- Cancer Lett. 2002 Feb 8;176(1):31-6

Antimutagenic effects of garlic extract on chromosomal aberrations.

Shukla Y, Taneja P.
Environmental Carcinogenesis Division, Industrial Toxicology Research Centre, P.O. Box 80, MG Marg, Lucknow 226 001, India.

Garlic (Allium sativum) has been used since ancient times, as a spice and also for its medicinal properties. In present set of investigations antimutagenic effect of garlic extract (GE) has been evaluated using 'in vivo chromosomal aberration assay' in Swiss albino mice. Cyclophosphamide (CP), a well-known mutagen, was given at a single dose of 25 mg/kg b.w. intraperitoneally. Pretreatment with 1, 2.5 and 5% of freshly prepared GE was given through oral intubation for 5 days prior to CP administration. Animals from all the groups were sacrificed at sampling times of 24 and 48 h and their bone marrow tissue was analyzed for chromosomal damage. The animals of the positive control group (CP alone) shows a significant increase in chromosomal aberrations both at 24 and 48 h sampling time. GE, alone did not significantly induced aberrations at either sampling time, confirming its non-mutagenicity. However in the GE pre-treated and CP post-treated groups, a dose dependent decrease in cytogenetic damage was recorded. A significant suppression in the chromosomal aberrations was recorded following pretreatment with 2.5 and 5% GE administration. The anticytotoxic effects of GE were also evident, as observed by significant increase in mitotic index, when compared to positive control group. Reduction in CP induced clastogenicity by GE was evident at 24 h and to a much greater extent at 48 h of cell cycle. Thus results of the present investigations revealed that GE has chemopreventive potential against CP induced chromosomal mutations in Swiss albino mice.

PMID: 11790451 [PubMed - indexed for MEDLINE]

- Cancer Lett. 1997 Dec 16;121(1):45-52

Mustard oil and garlic extract as inhibitors of sodium arsenite-induced chromosomal breaks in vivo.

Choudhury AR, Das T, Sharma A.
Centre of Advanced Studies in Cell and Chromosome Research, Department of Botany, University of Calcutta, India.

Arsenic, a well-known human carcinogen present as a contaminant in ground water poses a serious threat to public health in various countries. The anticlastogenic properties of two dietary supplements, garlic and mustard oil, were screened against the clastogenic activity of sodium arsenite, since diet may contain factors which affect the process of mutagenesis and carcinogenesis. Aqueous extract of garlic (100 mg/kg b.w.) and mustard oil (0.643 mg/kg b.w.) were fed to Mus musculus for 30 consecutive days either singly or simultaneously. Sodium arsenite (0.1 mg/kg b.w.) was injected subcutaneously on days 7, 14, 21 and 30 of the experiment, singly and together with the dietary supplements. The animals were sacrificed 24 h after the last exposure to sodium arsenite and clastogenic effects were observed in the bone marrow cells. The degree of modulation of sodium arsenite-induced chromosomal aberrations was more pronounced in mustard oil than in garlic extract and simultaneous administration of both the dietary supplements reduced the clastogenic effects of sodium arsenite closer to the level of the negative control. The greater efficacy could be due to the interaction of the two dietary supplements and its radical scavenging property.

Publication Types: Research Support, Non-U.S. Gov't
PMID: 9459173 [PubMed - indexed for MEDLINE]

- Biosci Biotechnol Biochem. 1996 Dec;60(12):2086-8

Antimutagenic effects of ajoene, an organosulfur compound derived from garlic.

Ishikawa K, Naganawa R, Yoshida H, Iwata N, Fukuda H, Fujino T, Suzuki A.

Bio Development Division, Nagoya Seiraku Co., Ltd., Japan.

The antimutagenic effects of ajoene, which is an organosulfur compound derived from garlic, were investigated by the Ames test. Ajoene inhibited mutagenesis induced by both benzo[a]pyrene (B[a]P) and 4-nitro-1,2-phenylenediamine (NPD) in a dose-dependent manner. In particular, NPD-induced mutagenesis was more effectively suppressed by ajoene than the B[a]P-induced type. Furthermore, the inhibition of mutagenesis by ajoene was more effective for transition-type mutations than for the frame shift type. HPLC analysis of B[a]P metabolism in the presence of the rat liver microsomal fraction (S-9) showed that ajoene dose-dependently inhibited the metabolic activation of B[a]P. This suggests that ajoene affected the metabolic enzymes in the S-9 fraction.

Publication Types: In Vitro
PMID: 8988645 [PubMed - indexed for MEDLINE]

- Environ Mol Mutagen. 1993;21(4):383-8

Modification of clastogenicity of three known clastogens by garlic extract in mice in vivo.

Das T, Roychoudhury A, Sharma A, Talukder G.
Department of Botany, University of Calcutta, India.

The anticlastogenic activity of crude extract of garlic (Allium sativum L.) was studied in bone marrow cells of mice. Male laboratory-bred Swiss albino mice were given one of three concentrations of the freshly prepared extract (100 mg, 50 mg, and 25 mg/kg body weight) as a dietary supplement by gavage for 6 consecutive days. On the seventh day the mice were administered a single acute dose of two known clastogens, mitomycin C(1.5 mg/kg) and cyclophosphamide (25 mg/kg) or sodium arsenite (2.5 mg/kg), simultaneously with garlic extract. After 24 hr, chromosome preparations were made from the bone marrow cells. The endpoint studied were chromosomal aberrations and damaged cells. Garlic extract alone induced a low level of chromosomal damage. The clastogenicity of all three mutagens were reduced significantly in the animals which had been given garlic extract as dietary supplement. The extent of reduction was different for the three clastogens and may be attributed to the interaction with the different components of the extract.

Publication Types: Research Support, Non-U.S. Gov't
PMID: 8491218 [PubMed - indexed for MEDLINE]

- Nutr Cancer. 1991;15(2):87-95

Organosulfur compounds of garlic modulate mutagenesis, metabolism, and DNA binding of aflatoxin B1.

Tadi PP, Teel RW, Lau BH.
Department of Biology, Graduate School, Loma Linda University, CA 92350.

The effects of two organosulfur compounds of garlic (ajoene and diallyl sulfide) and a crude garlic extract on aflatoxin B1 (AFB1)-induced mutagenesis were determined using rat liver 9,000 g supernatant (S-9) as the activation system and Salmonella typhimurium TA-100 as the tester strain. The effects of these compounds on AFB1 binding to calf thymus DNA were also measured. Metabolites of AFB1 were isolated and analyzed by reverse-phase high-performance liquid chromatography. All these compounds inhibited S-9-dependent mutagenesis induced by AFB1. They also inhibited AFB1 binding to DNA. A significant decrease in organo-soluble metabolites of AFB1 was observed with ajoene and garlic extract. An increase of glucuronide and glutathione conjugates was obtained with garlic extract. The results indicate that garlic compounds tested in this study are antimutagenic and, potentially, anticarcinogenic.

Publication Types: Research Support, Non-U.S. Gov't
PMID: 1903884 [PubMed - indexