities of four garlic preparations, raw garlic juice (RGJ), heated garlic juice (HGJ), dehydrated garlic powder (DGP) and aged garlic extract (AGE). The study used three animal models, i.e., testicular hypogonadism (hypospermatogensis and impotence) induced by warm water treatment,

intoxication of acetaldehyde and growth of inoculated tumor cells. RGJ was found to be effective only in recovery of testicular function. The efficacy of HGJ was observed in three models; however, it did not improve impotence. DGP was effective in recovery of spermatogenesis and stimulated acetaldehyde detoxification. Significant beneficial effects of AGE were found in all three models. Although all four garlic preparations significantly enhanced natural killer (NK) and killer cell activities of the spleen cells of tumor-bearing mice, only AGE and HGJ inhibited the growth of inoculated tumor cells. These results suggest that different types of garlic preparations have different pharmacologic properties, and among the four garlic preparations studied, AGE could be the most useful garlic preparation.

44. AU: Kyo,-E.; Uda,-N.; Kasuga,-S.; Itakura,-Y.
TI: Immunomodulatory effects of aged garlic extract.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1075S-1079S.
LA: English
DE: garlic-. plant-extracts. immune-response. ige-. inflammation-. allergic-reactions. carcinoma-. sarcoma-. growth-. inhibition-. cell-division. cytokines-. nitric-oxide. phagocytosis-. cell-lines. natural-killer-cells. spleen-cells. spleen-. weight-. mental-stress. electricity-. stress-. mice-. animal-models.
AB: Using various kinds of models, we examined the effects of aged garlic extract (AGE) on immune functions. In the immunoglobulin (Ig)E-mediated allergic mouse model, AGE significantly decreased the antigen-specific ear swelling induced by picryl chloride ointment to the ear and intravenous administration of antitrinitrophenyl antibody. In the transplanted carcinoma cell model, AGE significantly inhibited the growth of Sarcoma-180 (allogenic) and LL/2 lung carcinoma (syngenic) cells transplanted into mice. Concomitantly, increases in natural killer (NK) and killer activities of spleen cells were observed in Sarcoma-180-bearing mice administered AGE. In the psychological stress model, AGE significantly prevented the decrease in spleen weight and restored the reduction of anti-SRBC hemolytic plaque-forming cells caused by the electrical stress. These studies strongly suggest that AGE could be a promising candidate as an immune modifier, which maintains the homeostasis of immune functions; further studies are warranted to determine when it is most beneficial.

45. AU: Horie,-T.; Awazu,-S.; Itakura,-Y.; Fuwa,-T.
TI: Alleviation by garlic of antitumor drug-induced damage to the intestine.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1071S-1074S.
LA: English
DE: garlic-. methotrexate-. fluorouracil-. intestinal-mucosa. trauma-. adverse-effects. drug-therapy. protection-. plant-extracts. supplements-. intestinal-absorption. permeability-. body-weight. diet-. experimental-diets. rats-. animal-models.
AB: Antitumour drugs such as methotrexate (MTX) and 5-fluorouracil (5-FU) induce intestinal damage. This is a serious side effect of cancer chemotherapy. The present studies examined whether or not aged garlic extract (AGE) protects against damage from these antitumor drugs. Both drugs were administered orally for 4 or 5 d to rats fed a standard laboratory diet with and without 2% AGE. The small intestinal absorption of the poorly absorbable compound,

fluorescein isothiocyanate-labeled dextran (FD-4; average molecular weight, 4400) was used to evaluate the damage to the intestine using the in vitro everted intestine technique and the in situ intestinal loop technique. FD-4 absorption increased in the antitumour drug-treated rats fed the diet without garlic. Interestingly, FD-4 absorption was depressed in rats fed the diet containing AGE. These results suggest that AGE may protect the small intestine of rats from antitumour drug-induced damage.

46. AU: Lamm,-D.L.; Riggs,-D.R.
TI: Enhanced immunocompetence by garlic: role in bladder cancer and other malignancies.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1067S-1070S.
LA: English
DE: garlic-. plant-extracts. bladder-. neoplasms-. growth-. inhibition-. bacillus-. allium-sativum. immune-competence. carcinogens-. detoxification-. immune-response. suppression-. nonspecific-immunostimulation. immunological-deficiency. prevention-. literature-reviews.
AB: Of the many beneficial actions of garlic, inhibition of the growth of cancer is perhaps the most remarkable. Our previous animal studies demonstrated that aged garlic extract was highly effective, and unlike the approved immunotherapy for human bladder cancer, bacillus Calmette-Guerin (BCG), garlic was effective when added to the diet. To elucidate the mechanism of this antitumor effect, the literature describing antitumor and immune-enhancing effects of garlic is reviewed. Garlic can detoxify carcinogens by stimulation of cytochrome P450 enzymes, antioxidant activity or sulfur compound binding. Studies demonstrate a direct toxic effect of garlic to sarcoma and gastric, colon, bladder and prostate cancer cells in tissue culture, but these effects cannot explain the inhibition of growth of transplanted cancer in animal models. The most likely explanation of this effect is immune stimulation. Comparison of the effects of garlic to BCG immunotherapy reveals many similarities. Both stimulate proliferation of lymphocytes and macrophage phagocytosis, induce the infiltration of macrophages and lymphocytes in transplanted tumors, induce splenic hypertrophy, stimulate release of interleukin-2, tumor necrosis factor-alpha and interferon-gamma, enhance natural killer cell, killer cell and lymphokine-activated killer cell activity. These activities represent effective stimulation of the immune response. Studies suggest that garlic may be useful in preventing the suppression of immune response that is associated with increased risk of malignancy. Data suggest that maintenance of immune stimulation can significantly reduce the risk of cancer. Clinical trials should be initiated to test the hypothesis that. the immune stimulation and other beneficial effects of garlic are able to reduce the incidence of cancer.

47. AU: Knowles,-L.M.; Milner,-J.A.
TI: Possible mechanism by which allyl sulfides suppress neoplastic cell proliferation.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1016S-1066S.
LA: English
DE: garlic-. organic-sulfur-compounds. neoplasms-. growth-. suppression-. cell-division. inhibition-. cell-cycle. apoptosis-. amino-acid-derivatives. kinases-. dna-. literature-reviews.
AB: Both oil- and water-soluble allyl sulfur compounds from garlic have been found to possess antitumorigenic properties. These

antitumorigenic properties increase as exposure increases both in vitro and in vivo. Generally, oil-soluble allyl sulfur compounds are more effective antiproliferative agents than their water-soluble counterparts. The ability of these compounds to suppress proliferation is associated with a depression in cell cycle progression and the induction of apoptosis. This depression in cell division coincides with an increase in the percentage of cells blocked in the G2/M phase of the cell cycle. A depression in p34cdc2 kinase may account for this blockage in cell division.

48. AU: Pinto,-J.T.; Rivlin,-R.S.
TI: Antiproliferative effects of allium derivatives from garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1058S-1060S.
LA: English
DE: garlic-. organic-sulfur-compounds. neoplasms-. growth-. antineoplastic-agents. cell-division. cell-lines. hormonal-control. apoptosis-. regulation-. cell-cycle. derivatives-. immune-response. inflammation-. prostate-. breast-cancer.
AB: There is increasing evidence that allium derivatives from garlic have significant antiproliferative actions on human cancers. Both hormone-responsive and hormone-unresponsive cells lines respond to these derivatives. The effects shown by allium derivatives include induction of apoptosis, regulation of cell cycle progression and modification of pathways of signal transduction. Allium derivatives appear to regulate nuclear factors involved in immune function and inflammation, as well as in cellular proliferation. Our own studies indicate that allium derivatives inhibit proliferation of the human prostate cancer cell line (LNCaP) and the human breast cancer cell line (MCF-7). Further research is required to clarify the mechanisms of inhibition of cellular proliferation by allium derivatives and to explore their potential application to cancer prevention and control.

47. AU: Song,-K.; Milner,-J.A.
TI: The influence of heating on the anticancer properties of garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1045S-1057S.
LA: English
DE: garlic-. food-processing. crushing-. cooking-. heat-treatment. food-processing-quality. adverse-effects. antineoplastic-agents. inhibition-. organic-sulfur-compounds. amino-acid-derivatives. dna-. chemical-reactions. microwave-treatment. roasting-. time-. carcinogens-. metabolites-. epithelium-. enzymes-. enzyme-activity. literature-reviews.
AB: Allyl sulfur compounds are the major active constituents found in crushed garlic. Research has revealed that garlic and its lipid- or water-soluble components have many pharmacologic properties; however, studies also demonstrate that heating has a negative influence on these beneficial effects. We recently conducted several studies to investigate the influence of microwave or oven heating on the anticarcinogenesis property of garlic. Our studies showed that as little as 60 s of microwave heating or 45 min of oven heating can block garlic's ability to inhibit in vivo binding of mammary carcinogen [7,12-dimethylbenzene(a)anthracene (DMBA)] metabolites to rat mammary epithelial cell DNA. Allowing crushed garlic to "stand" for 10 min before microwave heating for 60 s prevented the total loss of anticarcinogenic activity. Our studies demonstrated that this blocking of the ability of garlic was consistent with inactivation of alliinase. These studies suggest that heating destroyed garlic's active allyl sulfur compound

formation, which may relate to its anticancer properties.

48. AU: Fukushima,-S.; Takada,-N.; Wanibuchi,-H.; Hori,-T.; Min,-W.; Ogawa, -M.
TI: Suppression of chemical carcinogenesis by water-soluble organosulfur compounds.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1049S-1053S.
LA: English
DE: garlic-. organic-sulfur-compounds. carcinogenesis-. liver-cancer. neoplasms-. water-. solubility-. cysteine-. inhibition-. suppression-. mecysteine-. analogs-. n-nitrosodimethylamine-. lesions-. ornithine-decarboxylase. acyltransferases-. enzyme-activity. liver-cells. liver-. body-parts. disease-prevention. hepatectomy-. cell-division. genes-. time-. rats-. animal-models.
AB: The chemopreventive effects of five water-soluble organosulfur compounds, S-methylcysteine (SMC) and four analogs, were examined on the promotion stage of diethylnitrosamine hepatocarcinogenesis in male F344 rats, using the medium-term bioassay (Ito test), which is based on the two-step model of hepatocarcinogenesis. In addition, we investigated the modifying effects of SMC and cysteine on the initiation stage of rat hepatocarcinogenesis. Carcinogenic potential was scored by comparing the numbers and areas of a putative neoplastic lesion, glutathione S-transferase placental form (GST-P)-positive hepatocellular foci. SMC and cysteine significantly decreased the number and area of GST-P-positive foci when given in the promotion stage of the Ito test. When given during the initiation stage, these two organosulfur compounds also significantly inhibited focus formation. Liver ornithine decarboxylase activity after two thirds partial hepatectomy and the proportion of hepatocytes positive for proliferating cell nuclear antigen significantly decreased the number of aberrant crypt foci in the colon in a multiorgan carcinogenesis bioassay of rats. These results support SMC and cysteine as chemopreventive agents for hepatocarcinogenesis and colon carcinogenesis. Their intake may be of importance for cancer.

49. AU: Singh,-S.V.
TI: Impact of garlic organosulfides on p21H-ras processing.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1046S-1048S.
LA: English
DE: garlic-. organic-sulfur-compounds. cell-lines. neoplasms-. mutations-. growth-. dosage-effects. plasma-membranes. cytosol-. animal-proteins. genetic-transformation. hydroxymethylglutaryl-coa-reductase. alkyl-aryl-transferases. enzyme-activity. supplements-. mice-. animal-models.
AB: This study describes the novel anticarcinogenic activity of diallyl disulfide, a naturally occurring organosulfide from garlic . Oral administration of diallyl disulfide resulted in a dose-dependent and significant inhibition of the growth of H-ras oncogene transformed NIH 3T3 cells implanted in nude mice. The effect of diallyl disulfide was apparent in terms of delay in the appearance of measurable tumors, tumor volume and tumor weight. On the other hand, the growth of H-ras oncogene transformed tumors was not inhibited by dipropyl disulfide, a naturally occurring saturated analog of diallyl disulfide. The diallyl disulfide-mediated inhibition of H-ras oncogene transformed tumor growth correlated with the inhibition of p21H-ras membrane association. The levels of membrane-associated p21H-ras were

markedly lower in the tumors of diallyl disulfide-treated mice than in those of controls. An opposite trend, however in the tumors of diallyl disulfide-treated mice than in those of controls. An opposite trend, however, was evident for the cytosolic p21H-ras. The results of this study indicate that diallyl disulfide inhibits the growth of H-ras oncogene transformed tumors in vivo by inhibiting the membrane association of p21H-ras and that the allyl group may be an important determinant in the inhibitory effect of this organosulfide on tumor growth.

40. AU: Yang,-C.S.; Chhabra,-S.K.; Hong,-J.Y.; Smith,-T.J.
TI: Mechanisms of inhibition of chemical toxicity and carcinogenesis by diallyl sulfide (DAS) and related compounds from garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1041S-1045S.
LA: English
DE: garlic-. organic-sulfur-compounds. neoplasms-. carcinogenesis-. inhibition-. toxicity-. carbon-tetrachloride. n-nitrosodimethylamine-. acetaminophen-. hepatotoxins-. disease-prevention. cytochrome-p-450. enzyme-inhibitors. metabolism-. biochemical-pathways. detoxification-. glutathione-transferase. rats-. mice-. animal-models.
AB: Diallyl sulfide (DAS) is a flavor compound derived from garlic and is sequentially converted to diallyl sulfoxide (DASO) and diallyl sulfone (DASO2) by cytochrome P450 2E1 (CYP2E1). These compounds have been shown to reduce the incidence of a multitude of chemically induced tumors in animal models. The impediment of phase I activation of these carcinogens is hypothesized to be accountable for the reduction in tumor incidence. Indeed, DAS, DASO and DASO2 are competitive inhibitors of CYP2E1. DASO2, in addition, is a suicide inhibitor of CYP2E1. These compounds have been shown to reduce carbon tetrachloride-, N-nitrosodimethylamine- and acetaminophen-induced toxicity in rodents. All three chemicals are substrates for CYP2E1. The protective effect was observed when the organosulfur compounds were given before, during or soon after chemical treatment. DAS and DASO2 inhibited the bioactivation of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and related lung tumorigenesis in A/J mice. Because CYP2E1 does not play a key role in NNK activation, the inhibition of other CYP enzymes active in NNK metabolism is likely. DAS also has been shown to induce other CYP and phase II enzymes as well as decrease hepatic catalase activity. All of these effects are observed at concentrations much higher than what is normally ingested by humans. The biological activities of garlic and its related compounds at lower concentrations that mimic human consumption remain to be studied further.

41. AU: Fleischauer,-A.T.; Arab,-L.
TI: Garlic and cancer: a critical review of the epidemiologic literature.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1032S-1040S.
LA: English
DE: garlic-. neoplasms-. human-nutrition-research. epidemiological-surveys. dietary-surveys. data-analysis. stomach-. colon-. head-. neck-. lungs-. breast-cancer. colorectal-cancer. mammary-gland-neoplasms. prostate-. risk-. food-intake. literature-reviews.
AB: Animal and in vitro studies provide evidence of an anticarcinogenic effect of active ingredients in garlic. This review of the epidemiologic literature on garlic consumption

addresses cancers of the stomach, colon, head and neck, lung, breast and prostate. Nineteen studies reported relative risk estimates for garlic consumption and cancer incidence. Site-specific case-control studies of stomach and colorectal cancer, in which multiple reports were available, suggest a protective effect of high intake of raw and/or cooked garlic. Cohort studies confirm this inverse association for colorectal cancer. Few cohort and case-control studies for other sites of cancer exist. Garlic supplements, as analyzed in four cohort studies and one case-control report, from two distinct populations, do not appear to be related to risk. Low study power, lack of variability in garlic consumption categorization within studies and poor adjustment for potential cofounders may limit the reliability of any conclusions regarding garlic supplements. However, an indication of publication bias was also found by visual inspection of a funnel plot and in a log-rank test (P = 0.004). Evidence from available studies nevertheless suggests a preventive effect of garlic consumption in stomach and colorectal cancers. The study limitations indicate the need for more definitive research and improved nutritional epidemiologic analyses of dietary data.

42. AU: Milner,-J.A.
TI: A historical perspective on garlic and cancer.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1027S-1031S.
LA: English
DE: garlic-. neoplasms-. history-. human-nutrition-research. carcinogenesis-. organic-sulfur-compounds. disease-prevention. nitrosamines-. carcinogens-. antineoplastic-agents. diet-. nutritional-state. nitrogen-metabolism. inhibition-. dna-. damage-. literature-reviews.
AB: Epidemiological and laboratory studies provide insight into the anticarcinogenic potential of garlic and its constituent compounds. Both water- and lipid-soluble allyl sulfur compounds are effective in blocking a myriad of chemically induced tumors. Part of the protection from these compounds probably relates to a block in nitrosamine formation and metabolism. However, blockage in the initiation and promotion phases of the carcinogenicity of various compounds, including polycyclic hydrocarbons, provide evidence that garlic and its constituents can alter several phase I and II enzymes. Their ability to block experimentally induced tumors in a variety of sites including skin, mammary and colon, suggests a general mechanism of action. Changes in DNA repair and in immunocompetence may also account for some of this protection. Some, but not all, allyl sulfur compounds can also effectively retard tumor proliferation and induce apoptosis. Changes in cellular thiol and phosphorylation stains may account for some of these antitumorigenic properties. The anticarcinogenic potential of garlic can be influenced by several dietary components including specific fatty acids, selenium, and vitamin A. Since garlic and its constituents can suppress carcinogen formation, carcinogen bioactivation, and tumor proliferation it is imperative that biomarkers be established to identify which individuals might benefit most and what intakes can occur with ill consequences.

43. AU: Ide,-N.; Lau,-B.H.S.
TI: Garlic compounds minimize intracellular oxidative stress and inhibit nuclear factor-kappaB activation.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1020S-1026S.
LA: English

DE: garlic-. plant-extracts. supplements-. organic-sulfur-compounds. lipid-peroxidation. low-density-lipoprotein. trauma-. damage-. prevention-. endothelium-. lactate-dehydrogenase. viability-. glutathione-. lipid-peroxides. hydrogen-peroxide. tumor-necrosis-factor. transcription-factors. transactivation-. inhibition-. amino-acid-derivatives.

AB: Oxidative modification of LDL has been recognized as playing an important role in the initiation and progression of atherosclerosis. In this study, we determined the effects of aged garlic extract (AGE) and its major compound, S-allylcysteine (SAC), on oxidized LDL (Ox-LDL)-induced injury in endothelial cells (EC). Lactate dehydrogenase (LDH) release as an index of membrane damage, methylthiazol tetrazoium (MTT) assay for cell viability and thiobarbituric acid reactive substances (TBARS) indicating lipid peroxidation were measured. Ox-LDL caused an increase of LDH release, loss of cell viability and TBARS formation. Both AGE and SAC prevented all of these changes. To elucidate the mechanism, effects of AGE or SAC on intracellular glutathione (GSH) level in EC, and release of peroxide from EC and macrophages were determined. Ox-LDL depleted intracellular GSH and increased release of peroxides. Both AGE and SAC inhibited these changes. Effects of SAC on hydrogen peroxide (H2O2) or tumor necrosis factor (TNF)-alpha-induced nuclear factor (NF)-kB activation were determined. Pretreatment of EC with SAC inhibited NF-kB activation. We demonstrated that both AGE and SAC can protect EC from Ox-LDL-induced injury by preventing intracellular GSH depletion in EC and by minimizing release of peroxides from EC and macrophages. SAC also inhibited H2O2- or TNF-alpha-induced NF-kB activation. Our data suggest that AGE and its main compound, SAC, may be useful for prevention of atherosclerosis.

44. AU: Moriguchi,-T.; Takasugi,-N.; Itakura,-Y.

TI: The effects of aged garlic extract on lipid peroxidation and the deformability of erythrocytes.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1016S-1019S.

LA: English

DE: garlic-. plant-extracts. lipid-peroxidation. erythrocytes-. deformation-. cell-membranes. supplements-. damage-. dosage-effects. hemolysis-. atp-. antioxidants-. rats-. animal-models.

AB: The effects of aged garlic extract (AGE) on lipid peroxidative damage and the deformability of erythrocytes were evaluated in rats. The deformability of erythrocytes was measured using the micropore filtration method. AGE significantly prevented the decrease of erythrocyte deformability induced by lipid peroxidation in a dose-dependent manner. The addition of AGE significantly inhibited an increase in thiobarbituric acid-reactive substances (TBARS) and hemolysis rate and prevented the loss of intraerythrocytic ATP and 2,3-diphosphoglycerate (2,3-DPG) in oxidized erythrocytes. Moreover, AGE significantly suppressed not only the hemolysis rate induced by peroxidation but also hemolysis due to nonperoxidation. These results suggest the possibility that AGE improves microcirculation and rheological blood properties and preserves the structure and function of erythrocytes not only through an antioxidant process, but also via the glycolysis pathway and membrane stabilization of erythrocytes.

45. AU: Borek,-C.

TI: Antioxidant health effects of aged garlic extract.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1010S-1015S.

LA: English
DE: garlic-. plant-extracts. antioxidants-. disease-prevention. amino-acid-derivatives. health-promotion. oxidation-. dna-. damage-. inhibition-. lipid-peroxidation. oxygen-. ions-. organic-sulfur-compounds. flavonoids-. selenium-. chemical-composition. lipid-peroxides. low-density-lipoprotein. glutathione-. supplements-. cardiovascular-diseases. cerebrovascular-disorders. transcription-factors. carcinogenesis-. ultraviolet-radiation. protection-. doxorubicin-. immunity-. brain-. atrophy-. literature-reviews.
AB: Oxidative modification of DNA, proteins and lipids by reactive oxygen species (ROS) plays a role in aging and disease, including cardiovascular, neurodegenerative and inflammatory diseases and cancer. Extracts of fresh garlic that are aged over a prolonged period to produce aged garlic extract (AGE) contain antioxidant phytochemicals that prevent oxidant damage. These include unique water-soluble organosulfur compounds, lipid-soluble organosulfur components and flavonoids, notably allixin and selenium. Long-term extraction of garlic (up to 20 mo) ages the extract, creating antioxidant properties by modifying unstable molecules with antioxidant activity, such as allicin, and increasing stable and highly bioavailable water-soluble organosulfur compounds, such as S-allylcysteine and S-allylmercaptocysteine. AGE exerts antioxidant action by scavenging ROS, enhancing the cellular antioxidant enzymes superoxide dismutase, catalase and glutathione peroxidase, and increasing glutathione in the cells. AGE inhibits lipid peroxidation, reducing ischemic/reperfusion damage and inhibiting oxidative modification of LDL, thus protecting endothelial cells from the injury by the oxidized molecules, which contributes to atherosclerosis. AGE inhibits the activation of the oxidant-induced transcription factor, nuclear factor (NF)-kB, which has clinical significance in human immunodeficiency virus gene expression and atherogenesis. AGE protects DNA against free radical-mediated damage and mutations, inhibits multistep carcinogenesis and defends against ionizing radiation and UV-induced damage, including protection against some forms of UV-induced immunosuppression. AGE may have a role in protecting against loss of brain.
function in aging and possess other antiaging effects, as suggested by its ability to increase cognitive functions, memory and longevity in a senescence-accelerated mouse model. AGE has been shown to protect against the cardiotoxic effects of doxorubicin, an antineoplastic agent used in cancer therapy and against liver toxicity caused by carbon tetrachloride (an industrial chemical) and acetaminophen, an analgesic. Substantial experimental evidence shows the ability of AGE to protect against oxidant-induced disease, acute damage from aging, radiation and chemical exposure, and long-term toxic damage. Although additional observations are warranted in humans, compelling evidence supports the beneficial health effects attributed to AGE, i.e., reducing the risk of cardiovascular disease, stroke, cancer and aging, including the oxidant-mediated brain cell damage that is implicated in Alzheimer's disease.

46. AU: Campbell,-J.H.; Efendy,-J.L.; Smith,-N.J.; Campbell,-G.R.
TI: Molecular basis by which garlic suppresses atherosclerosis.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1006S-1009S.
LA: English
DE: garlic-. atherosclerosis-. inhibition-. suppression-. supplements-. blood-plasma. blood-lipids. diet-. cholesterol-. experimental-diets. aorta-. lesions-. disease-course. smooth-muscle.

endothelium-. cell-division. phenotypes-. dosage-effects. time-. rabbits-. animal-models.

AB: The aim of this study was to determine the mechanism by which the aged garlic extract "Kyolic" has a protective effect against atherosclerosis. Plasma cholesterol of rabbits fed a 1% cholesterol-enriched diet for 6 wk was not reduced by supplementation with 800 microliter Kyolic/(kg body(.)d). In spite of this, Kyolic reduced by 64% ($P < 0.05$) the surface area of the thoracic aorta covered by fatty streaks and significantly reduced aortic arch cholesterol. Kyolic also significantly inhibited by approximately 50% the development of thickened, lipid-filled lesions in preformed neointimas produced by Fogarty 2F balloon catheter injury of the right carotid artery in cholesterol-fed rabbits. In vitro studies found that Kyolic completely prevented vascular smooth muscle phenotypic change from the contractile, high volume fraction of filament (V(v)myo) state, and inhibited proliferation of smooth muscle cells in the synthetic state with a 50% effective dose (ED50) of 0.2%. Kyolic also slightly inhibited the accumulation of lipid in cultured macrophages but not smooth muscle, and had no effect on the expression of adhesion molecules on the surface of the endothelium or the adherence of leukocytes. It is concluded that Kyolic exerts antiatherogenic effects through inhibition of smooth muscle phenotypic change and proliferation, and by another (unclarified) effect on lipid accumulation in the artery wall.

47. AU: Matsuura,-H.

TI: Saponins in garlic as modifiers of the risk of cardiovascular disease.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 1000S-1005S.

LA: English

DE: garlic-. steroid-saponins. sapogenins-. cardiovascular-diseases. risk-factors. plant-extracts. food-composition. chemical-composition. isolation-. determination-. chemical-structure. molecular-conformation. cytotoxicity-. cholesterol-metabolism. intestinal-absorption. blood-plasma. blood-lipids. literature-reviews.

AB: Most chemical and biological studies about garlic have been conducted using organosulfur compounds. However, a variety of steroid saponins from garlic and related Allium species are being increasingly recognized for their importance in biological processes. This report demonstrates the isolation and structure determination of steroid saponins from garlic and aged garlic extract (AGE). In addition, the in vitro antifungal antitumor cytotoxicity and blood coagulability effects of steroid saponins from garlic and related Allium species are provided. Animal studies on the cholesterol-lowering effects of the saponin fractions from garlic are also summarized.

48. AU: Slowing,-K.; Ganado,-P.; Sanz,-M.; Ruiz,-E.; Tejerina,-T.

TI: Study of garlic extracts and fractions on cholesterol plasma levels and vascular reactivity in cholesterol-fed rats.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 994S-999S.

LA: English

DE: garlic-. plant-extracts. cholesterol-. blood-lipids. blood-plasma. cholesterol-metabolism. diet-. experimental-diets. freezing-. food-processing-quality. cardiovascular-system. muscle-contraction. norepinephrine-. acetylcholine-. vasodilator-agents. hypercholesterolemia-. high-density-lipoprotein. low-density-

lipoprotein. heart-. liver-. kidneys-. weight-. aorta-. body-weight. rats-. animal-models.

AB: Garlic is known for its pharmacologic and nutritional properties. In previous studies, garlic elicited a reduction in plasma levels of lipids by inhibiting hepatic cholesterol synthesis. The aim of this study was to investigate in an in vivo model the effects of garlic extract and some fractions on cholesterol levels and vascular reactivity in cholesterol-fed rats. Rats were fed a cholesterol-enriched diet for 16 wk and were divided into 10 groups as follows: control and hypercholesterolemic diet groups, 4 groups fed frozen garlic fractions and 4 groups fed raw garlic fractions with different doses. Blood samples were obtained to analyze HDL and LDL cholesterol levels. After treatment, rats were killed. The heart, liver and kidneys were weighted; the aorta was isolated, mounted in organ chambers and vascular reactivity was tested. Plasma concentration of cholesterol was 58 mg/dL (100%) at the beginning of the study and increased to 102 mg/dL (153%; hypercholesterolemic group) at the end of the treatment. Plasma total cholesterol decreased in all groups treated with garlic; moreover, this effect was higher in rats fed raw garlic fractions and extracts. LDL decreased significantly with respect to the hypercholesterolemic group in all groups treated with garlic fractions and extracts ($P < 0.01$); however, an increase in HDL was found in those treated with frozen fractions and extracts. The liver:body weight ratio decreased in all treated groups. The relaxing effect of acetylcholine (ACh) was enhanced in arteries contracted with noradrenaline (NE). These data suggest that garlic fractions could prevent diet-induced hypercholesterolemia and vascular alterations in the.
endothelium-dependent relaxation associated with atherosclerosis.

49. AU: Yeh,-Y.Y.; Liu,-L.

TI: Cholesterol-lowering effect of garlic extracts and organosulfur compounds: human and animal studies.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 989S-993S.

LA: English

DE: garlic-. plant-extracts. cholesterol-. blood-lipids. amino-acid-derivatives. organic-sulfur-compounds. supplements-. blood-plasma. low-density-lipoprotein. triacylglycerols-. cholesterol-metabolism. solubility-. literature-reviews.

AB: The medicinal use of garlic dates back thousands of years, but there was little scientific support of its therapeutic and pharmacologic properties until recently. In the past decade, the cancer-protective effects of garlic have been well established by epidemiologic studies and animal experiments. However, the cardiovascular-protective properties of garlic are less well understood. In particular, despite the reported hypocholesterolemic effect of garlic, the mechanism of the effect is unclear. In a recent randomized, double-blind, placebo-controlled intervention study, we showed that aged garlic extract (AGE) supplementation was effective in lowering plasma concentration of total cholesterol by 7% and LDL cholesterol by 10% in hypercholesterolemic men compared with subjects consuming a placebo. Supplementation of AGE in animal diets similarly reduced plasma concentrations of total cholesterol and triacylglycerol by 15 and 30%, respectively. In subsequent experiments using cultured rat hepatocytes, we found 44-87% inhibition of cholesterol synthesis by the water-extractable fraction (WEF), methanol-extractable fraction (MEF) and petroleum ether-extractable fraction (PEF) of fresh garlic, and Kyolic (

liquid form of AGE). These observations suggested that hydrophilic and hydrophobic compounds of garlic are inhibitory to cholesterol synthesis. Because S-allylcysteine (SAC) alone was less potent than Kyolic, which contains SAC and other sulfur compounds, a maximal inhibition appears to require a concerted action of multiple compounds of garlic. In a series of experiments, we further characterized the inhibitory potency of individual water-soluble and lipid-soluble compounds of. garlic. Among water-soluble compounds, SAC, S-ethylcysteine (SEC), and S-propylcysteine (SPC) inhibited cholesterol synthesis by 40-60% compared with 20-35% by gamma-glutamyl-S-allylcysteine (GSAC), gamma-glutamyl-S-methylcysteine (GSMC) and gamma-glutamyl-S-propylcysteine (GSPC). Lipid-soluble sulfur compounds (i.e., diallyl sulfide, diallyl disulfide, diallyl trisulfide, dipropyl sulfide and dipropyl trisulfide) at low concentrations (0.05-0.5 mol/L) slightly (10-15%) inhibited cholesterol synthesis but became highly cytotoxic at high concentrations (1.0-4.0 mol/L). All water-soluble compounds, except S-allylmercaptocysteine, were not cytotoxic, judging from the release of cellular lactate dehydrogenase into the culture medium. Taken together, the results of our studies indicate that the cholesterol-lowering effects of garlic extract, such as AGE, stem in part from inhibition of hepatic cholesterol synthesis by water-soluble sulfur compounds, especially SAC.

50. AU: Lau,-B.H.S.
TI: Suppression of LDL oxidation by garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 985S-988S.
LA: English
DE: garlic-. low-density-lipoprotein. lipid-peroxidation. inhibition-. amino-acid-derivatives. suppression-. antioxidants-. plant-extracts. supplements-. damage-. endothelium-. organic-sulfur-compounds. time-. literature-reviews.
AB: It has been known for several decades that hypercholesterolemia is a major risk factor for atherosclerosis and that lowering of cholesterol can significantly reduce risk for cardiovascular diseases. More recently, oxidation of LDL has been recognized as playing an important role in the initiation and progression of atherosclerosis. Oxidized LDL, but not native LDL, promotes vascular dysfunction by exerting direct cytotoxicity toward endothelial cells, by increasing chemotactic properties for monocytes, by transforming macrophages to foam cells via scavenger-receptors and by enhancing the proliferation of various cell types, e.g., endothelial cells, monocytes and smooth muscle cells; all of these events are recognized as contributing to atherogenesis. In this paper, experimental evidence is presented that shows that several garlic compounds can effectively suppress LDL oxidation in vitro. Short-term supplementation of garlic in human subjects has demonstrated an increased resistance of LDL to oxidation. These data suggest that suppressed LDL oxidation may be one of the powerful mechanisms accounting for the antiatherosclerotic properties of garlic.

51. AU: Steiner,-M.; Li,-W.
TI: Aged garlic extract, a modulator of cardiovascular risk factors: a dose-finding study on the effects of AGE on platelet functions.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 980S-984S.
LA: English
DE: garlic-. supplements-. dosage-effects. platelets-. platelet-

aggregation. organic-sulfur-compounds. amino-acid-derivatives. adhesion-. epinephrine-. collagen-. adp-. fibrinogen-. blood-coagulation-factors. blood-flow. shear-. blood-serum. diet-. experimental-diets. intake-. cardiovascular-diseases. risk-factors. men-. women-.

AB: Aged garlic extract (AGE) has been shown previously to have moderate cholesterol-lowering and blood pressure-reducing effects. We have now investigated whether platelet function, a potential risk factor for cardiovascular disease, can be inhibited by AGE administration. In a randomized, double-blind study of normal healthy individuals (n = 34), both men and women, the effect of AGE was evaluated in doses between 2.4 and 7.2 g/d vs. equal amounts of placebo. Platelet aggregation and adhesion were measured at 2-wk intervals throughout the study. Threshold concentrations for epinephrine and collagen increased moderately during AGE administration compared with the placebo and baseline periods. Only at the highest supplementation level did AGE show a slight increase in the threshold level of ADP-induced aggregation. Platelet adhesion to collagen, fibrinogen and von Willebrand factor was investigated by perfusing whole blood through a laminar flow chamber under controlled flow conditions. Adherence of platelets was inhibited by AGE in a dose-dependent manner when collagen was the adhesive surface perfused at low shear rates (approximately 30 s-1). At high shear rates (1200 s-1), AGE also inhibited platelet adhesion to collagen but only at higher intake levels. Adhesion to von Willebrand factor was reduced only at 7.2 g/d AGE, but adherence to fibrinogen was potently inhibited at all levels of supplementation. Thus, AGE exerts selective inhibition on platelet aggregation and adhesion, platelet functions that may be important for the development of cardiovascular events such as myocardial infarction and ischemic stroke. We briefly review the effect of garlic preparations in general on.
cardiovascular risk factors and point out differences between AGE and other garlic preparations that we feel are important to explain the efficacy of AGE.

52. AU: Rahman,-K.

TI: Historical perspective on garlic and cardiovascular disease.

SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 977S-979S.

LA: English

DE: garlic-. cardiovascular-diseases. history-. medical-treatment. clinical-trials. diet-. diet-treatment. supplements-. blood-lipids. low-density-lipoprotein. disease-prevention. literature-reviews.

AB: Cardiovascular disease is a complex and multifactorial disease characterized by such factors as high cholesterol, hypertension, reduced fibrinolysis, increase in blood-clotting time and increased platelet aggregation. Dietary therapy is the first step in the treatment of hyperlipidemia; garlic has been used medicinally for centuries and is still included in the traditional medicine of many cultures. Historically, there has been great interest in the role of garlic in reducing cardiovascular risk factors. Evidence from numerous studies points to the fact that garlic can bring about the normalization of plasma lipids, enhancement of fibrinolytic activity, inhibition of platelet aggregation and reduction of blood pressure and glucose. However, some contradictory results have also emerged as a result of methodological shortcomings, the use of different formulations/ preparations of garlic and different time scales of the studies. Accordingly, further clinical studies are required in which standardized formulations of garlic with known compositions can be

used. Such formulations (e.g., Aged Garlic Extract) are now available and are being investigated. Evidence obtained from these studies indicates that garlic has potential in the prevention and control of cardiovascular disorders and is beneficial when taken as a dietary supplement.

53. AU: Ryu,-K.; Ide,-N.; Matsuura,-H.; Itakura,-Y.
TI: Nalpha-(1-deoxy-D-fructos-1-yl)-L-arginine, an antioxidant compound identified in aged garlic extract.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 972S-976S.
LA: English
DE: garlic-. plant-extracts. antioxidants-. organic-sulfur-compounds. amino-acid-derivatives. supplements-. fructose-. arginine-. ripening-. food-processing. food-composition. chemical-composition. hydrogen-peroxide. juices-. heat-treatment. food-processing-quality. time-.
AB: Aged garlic extract (AGE) has been shown to have antioxidant activity. The organosulfur compounds, S-allyl-L-cysteine and S-allylmercapto-L-cysteine, are responsible, at least in part, for the antioxidant activity of AGE. To identify major active components, we fractionated AGE, using hydrogen peroxide scavenging activity as an antioxidative index. Strong activity in the amino acid fraction was found and the major active compound was identified as Nalpha-(1-deoxy-D-fructos-1-yl)-L-arginine (Fru-Arg). Antioxidant activity of Fru-Arg was comparable to that of ascorbic acid, scavenging hydrogen peroxide completely at 50 micromol/L and 37% at 10 micromol/L. Quantitative analysis using the established HPLC system revealed that AGE contained 2.1-2.4 mmol/L of Fru-Arg, but none was detected in either raw or heated garlic juice. Furthermore, it was shown that a minimum of 4 mo aging incubation was required for Fru-Arg to be generated. These findings indicate that the aging process is critical for the production of the antioxidant compound, Fru-Arg. These results may explain some of the variation in benefits among different commercially available garlic preparations.

54. AU: Rosen,-R.T.; Hiserodt,-R.D.; Fukuda,-E.K.; Ruiz,-R.J.; Zhou,-Z.; Lech,-J.; Rosen,-S.L.; Hartman,-T.G.
TI: Determination of allicin, S-allylcysteine and volatile metabolites of garlic in breath, plasma or simulated gastric fluids.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 968S-971S.
LA: English
DE: garlic-. metabolites-. volatile-compounds. plant-extracts. breath-. blood-plasma. gastric-juices. simulation-models. adults-.
AB: Various components of garlic and aged garlic extract, including allicin, S-allylcysteine (SAC) and volatile metabolites of allicin were determined in breath, plasma and simulated gastric fluids by HPLC, gas chromatography (GC) or HPLC- and GC-mass spectrometry (MS). Data indicate that allicin decomposes in stomach acid to release allyl sulfides, disulfides and other volatiles that are postulated to be metabolized by glutathione and/or S-adenosylmethionine to form allyl methyl sulfide. SAC can be absorbed by the body and can be determined in plasma by HPLC or HPLC-MS using atmospheric pressure chemical ionization (APCI)-MS.

55. AU: Itakura,-Y.; Ichikawa,-M.; Mori,-Y.; Okino,-R.; Udayama,-M.; Morita,-T.
TI: How to distinguish garlic from the other Allium vegetables.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar

2001. v. 131 (3S) p. 963S-967S.
LA: English
DE: garlic-. allium-. vegetables-. identification-. food-analysis. amino-acid-derivatives. food-composition. saponins-. characteristics-. biochemical-markers. biological-indicators. organic-sulfur-compounds. onions-. leeks-. allium-sativum. allium-ascalonicum. allium-cepa. allium-chinense. allium-fistulosum. allium-porrum. allium-schoenoprasum. allium-tricoccum. allium-ampeloprasum. allium-tuberosum. species-differences. food-processing-quality. food-processing. heat-treatment. bulbs-. rhizomes-.
AB: The establishment of international monographs for herbs is in progress. Here, we propose both a marker compound and a method for its analysis for the identification of garlic bulbs and their products. The constituents in 26 kinds of fresh edible parts of Allium vegetables and three types of garlic preparations were analyzed. Sulfur compounds are the most characteristic constituents in garlic, but manufacturing processes of garlic products dramatically affect these constituents. Thus, no sulfur compound could be specified as a universal marker of identification applicable for any type of garlic. On the other hand, garlic contains other characteristic compounds, namely, saponins. After analyzing Allium vegetables and garlic preparations, we concluded that sapogenins, especially beta-chlorogenin, may be a viable candidate for identifying and distinguishing garlic from other Allium vegetables.

56. AU: Amagase,-H.; Petesch,-B.L.; Matsuura,-H.; Kasuga,-S.; Itakura,-Y.
TI: Intake of garlic and its bioactive components.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 955S-962S.
LA: English
DE: garlic-. food-composition. chemical-composition. supplements-. amino-acid-derivatives. dehydrated-foods. powders-. essential-oils. plant-extracts. disease-prevention. health-promotion. history-. food-intake. organic-sulfur-compounds. bioavailability-. safety-. quality-controls. toxicity-. adverse-effects. literature-reviews.
AB: The health benefits of garlic likely arise from a wide variety of components, possibly working synergistically. The complex chemistry of garlic makes it plausible that variations in processing can yield quite different preparations. Highly unstable thiosulfinates, such as allicin, disappear during processing and are quickly transformed into a variety of organosulfur components. The efficacy and safety of these preparations in preparing dietary supplements based on garlic are also contingent on the processing methods employed. Although there are many garlic supplements commercially available, they fall into one of four categories, i.e., dehydrated garlic powder, garlic oil, garlic oil macerate and aged garlic extract (AGE). Garlic and garlic supplements are consumed in many cultures for their hypolipidemic, antiplatelet and procirculatory effects. In addition to these proclaimed beneficial effects, some garlic preparations also appear to possess hepatoprotective, immune-enhancing, anticancer and chemopreventive activities. Some preparations appear to be antioxidative, whereas others may stimulate oxidation. These additional biological effects attributed to AGE may be due to compounds, such as S-allylcysteine, S-allylmercaptocysteine, N(alpha)-fructosyl arginine and others, formed during the extraction process. Although not all of the active ingredients are known, ample research suggests that several bioavailable components likely contribute to the observed beneficial effects of garlic.

57. AU: Rivlin,-R.S.
TI: Historical perspective on the use of garlic.
SO: J-nutr. Bethesda : American Society for Nutritional Sciences. Mar 2001. v. 131 (3S) p. 951S-954S.
LA: English
DE: garlic-. intake-. history-. medicinal-plants. disease-prevention. health-promotion. medical-treatment. social-anthropology. religion-. health-beliefs. literature-reviews.
AB: The objective of this review is to examine briefly the medical uses of garlic throughout the ages and the role that it was considered to play in prevention and treatment of disease. Interest in the potential benefits of garlic has origins in antiquity and is one of the earliest documented examples of plants employed for treatment of disease and maintenance of health. Garlic was in use at the beginning of recorded history and was found in Egyptian pyramids and ancient Greek temples. There are Biblical references to garlic. Ancient medical texts from Egypt, Greece, Rome, China and India each prescribed medical applications for garlic. In many cultures, garlic was administered to provide strength and increase work capacity for laborers. Hippocrates, the revered physician, prescribed garlic for a variety of conditions. Garlic was given to the original Olympic athletes in Greece, as perhaps one of the earliest "performance enhancing" agents. It is of interest that cultures that developed without contact with one another came to similar conclusions about the efficacy of garlic. Modern science is tending to confirm many of the beliefs of ancient cultures regarding garlic, defining mechanisms of action and exploring garlic's potential for disease prevention and treatment.

59. AU: Sunesen,-L.O.; Dorigoni,-V.; Zanardi,-E.; Stahnke,-L.
TI: Volatile compounds released during ripening in Italian dried sausage.
SO: Meat-sci. Oxford : Elsevier Science Limited. May 2001. v. 58 (1) p. 93-97.
LA: English
DE: fermented-foods. sausages-. pork-. ripening-. volatile-compounds. release-. garlic-. black-pepper. fungi-. surfaces-. italy-.
AB: A commercial production was analysed at six stages during ripening. Water content, pH and bacterial counts were followed, and volatile compounds from sausages were extracted by dynamic headspace sampling and analysed by gas chromatography/mass spectrometry. Total concentrations of all classes increased during ripening. Pepper compound concentrations peaked in the middle of the ripening period. Lipid oxidation products increased especially towards the end of ripening, in particular, the compounds 2-heptanol, 1-octen-3-ol, 2-heptanone and 2-nonanone. Surface moulds probably caused 4-heptanone to appear late in the processing. Benzeneacetaldehyde was absent in fresh mince, but increased to become one of the most abundant volatiles. Compounds from carbohydrate catabolism disappeared during the processing.

60. AU: Takaichi,-M.; Nagakubo,-T.; Oeda,-K.
TI: Mixed virus infections of garlic determined by a multivalent polyclonal antiserum and virus effects on disease symptoms.
SO: Plant-dis. [St. Paul, Minn., American Phytopathological Society]. Jan 2001. v. 85 (1) p. 71-75.
LA: English
DE: identification-. allium-sativum. mixed-infections. symptoms-. complementary-dna. plant-diseases. coat-proteins. polymerase-chain-

reaction. leek-yellow-stripe-potyvirus. molecular-weight. onion-yellow-dwarf-potyvirus. carlavirus-group. plant-viruses. bulbs-. weight-. yield-losses. japan-.

AB: A garlic virus-specific polyclonal antiserum was developed against a mixture of flexuous rod-shaped virus particles isolated from mosaic-diseased garlic plants (15). This antiserum was used in Western blot analysis against tissues from mosaic-diseased garlic plants, at least seven viral coat protein (CP) bands (from 38 to 32 kDa) were identified. Using Western blot analysis with Potyvirus-specific antibodies and reverse transcription-polymerase chain reaction (RT-PCR) analysis, we concluded that three of the seven bands corresponded to CPs of Leek yellow stripe virus (LYSV) (38 kDa) and two different Onion yellow dwarf virus (OYDV) strains (35.5 or 34 kDa). The 35 kDa). The 35 kDa band corresponded to the CP of GV1-Carlavirus, and the other four bands, 36, 35 (not GV1), 33, and 32 kDa, were identified as the CPs of four mite-borne viruses, based on RT-PCR analysis. Based on the molecular weights of CP, mixed infections of Potyvirus, Carlavirus, and mite-borne viruses were characterized. LYSV causes apparent disease symptoms in garlic plants, however, little reduction in bulb weights. Conversely, garlic plants infected with three different mite-borne viruses expressed weak symptoms and yield losses. Mixed infections of OYDV, the mite-borne viruses, and LYSV caused severe disease symptoms and considerable reduction of bulb weights.

61. AU: Park,-M.Y.; Yi,-N.R.; Lee,-H.Y.; Kim,-S.T.; Kim,-M.; Park,-J.H.; Kim,-J.K.; Lee,-J.S.; Cheong,-J.J.; Choi,-Y.D.

TI: Generation of chlorsulfuron-resistant transgenic garlic plants (Allium sativum L.) by particle bombardment.

SO: Mol-breed. Dordrecht ; Boston : Kluwer Academic Publishers, c1995-. 2002. v. 9 (3) p. 171-181.

LA: English

DE: allium-sativum. genetic-transformation. biolistics-. chlorsulfuron-. herbicide-resistance. gene-transfer. acetolactate-synthase. genes-. callus-. gene-expression. messenger-rna. regenerative-ability. promoters-.

AB: We established an effective biolistic transformation procedure for transferring foreign genes into garlic (Allium sativum L.), which we demonstrated by generating transgenic plants resistant to chlorsulfuron, a sulfonylurea herbicide. We subcultured callus tissue from the apical meristem of garlic cloves and repeatedly selected calli with brittle, non-mucilaginous surfaces for over six months, to increase transformation efficiency. We then constructed recombinant DNA that contained the acetolactate synthase (ALS) gene from a chlorsulfuron-resistant Arabidopsis mutant, the cauliflower mosaic virus 35S promoter, the beta-glucuronidase (GUS) reporter gene, and the hygromycin phosphotransferase (HPT) selectable marker gene. The garlic calli were bombarded twice with tungsten particles coated with the DNA constructs. Transformed calli were efficiently selected by embedding them in solid agar medium containing 50 mg l(-1) hygromycin B. Selected propagules were regenerated into 12 independent plants. We confirmed that the transgenes were integrated and expressed in the plants using PCR-Southern and Northern blot analyses and by beta-glucuronidase expression assay for GUS. The regenerated plants survived in the presence of 3 mg l(-1) chlorsulfuron, demonstrating that their ALS was insensitive to this herbicide. These results illustrate the successful transformation of foreign genes into garlic plants. The set of procedures developed in this study is applicable to the generation of transgenic garlic plants with other agronomically beneficial

traits.

62. AU: Hussain,-M.A.; Shafiur-Rahman,-M.; Ng,-C.W.
TI: Prediction of pores formation (porosity) in foods during drying: generic models by the use of hybrid neural network.
SO: J-food-eng. Oxford : Elsevier Science Ltd. Feb 2002. v. 51 (3) p. 239-248.
LA: English
DE: drying-quality. porosity-. neural-networks. simulation-models. temperature-. food-products. foods-. prediction-. water-content. food-composition. accuracy-.
AB: General porosity prediction models of food during air-drying have been developed using regression analysis and hybrid neural network techniques. Porosity data of apple, carrot, pear, potato, starch, onion, lentil, garlic, calamari, squid, and celery were used to develop the model using 286 data points obtained from the literature. The best generic model was developed based on four inputs as temperature of drying, moisture content, initial porosity, and product type. The error for predicting porosity using the best generic model developed is 0.58%, thus identified as an accurate prediction model.

63. AU: Garcia,-E.; Alviar-Agnew,-M.; Barrett,-D.M.
TI: Residual pectinesterase activity in dehydrated onion and garlic products.
SO: J-food-process-preserv. Trumbull, Conn. : Food & Nutrition Press Inc. Apr 2002. v. 26 (1) p. 11-26.
LA: English
DE: onions-. garlic-. fresh-products. dehydration-. dehydrated-foods. spices-. powders-. pectinesterase-. enzyme-activity. heat-treatment. drying-temperature. food-additives. gelation-.
AB: During the dehydration of onion and garlic products, use of high temperatures is undesirable due to the potential loss of aroma and flavor characteristics. As a consequence, residual pectinesterase (PE) activity may be found in these dehydrated spices. This study reports the presence of PE activity in raw onions and in dehydrated onion and garlic products. Pectinesterase activity is higher in the raw onion stem disks, and dehydrated products made from this tissue, than in the bulbs. Dehydrated onion products induced gelation of citrus pectin solutions and tomato purees. Although some inactivation of PE in dehydrated onion water suspensions and extracts was observed after 10 min at 50C, complete inactivation required 2 min at 82C. Commercial dehydration operations may require reevaluation to eliminate residual PE activity in dehydrated onion and garlic products.

64. AU: Kubec,-R.; Velisek,-J.; Musah,-R.A.
TI: The amino acid precursors and odor formation in society garlic (tulbaghia violacea Harv.).
SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. May 2002. v. 60 (1) p. 21-25.
LA: English
DE: tulbaghia-. amino-acids. amino-acid-metabolism. precursors-. rhizomes-. chemical-structure. plant-composition. leaves-. stems-. quantitative-analysis.
AB: Identification and isolation of (R(S)R(C))-S-(methylthiomethyl) cysteine-4-oxide from rhizomes of Tulbaghia violacea Harv. is reported. The structure and absolute configuration of the amino acid have been determined by NMR, MALDI-HRMS, IR, and CD spectroscopy. Its content varied in different parts of the plant (rhizomes, leaves, and stems) between 0.12 and 0.24 mg g-1 fr. wt,

being almost equal in the stems and rhizomes. In addition, S-methyl- and S-ethylcysteine derivatives have been detected in minute amounts (< 3 micrograms g-1 fr. wt) in all parts of the plant. The enzymatic cleavage of the amino acid and subsequent odor formation are discussed. 2,4,5,7-Tetrathiaoctane-4-oxide, the primary breakdown product, has been detected and isolated for the first time.

65. AU: Groot,-H.-de.
TI: Garlic plant named 'Melany'.
SO: US-pat-Plant. [Washington, D.C. : U.S. Patent and Trademark Office, 1976-. July 9, 2002. (12,761) 3 p.
LA: English
DE: allium-sativum. cultivars-. patents-. bulb-scales. planting-stock. disease-resistance. earliness-. high-yielding-varieties. usa-. netherlands-.
AB: Abstract: A new and distinct cultivar of garlic plant named ' Melany', characterized by early harvesting of the plant, high yield of bulbs, disease-free vegetation, presence of flower scape, and vigorous foliage that develops quicker and has more volume than comparative cultivars.

66. AU: Colic,-M.; Vucevic,-D.; Kilibarda,-V.; Radicevic,-N.; Savic,-M.
TI: Modulatory effects of garlic extracts on proliferation of T-lymphocytes in vitro stimulated with concanavalin A.
SO: Phytomedicine. Stuttgart ; New York : G. Fischer, c1994-. Mar 2002 . v. 9 (2) p. 117-124.
LA: English
DE: allium-sativum. immunological-deficiency. t-lymphocytes. concanavalin-a. immunomodulators-. medicinal-properties. plant-extracts. ethanol-. cell-growth. interleukin-2. production-. monoclonal-antibodies. lymphocyte-transformation. animal-experiments. rats-.

67. AU: Sharma,-S.; Bhat,-T.K.; Gupta,-M.N.
TI: Bioaffinity immobilization of tannase from Aspergillus niger on concanavalin A-Sepharose CL-4B.
SO: Biotechnol-appl-biochem. London : Portland Press Ltd. June 2002. v. 35 (pt.3) p. 165-169.
LA: English
AB: Tannase from Aspergillus niger van Teighem was immobilized on concanavalin A-Sepharose via bioaffinity interaction. The immobilized enzyme showed a pH optimum similar to that of the free enzyme. Km values for free and immobilized enzyme were 0.3 and 0.6 mM respectively. Vmax changed from 0.013 to 0.02 micromol(.)min-1 upon immobilization. The immobilized preparation was quite stable to reuse, there was no loss of enzyme activity after three cycles and it retained 81% activity even after the sixth cycle. Ester hydrolysis using the immobilized enzyme led to a 40% conversion into garlic acid as compared with 30% obtained with the free enzyme.

68. AU: Kodera,-Y.; Suzuki,-A.; Imada,-O.; Kasuga,-S.; Sumioka,-I.; Kanezawa,-A.; Taru,-N.; Fujikawa,-M.; Nagae,-S.; Masamoto,-K.
TI: Physical, chemical, and biological properties of S-allylcysteine, an amino acid derived from garlic.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. Jan 30, 2002. v. 50 (3) p. 622-632.
LA: English
DE: cysteine-. amino-acid-derivatives. physical-properties. chemical-properties. garlic-. oral-administration. intestinal-absorption.

half-life. excretion-. pharmacokinetics-. man-. toxicity-. mice-. rats-.

AB: Physical, chemical, and biological properties of S-allylcysteine (SAC) were investigated. SAC showed stable properties under tested conditions, and its acute/subacute toxicity was very minor in mice and rats (LD50 value >54.7 mM/kg po; >20 mM/kg ip). The pharmacokinetics of SAC was investigated after oral administration of garlic supplement containing SAC to human volunteers. SAC from garlic consumption was rapidly absorbed from the gastrointestinal tract, however, the half-life and excretion time were more than 10 h and 30 h, respectively.

69. AU: Al-Karaki,-G.N.

TI: Field response of garlic inoculated with arbuscular mycorrhizal fungi to phosphorus fertilization.

SO: J-plant-nutr. Monticello, N.Y. : Marcel Dekker Inc. 2002. v. 25 (4) p. 747-756.

LA: English

DE: allium-sativum. glomus-fasciculatum. inoculation-. vesicular-arbuscular-mycorrhizas. phosphorus-. application-rates. field-experimentation. roots-. developmental-stages. crop-yield. weight-. triple-superphosphate. jordan-.

AB: Several studies have demonstrated improved growth of plants infected with arbuscular mycorrhizal fungi (AMF) compared to non-AMF plants. The growth responses of garlic (Allium sativum L.) to an AMF in soil fertilized with different levels of phosphorus (P) were studied under field conditions. Garlic cloves were planted in furrows after treatment with different P levels (0, 20, 40, and 60 Kg P ha(-1)), and with or without the AMF Glomus fasciculatum. Roots were sampled at three growth stages to quantify AMF. AMF colonization occurred at all samplings and the root colonization by AMF increased gradually with time, peaking at mid-bulb filling stage in the AMF-inoculated treatments. The AMF-inoculated plants had higher fresh bulb yield and mean bulb weight than uninoculated plants regardless of P level. This increase in yield and mean bulb weight was associated with a significant increase in the bulb P total accumulation of AMF inoculated plants. The enhancement in fresh bulb yield and mean bulb weight due to AMF-inoculation was highest in plots fertilized with 20 Kg P ha(-1), whereas the AMF inoculation had no significant effect on these characters at higher P levels (40 and 60 Kg P ha(-1)). The AMF inoculant had no effect on bulb P concentration in plots fertilized with 60 Kg P ha(-1), but increased the P total accumulation of garlic plants at all P levels. Results of this study indicate that garlic was dependent on mycorrhizae and responded to an AMF inoculant in soils containing intermediate levels of P. Therefore, AMF inoculants should be introduced into soil to ensure satisfactory garlic yields and reduced P fertilization.

70. AU: Seefelder,-W.; Gossmann,-M.; Humpf,-H.U.

TI: Analysis of fumonisin B1 in Fusarium proliferatum-infected asparagus spears and garlic bulbs from Germany by liquid chromatography-electrospray ionization mass spectrometry.

SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. May 8, 2002. v. 50 (10) p. 2778-2781.

LA: English

DE: asparagus-officinalis. fungal-diseases. fusarium-proliferatum. spears-. fumonisins-. garlic-. food-contamination. liquid-chromatography. mass-spectrometry. germany-.

AB: Fusarium proliferatum is one of a group of fungal species that produce fumonisins and is considered to be a pathogen of many

economically important plants. The occurrence of fumonisin B1 (FB1) in F. proliferatum-infected asparagus spears from Germany was investigated using a liquid chromatography-electrospray ionization mass spectrometry (LC-ESI-MS) method with isotopically labeled fumonisin FB1-d6 as internal standard. FB1 was detected in 9 of the 10 samples in amounts ranging from 36.4 to 4513.7 ng/g (based on dry weight). Furthermore, the capability of producing FB1 by the fungus in garlic bulbs was investigated. Therefore, garlic was cultured in F. proliferatum-contaminated soil, and the bulbs were screened for infection with F. proliferatum and for the occurrence of fumonisins by LC-MS. F. proliferatum was detectable in the garlic tissue, and all samples contained FB1 (26.0-94.6 ng/g). This is the first report of the natural occurrence of FB1 in German asparagus spears, and these findings suggest a potential for natural contamination of garlic bulbs with fumonisins.

71. AU: Ikeda,-T.; Fujime,-Y.; Terabayashi,-S.; Date,-S.
TI: Water status of garlic callus under various salt and osmotic stress conditions.
SO: HortScience. Alexandria, Va. : The American Society for Horticultural Science. Apr 2002. v. 37 (2) p. 404-405.
LA: English
DE: allium-sativum. tissue-culture. plant-water-relations. osmosis-. stress-. salinity-. mannitol-. application-rates. water-potential. culture-media. turgor-.
AB: Garlic (Allium sativum L.) calli in vitro were evaluated over a range of salt concentrations and by adding mannitol to culture medium with reduced salt to provide equivalent osmoticum. The water potential of the medium ranged from -0.27 to -0.73 MPa under the various salt and osmotic stress conditions. The percent increase in calli was highest in standard Murashige & Skoog (MS) medium and was reduced when MS salts were reduced but the water potential of medium was adjusted to that of standard MS medium by addition of mannitol. The water potential of callus tissue was similar to that of tissue culture media over a 20-fold range (10% to 200%) of MS concentrations. Turgor of callus tissue was not influenced by any stress conditions. These results indicate that the optimum concentration of salt and water status of medium for formation of garlic calli was provided by standard MS medium.

72. AU: Lopez-Diaz,-T.M.; Gonzalez,-C.J.; Moreno,-B.; Otero,-A.
TI: Effect of temperature, water activity, pH and some antimicrobials on the growth of Penicillium olsonii isolated from the surface of Spanish fermented meat sausage.
SO: Food-microbiol. London ; Orlando : Academic Press, c1984-. Feb 2002 . v. 19 (1) p. 1-7.
LA: English
DE: sausages-. fermented-foods. penicillium-. starters-. temperature-. water-activity. ph-. sodium-chloride. sodium-nitrite. potassium-nitrate. paprika-. garlic-. spices-.
AB: The effect of various factors and compounds used in the manufacturing of 'Cantimpalos chorizo', a fermented meat sausage made in Spain, on the growth of three strains of Penicillium olsonii isolated from the surface of the sausage has been investigated. In addition, one strain of Penicillium nalgiovense (ATCC 66742), used as starter culture in fermented foods, has been included in the study. Fungi were grown under various ecological conditions (temperature, water activity and pH) and in the presence of the main antimicrobial compounds (sodium chloride, sodium nitrite and potassium nitrate) and spices (paprika, oregano and garlic) that are added to the initial sausage mixture. The

effect of different combinations of some of the factors was also investigated. The results showed that at the levels found during the manufacturing of the sausage, the most influencing parameters on the growth of both species were water activity, temperature and sodium chloride. Both P. olsonii and Penicillium nalgiovense were capable of growing at 10 degrees C. Penicillium nalgiovense and one of the natural P. olsonii strains could also grow at the lowest water activity tested (0.86). However, the optimum water activity was higher for both species (0.92 for P. olsonii and close to 1 for P. nalgiovense). The pH, nitrates and nitrites, and the spices tested had no or a very little effect on the growth of both species. Differences among the naturally isolated strains were not significant (P > 0.05) in most experiments. Also, in general terms, the behaviour of our isolates was very similar to the reference strain of P. nalgiovense, which indicates closeness to this species from a technological point of view and. suggests the possibility of the use of P. olsonii as starter culture.

73. AU: Macone,-A.; Nardini,-M.; Antonucci,-A.; Maggio,-A.; Matarese,-R.M.
TI: Identification of aminoethylcysteine ketimine decarboxylated dimer, a natural antioxidant, in dietary vegetables.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. Mar 27, 2002. v. 50 (7) p. 2169-2172.
LA: English
DE: cysteine-. amino-acid-derivatives. vegetables-. gas-chromatography. mass-spectrometry. hplc-.
AB: Aminoethylcysteine ketimine decarboxylated dimer (simply named dimer) is a natural sulfur-containing tricyclic compound detected, until now, in human urine, bovine cerebellum, and human plasma. Recently, the antioxidant properties of this compound have been demonstrated. In this investigation, the presence of aminoethylcysteine ketimine decarboxylated dimer was identified in garlic, spinach, tomato, asparagus, aubergine, onion, pepper, and courgette. Identification of this compound in dietary vegetables was performed using gas chromatography, high-performance liquid chromatography, and gas chromatography-mass spectrometry. Results from GC analysis range in the order of 10(-4) micromol of dimer/g for all the tested vegetables. These results and the lack of a demonstrated biosynthetic pathway in humans might account for a dietary supply of this molecule.

74. AU: Damme,-E.J.M.-van.; Charels,-D.; Menu-Bouaouiche,-L.; Proost,-P.; Barre,-A.; Rouge,-P.; Peumans,-W.J.
TI: Biochemcal, molecular and structural analysis of multiple thaumatin-like protein from the elderberry tree (Sambucus nigra L.).
SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Apr 2002. v. 214 (6) p. 853-862.
LA: English
DE: sambucus-nigra. plant-proteins. chemical-structure. plant-composition. fruits-. leaves-. genes-. nucleotide-sequences. amino-acid-sequences. ethephon-. antifungal-properties. enzyme-activity. beta-glucanase-. jasmonic-acid. pathogenesis-related-proteins.
AB: Thaumatin-like proteins (TLPs) were isolated and characterized from fruits and leaves of elderberry (Sambucus nigra) and their corresponding genes cloned. In addition, the developmental regulation and induction of the different TLPs was followed in some detail. Ripening berries accumulated a fruit-specific TLP during the final stages of maturation. This fruit-specific TLP had no antifungal activity and was devoid of beta-glucanase activity.

Leaves constitutively expressed a TLP that closely resembled the fruit-specific homologue. Treatment with jasmonate methyl ester induced two additional TLPs in leaves but did not induce or enhance the expression of TLPs in immature berries. In contrast to jasmonate methyl ester, both ethephon and garlic extract induced the expression of a TLP in unripe berries that normally do not express any TLP. Sequence analysis and molecular modeling indicated that all elderberry thaumatin-like proteins share a high sequence similarity with group-5 pathogenesis-related proteins. However, the proteins encoded by the different sequences differed from each other in isoelectric point and the distribution of the charges on the surface of the molecule.

75. AU: Hu,-Q.; Yang,-Q.; Yamato,-O.; Yamasaki,-M.; Maede,-Y.; Yoshihara,-T.
TI: Isolation and identification of organosulfur compounds oxidizing canine erythrocytes from garlic (Allium sativum).
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. Feb 27, 2002. v. 50 (5) p. 1059-1062.
LA: English
DE: garlic-. organic-sulfur-compounds. chemical-structure. hemoglobin-. erythrocytes-. dogs-.
AB: Five compounds oxidizing canine erythrocytes were isolated from an aqueous ethanol garlic extract by silica gel column chromatography and preparative thin-layer chromatography. On the basis of nuclear magnetic resonance, infrared spectroscopy, and mass spectrometry, they were identified as three known compounds: bis-2-propenyl trisulfide (1), bis-2-propenyl tetrasulfide (2), and bis-2-propenyl pentasulfide (3) as well as two novel compounds, bis-2-propenyl thiosulfonate (4) and trans-sulfuric acid allyl ester 3-allylsulfanyl-allyl ester (5). A mixture of compounds 1-3 and compounds 4 and 5 induced methemoglobin formation in canine erythrocyte suspension in vitro resulting in the oxidation of canine erythrocytes. These groups of characteristic organosulfur compounds contained in garlic probably contribute to oxidations in blood. The constituents of garlic have the potential to oxidize erythrocytes and hemoglobin, suggesting that foods containing quantities of garlic should be avoided for feeding dogs.

76. AU: Wu,-C.C.; Sheen,-L.Y.; Chen,-H.W.; Kuo,-W.W.; Tsai,-S.J.; Lii,-C.K.
TI: Differential effects of garlic oil and its three major organosulfur components on the hepatic detoxification system in rats.
SO: J-agric-food-chem. Washington, D.C. : American Chemical Society. Jan 16, 2002. v. 50 (2) p. 378-383.
LA: English
DE: garlic-. plant-oils. sulfides-organic. oral-administration. enzyme-activity. unspecific-monooxygenase. cytochrome-p-450. glutathione-transferase. gene-expression. messenger-rna. metabolic-detoxification. liver-. rats-.
AB: The objective of this study was to compare the modulatory effect of garlic oil and its three organosulfur compounds, diallyl sulfide (DAS), diallyl disulfide (DADS), and diallyl trisulfide (DATS), on rat hepatic detoxification enzyme activity, and protein and mRNA expression. Rats were orally administered garlic oil (80 or 200 mg/kg bw), DAS (20 or 80 mg/kg bw), DADS (80 mg/kg bw), or DATS (70 mg/kg bw) three times a week for 6 weeks. Control rats received corn oil. According to the results, garlic oil and DAS in dosages of 200 and 80 mg/kg bw, respectively, significantly increased pentoxyresorufin O-dealkylase (PROD) activity as compared with the that of the control rats ($P < 0.05$). In

contrast, N-nitrosodimethylamine demethylase activity in rats that received DADS and DATS was significantly lower than that in the control rats (P < 0.05). Ethoxyresorufin O-deethylase and erythromycin demethylase activities were not influenced by garlic oil, DAS, DADS, or DATS. To the phase II enzyme, garlic oil, DADS, and DATS significantly increased the glutathione S-transferase (GST) activity toward ethacrynic acid (P < 0.05). Immunoblot assay showed that the protein contents of cytochrome P450 1A1, 2B1, and 3A1 were increased by garlic oil and each of three allyl sulfides, and the change among the allyl sulfides was in the order of DAS > DADS > DATS. The placental form of GST (PGST) level was also increased by garlic oil and the three allyl sulfides, but the increase among the allyl sulfides was DATS approximately equal to DADS > DAS. P450 2E1, however, was suppressed by each garlic component. Northern blot results indicated that the changes in P450 1A1, 2B1, 3A1, and PGST mRNA.
levels by garlic components were similar to those noted in the protein levels. These results indicate that the modulatory effect of garlic oil on hepatic drug-metabolizing enzymes can be attributed to its three major allyl sulfide components DAS, DADS, and DATS. These three allyl sulfides vary in modulatory activity, and this variation is related to the number of sulfur atoms in the molecule.

77. Title:Efficient transient expression of the beta -glucuronidase reporter gene in garlic (Allium sativum L.)
View Article: Agronomie. 2000. 20 (8). 869-874
CD Volume:336
Print Article: Pages: 869-874
Author(s):Ferrer E Linares C Gonzalez J M
Author Affiliation:Department of Cell Biology and Genetics, University of Alcala, Campus Universitario, 28871 Alcala de Henares, Madrid, Spain
Language:English
Language of Summary:french
Abstract:A biolistic particle delivery system was used to introduce DNA containing a beta -glucuronidase (gus) reporter gene under the control of the CaMV35S promoter in three different garlic (Allium sativum L.) tissues: embryogenic calluses, leaves and basal plate discs. Expression of the reporter gene was assayed histochemically and fluorimetrically when the tissues were bombarded with 1 micro m diameter gold particles coated with DNA, at a distance of 3 cm from the stopping plate and using 1100 psi rupture discs. Following bombardment, high levels of beta -glucuronidase (GUS) were found without the need for treatment to block previously reported putative endogenous nuclease activity
Descriptors:garlic. beta-glucuronidase. gene-expression. biolistics. leaves. callus. bulbs
Organism Descriptors:Allium-sativum
Supplemental Descriptors:Allium. Alliaceae. Liliales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF003. FF020. FF060
Supplementary Info:21 ref
ISSN:0249-5627
Year:2000
Journal Title:Agronomie
Copyright:Copyright CAB International

78. Title:Temperature and relative humidity effects on egg and nymphal development of Aceria tulipae (K.) (Acari : Eriophyidae) on garlic leaves (Allium sativum L.)
View Article: Annals of Applied Biology. 137 (3). December, 2000. 207-211
CD Volume:356

Print Article: Pages: 207-211
Author(s):Courtin Olivier Fauvel Guy Leclant Francois
Author Affiliation:UFR d'Ecologie animale et de Zoologie agricole, INRA-ENSA-M, 2, Place Viala, 34060, Montpellier Cedex 1: sicail.flugers@online.fr
Language:English
Language of Summary:English (EN)
Abstract:Aceria tulipae (K.) is responsible for important crop losses of garlic in all production areas around the world. However, very little is known about its development in relation to temperature and relative humidity (r.h). Laboratory rearings from egg to adult stage were done on pieces of the apical part of young garlic leaves. These leaf pieces were placed in aluminium dishes floating on water or put on a solid hygroscopic salt in closed plastic trays. Rearing done in dark incubators at constant temperatures (10degreeC to 45degreeC) and with different r.h (25% to 75%) at 15degreeC and 25degreeC showed that: i) the shortest development time occurs at about 25degreeC; ii) the upper lethal temperature and the development threshold for the eggs are respectively estimated about 45degreeC and 6degreeC; iii) a r.h close to 100% is required for a high percentage of egg hatching, but water condensation on leaves is harmful. Host transpiration has an important regulatory effect on humidity conditions favouring mite survival
Descriptors:host transpiration; insect development; mite survival; relative humidity; temperature effect. Chemical Coordination and Homeostasis; Development; Economic Entomology; Climatology (Environmental Sciences); Pest Assessment Control and Management
Organism Descriptors:Aceria tulipae (Acarina): egg, nymph; Allium sativum [garlic] (Liliaceae). leaf
Supplemental Descriptors:Acarina: Chelicerata, Arthropoda, Invertebrata, Animalia; Liliaceae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Animals; Arthropods; Chelicerates; Invertebrates; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Chemical Coordination and Homeostasis; Development; Economic Entomology; Climatology (Environmental Sciences); Pest Assessment Control and Management
ISSN:0003-4746
Year:2000
Journal Title:Annals of Applied Biology

79. Title:Chemical speciation influences comparative activity of selenium-enriched garlic and yeast in mammary cancer prevention
View Article: Journal of Agricultural and Food Chemistry. 48 (6). June, 2000. 2062-2070
CD Volume:301
Print Article: Pages: 2062-2070
Author(s):Ip Clement Birringer Marc Block Eric Kotrebai Mihaly Tyson Julian F Uden Peter C Lisk Donald J
Author Affiliation:Department of Experimental Pathology, Roswell Park Cancer Institute, Elm and Carlton St., Buffalo, NY, 14263
Language:English
Language of Summary:English (EN)
Abstract:A recent human intervention trial showed that daily supplementation with selenized yeast (Se-yeast) led to a decrease in the overall cancer morbidity and mortality by nearly 50%; past research has also demonstrated that selenized garlic (Se-garlic) is very effective in mammary cancer chemoprevention in the rat model. The goal of this study was to compare certain biological activities of Se-garlic and Se-yeast and to elucidate the differences based on the chemical forms of selenium found in these two natural products. Characterization of organic selenium compounds in yeast (1922 mug/g Se) and garlic (296 mug/g Se) was carried out by high-performance liquid chromatography with inductively coupled plasma mass spectrometry or with electrospray mass spectrometry. Analytical speciation studies showed that the bulk of the selenium

in Se- garlic and Se-yeast is in the form of gamma-glutamyl-Se-methylselenocysteine (73%) and selenomethionine (85%), respectively. The above methodology has the sensitivity and capability to account for >90% of total selenium. In the rat feeding studies, supplementation of Se-garlic in the diet at different levels consistently caused a lower total tissue selenium accumulation when compared to Se-yeast. On the other hand, Se- garlic was significantly more effective in suppressing the development of premalignant lesions and the formation of adenocarcinomas in the mammary gland of carcinogen-treated rats. Given the present finding on the identity of selenomethionine and gamma-glutamyl-Se-methylselenocysteine as the major form of selenium in Se-yeast and Se-garlic, respectively, the metabolism of these two compounds is discussed in an attempt to elucidate how their disposition in tissues might account for the differences in cancer chemopreventive activity
Descriptors:chemical speciation; selenized garlic: vegetable; selenized yeast. Foods; Nutrition; Tumor Biology. mammary cancer [breast cancer]: neoplastic disease, prevention, reproductive system disease/female. selenium
Organism Descriptors:yeast (Fungi)
Supplemental Descriptors:Fungi: Plantae. Fungi; Microorganisms; Nonvascular Plants; Plants
Subject Codes:Foods; Nutrition; Tumor Biology
ISSN:0021-8561
Year:2000
Journal Title:Journal of Agricultural and Food Chemistry

80. Title:Use of the MS-sensor to discriminate between different dosages of garlic flavoring in tomato sauce
View Article: Journal of Agricultural and Food Chemistry. 48 (7). July, 2000. 2887-2892
CD Volume:301
Print Article: Pages: 2887-2892
Author(s):Dittmann B Zimmermann B Engelen C Jany G Nitz S
Author Affiliation:HKR Sensorsysteme GmbH, Gotzinger Str. 56, D-81371, Muenchen
Language:English
Language of Summary:English (EN)
Abstract:A method has been developed to discriminate between different dosages of garlic flavoring in tomato sauce with the help of a mass spectrometry based sensory system. Four fragment ions m/z 73, 81, 114, and 120 were selected as "sensor array" during direct injection of the sample headspace into the mass spectrometer. Tomato sauces blended with different types of flavoring could be discriminated, and concentration gradients could be monitored. Fragment ions were chosen after volatile components had been analyzed and identified by SPME-GC/MS and HS-GC/MS (full scan). HS- GC/MS profiles of m/z 73, 81, 114, and 120 were recorded in the selected ion monitoring mode
Descriptors:food chemistry; garlic flavoring dosage; tomato sauce: sauces and condiments. Foods
Subject Codes:Foods
ISSN:0021-8561
Year:2000
Journal Title:Journal of Agricultural and Food Chemistry

81. Title:Improvement of garlic (Allium sativum L.) resistance to white rot and storability using gamma irradiation induced mutations
View Article: Journal of Genetics & Breeding. 2000. 54 (3). 175-181
CD Volume:321
Print Article: Pages: 175-181
Author(s):Al Safadi B Mir Ali N Arabi M I E
Author Affiliation:Department of Agriculture, Atomic Energy Commission of Syria, P.O. Box 6091, Damascus, Syria
Language:English

Abstract:A mutation breeding programme was conducted to improve garlic (Allium sativum) resistance to white rot (Sclerotium cepivorum) and to improve its storability under natural conditions. Cloves of two local garlic cultivars (Kisswany and Yabroudy) were irradiated with gamma -ray doses 4, 5, 6, and 7 Gray (Gy). The cloves were planted in the field and the plants were advanced for 4 generations to isolate mutations in stable form. Starting in the second generation (M2), selection pressure against white rot disease was applied by covering the soil surrounding the plantlets with infested crop residues (50 g/m2). In the third (M3) and fourth (M4) generations, however, full selection pressure was applied by inoculating the cloves with the fungus sclerotes and planting them in a soil previously planted with infected garlic plants. Healthy garlic bulbs were harvested and stored under natural conditions and then planted to obtain the next generation. By the end of the (M4) generation, improvements were made to resistance to white rot disease and its storability without a reduction in bulb size. Twenty-four mutant lines from each garlic cultivar were selected. Twelve lines from cv. Kisswany had only a 3% infection percentage as compared to 29% in the control, and twelve lines from cv. Yabroudy had less than 5% infection percentage as compared to 20% in the control. Also, storability under natural conditions has improved. Weight loss during storage decreased from 8% in the control to only 4% in some Kisswany lines and from 10% to 3% in some Yabroudy lines
Descriptors:garlic. plant-pathogens. plant-pathogenic-fungi. plant-diseases. disease-resistance. varietal-reactions. fungal-diseases. gamma-radiation. mutagens. induced-mutations. storage-decay. storage-quality
Organism Descriptors:Sclerotium-cepivorum. Allium-sativum
Supplemental Descriptors:Sclerotium. Deuteromycotina. Eumycota. fungi. Allium. Alliaceae. Liliales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF020. FF003. FF610. HH600
Supplementary Info:22 ref
ISSN:0394-9257
Year:2000
Journal Title:Journal of Genetics & Breeding
Copyright:Copyright CAB International

82. Title:The effect of paprika, garlic and salt on rancidity in dry sausages
View Article: Meat Science. 54 (1). Jan., 2000. 77-81
CD Volume:335
Print Article: Pages: 77-81
Author(s):Aguirrezabal M M Mateo J Dominguez M C Zumalacarregui J M
Author Affiliation:Departamento de Higiene y Tecnologia de los Alimentos, Facultad de Veterinaria, Universidad de Leon, Campus Vegazana s/n, 24007, Leon
Language:English
Language of Summary:English (EN)
Abstract:Eight batches of ground fat and eight batches of a mixture of meat and fat (70 and 30%, respectively), were prepared by adding salt, paprika and garlic, in the proportions used for making chorizo - a dry fermented sausage - stuffed into natural casings and then ripened. The evolution of rancidity in these products was evaluated by means of total free fatty acid content, peroxide value and TBARS during the ripening period. Spanish paprika and salt showed antioxidant and prooxidant properties, respectively. Paprika was even able to inhibit the prooxidant effect of salt. Also, four batches of chorizo were made to compare the antioxidant effect of the spices (garlic and paprika) with a mixture of nitrate, nitrite and ascorbic acid. In this respect, paprika and garlic were as effective as the mixture of additives in inhibiting lipid oxidation
Descriptors:dry sausage: meat, rancidity; garlic: herbs and spices; paprika: herbs and spices. Foods. lipid: oxidation, rancidity; salt
Subject Codes:Foods
ISSN:0309-1740
Year:2000
Journal Title:Meat Science

83. Title:The influence of Debaryomyces hansenii and Candida utilis on the aroma formation in garlic spiced fermented sausages and model minces
View Article: Meat Science. 56 (4). December, 2000. 357-368
CD Volume:335
Print Article: Pages: 357-368
Author(s):Olesen Pelle Thonning Stahnke Louise Heller
Author Affiliation:Department of Biotechnology, Technical University of Denmark, Building 221, DK-2800, Lyngby
Language:English
Language of Summary:English (EN)
Abstract:The influence of the yeast starter cultures Debaryomyces hansenii and Candida utilis on fermented meat aroma was studied in model minces and in commercial-type fermented sausages. Volatile compounds from model minces and sausages were collected using diffusive and dynamic headspace sampling respectively and were identified by gas chromatography/mass spectrometry (GC/MS). A triangle test was carried out on the sausages to detect whether the yeast influenced the sausage odour. C. utilis demonstrated high metabolic activity in the model minces, producing several volatile compounds, in particularly esters. C. utilis also seemed to ferment the amino acids valine, isoleucine and leucine into compounds important for the aroma of sausages. D. hansenii on the contrary, had very little effect on the production of volatile compounds in the model minces. In the sausage experiment both yeast cultures died out before the ripening process ended and the sensory analysis showed only a slight difference between the sausages. A fungistatic test of the garlic powder added to the sausages indicated that garlic inhibits the growth of the yeast starter cultures
Descriptors:garlic: fungistatic effect, herbs and spices; garlic spiced fermented sausages: aroma, meat product; model minces. Foods. esters; isoleucine; leucine; valine; volatile compounds
Organism Descriptors:Candida utilis (Fungi Imperfecti or Deuteromycetes): fermentation agent; Debaryomyces hansenii (Ascomycetes): fermentation agent
Supplemental Descriptors:Ascomycetes: Fungi, Plantae; Fungi Imperfecti or Deuteromycetes: Fungi, Plantae. Fungi; Microorganisms; Nonvascular Plants; Plants
Subject Codes:Foods
ISSN:0309-1740
Year:2000
Journal Title:Meat Science

84. Title:Hyperaccumulation of cadmium by roots, bulbs and shoots of garlic (Allium sativum L.)
View Article: Bioresource Technology. 2001. 76 (1). 9-13
CD Volume:367
Print Article: Pages: 9-13
Author(s):Jiang WuSheng Liu DongHua Hou WenQiang
Author Variant:Jiang-W-S. Liu-D-H. Hou-W-Q
Author Affiliation:Department of Biology, College of Chemistry and Life Sciences, Tianjin Normal University, Tianjin 300074, China
Language:English
Abstract:The effects of cadmium chloride concentration on root, bulb and shoot growth of garlic (Allium sativum), and the uptake and accumulation of Cd2+ by garlic roots, bulbs and shoots were investigated. The range of cadmium chloride (CdCl2.2.5H2O) concentrations was 10-6-10-2 M. Cadmium stimulated root length at lower concentrations (10-6-10-5 M) significantly ($P<0.005$) during the entire treatment period. The seedlings exposed to 10-3-10-2 M Cd exhibited substantial growth reduction ($P<0.005$), but did not develop chlorosis. Garlic has considerable ability to remove Cd from solutions and accumulate it. The Cd content in roots of garlic increased with increasing solution concentration of

Cd2+. The roots in plants exposed to 10-2 M Cd accumulated a large amount of Cd, approximately 1826 times the control. The Cd contents in roots of plants treated with 10-3, 10-4, 10-5 and 10-6 M Cd were approximately 114, 59, 24 and 4 times the control, respectively. However, the plants transported only a small amount of Cd to their bulbs and shoots and concentrations in these tissues were low
Descriptors:bulbs. cadmium. garlic. chlorosis. seedlings. shoots. growth. uptake. chemical-composition. pollution
Organism Descriptors:Allium. Allium-sativum
Supplemental Descriptors:Alliaceae. Liliales. monocotyledons. angiosperms. Spermatophyta. plants. Allium
Subject Codes:FF003. FF040. PP600
Supplementary Info:42 ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology
Copyright:Copyright CAB International

85. Title:Genetic evaluation of cultivated garlic germplasm (Allium sativum L. and A. ampeloprasum L.)
View Article: Euphytica. 121 (3). 2001. 325-334
CD Volume:370
Print Article: Pages: 325-334
Author(s):Figliuolo G Candido V Logozzo G Miccolis V Zeuli P L Spagnoletti
Author Affiliation:Centro Interdipartimentale per la Salvaguardia delle Risorse Genetiche Vegetali 'P. Iannelli', Universita degli Studi della Basilicata, Campus M. Romana, 85100, Potenza
Language:English
Abstract:Garlic cultivated in rural farms of South Italy is often a heterogeneous clone population, which can comprise different cytotypes. A collection of cultivated garlic from the University of Basilicata gene-bank, was evaluated for ploidy level, and 16 different morphological traits. Out of 50 accessions, 7 were hexaploids (Allium ampeloprasum L.) and 43 diploids (Allium sativum L.). Significant differences in yield were observed within and between ploidy levels. The heritable traits most correlated with yield were plant height (h2=0.62) within diploid types and neck diameter (h2=0.75) within hexaploids. Discriminant analysis did show that four characters (leaf basal width, total ndegree of leaves, clove diameter and neck height) were able to correctly discriminate all germplasm accessions between the two species
Descriptors:biodiversity; cytotype characteristics; germplasm characterization; plant breeding. Genetics; Horticulture (Agriculture)
Geographic Locator:Italy (Europe, Palearctic region)
Organism Descriptors:Allium ampeloprasum (Liliaceae): hexaploid; Allium sativum (Liliaceae): diploid; garlic (Liliaceae): vegetable crop; great headed garlic (Liliaceae): vegetable crop
Supplemental Descriptors:Liliaceae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Genetics; Horticulture (Agriculture)
ISSN:0014-2336
Year:2001
Journal Title:Euphytica

86. Title:Effect of dressings "(alinos)" on olive texture: Cellulase, polygalacturonase and glycosidase activities of garlic and lemon present in brines
View Article: European Food Research and Technology. 212 (4). 2001. 465-468
CD Volume:357
Print Article: Pages: 465-468

Author(s):Fernandez Bolanos Juan Heredia Antonia Saldana Concepcion Rodriguez Rocio Guillen Rafael Jimenez Ana
Author Affiliation:Departamento de Biotecnologia de Alimentos, Instituto de la Grasa (CSIC), 41012, Sevilla: ahmoreno@cica.es
Language:English
Language of Summary:English (EN)
Abstract:Texture is a basic characteristic of plant products for human consumption, being an essential factor in acceptance or rejection by the consumer. Dressed olives are highly valued for their excellent organoleptic characteristics, but bear the drawback of low stability. They are mainly sold loose, without any preservatives, and only a small proportion is packed after pasteurization. This work investigates the enzymatic activities of the endogenous enzymes present in products used as dressings such as garlic and lemon, and their capacity to be solubilized in brine and remain active throughout storage. In preparations with lemon and garlic, a progressive increase in the cellulase and polygalacturonase activity was observed with storage time. Of all the glycosidases in the brine, only alpha-galactosidase activity was detected in garlic preparations. Environmental factors such as the presence of salt and/or the pH dependence of the enzymes were also studied
Descriptors:dressed olives: texture, vegetable; garlic: food dressing, herbs and spices; lemon: food dressing, fruit; pH effect. Foods. cellulase; glycosidase; polygalacturonase; salt
Subject Codes:Foods
ISSN:1438-2377
Year:2001
Journal Title:European Food Research and Technology

87. Title:Low allicin release from garlic supplements: A major problem due to the sensitivities of alliinase activity
View Article: Journal of Agricultural and Food Chemistry. 49 (5). May, 2001. 2592- 2599
CD Volume:367
Print Article: Pages: 2592-2599
Author(s):Lawson Larry D Wang Z Jonathan
Author Affiliation:Plant Bioactives Research Institute, 95 S. Mountain Way Drive, Orem, UT, 84058: Llawson23@aol.com
Language:English
Language of Summary:English (EN)
Abstract:Most garlic supplements are standardized on allicin potential and are enteric-coated to prevent gastric acid inactivation of the allicin-producing enzyme, alliinase. To determine whether these products release the claimed amount of allicin under simulated gastrointestinal conditions, USP dissolution method 724A for drug release was applied to all 24 known brands of enteric-coated tablets. It was found that nearly all brands employed effective coatings and that they met their claims for allicin potential when crushed and suspended in water. However, all brands except one gave low dissolution allicin release, with 83% of the brands releasing less than 15% of their potential. The low allicin release was found to be due to both impaired alliinase activity, mostly caused by tablet excipients, and to slow tablet disintegration, which also impairs alliinase activity. Only when tablets had high alliinase activity and disintegrated rapidly did they show high allicin release. The ability of USP 724A to estimate allicin release in vivo was validated by monitoring breath levels of the allicin metabolite, allyl methyl sulfide. In conclusion, garlic powder supplements should no longer be standardized on allicin potential, but rather on dissolution allicin release
Descriptors:enteric-coated tablets. Nutrition. allicin: release; alliinase; allyl methyl sulfide; garlic supplements: dietary supplement
Subject Codes:Nutrition
ISSN:0021-8561
Year:2001

Journal Title:Journal of Agricultural and Food Chemistry

88. Title:Novel quantitative assays for estimating the antimicrobial activity of fresh garlic juice
View Article: Journal of Food Protection. 64 (2). February, 2001. 189-194
CD Volume:362
Print Article: Pages: 189-194
Author(s):Unal R Fleming H P McFeeters R F Thompson R L Breidt F Jr Giesbrecht F G
Author Affiliation:U.S. Department of Agriculture, Agricultural Research Service, and North Carolina Agricultural Research Service, Department of Food Science, North Carolina State University, Raleigh, NC, 27695- 7624: henry_fleming@ncsu.edu
Language:English
Language of Summary:English (EN)
Abstract:Novel agar diffusion and broth dilution assays were developed for quantitatively estimating the antimicrobial activity of fresh garlic juice. Bacteria found to be inhibited by garlic juice in agar diffusion assay included two gram-positive and five gram- negative species. Leuconostoc mesenteroides was not inhibited. Escherichia coli B-103 (HB101, with pJH101, ampicillin resistant, 100 mug ml-1) was inhibited and chosen as the standard culture for quantitative assays. The agar diffusion assay was based on the slope ratio method, where the slope of dose response for garlic juice was divided by the slope of dose response for methylmethane thiosulfonate (MMTSO2). Juice from fresh garlic varied in activity between 1.76 and 2.31 mug of MMTSO2 per mg of garlic juice. The activity of juice decreased during 11 months of storage of garlic cloves at 5degreeC from 2.31 to less than 0.1 mug of MMTSO2 per mg of juice. The broth dilution assay also used the E. coli B-103 culture, which permitted selective enumeration of this bacterium when 100 mug ml-1 of ampicillin was incorporated into the enumerating agar. Selective enumeration was essential since the garlic juice was not sterile and, thus, contained natural flora. Growth of E. coli was unaffected by 0.1%, delayed by 0.25%, and completely inhibited at 0.5 and 2% garlic juice in broth during 24 h of incubation at 37degreeC. The minimum inhibition concentration of garlic juice by broth dilution assay was, thus, estimated to be 0.5%, which is equivalent to 3.46 mug of MMTSO2 per mg of garlic juice by the agar diffusion assay
Descriptors:garlic: antimicrobial activity, herbs and spices, juice. Foods; Methods and Techniques. methylmethane thiosulfonate
Organism Descriptors:Escherichia coli (Enterobacteriaceae): B-103; Leuconostoc mesenteroides (Gram-Positive Cocci)
Supplemental Descriptors:Enterobacteriaceae: Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms; Gram-Positive Cocci: Eubacteria, Bacteria, Microorganisms. Bacteria; Eubacteria; Microorganisms
Subject Codes:Foods; Methods and Techniques
ISSN:0362-028X
Year:2001
Journal Title:Journal of Food Protection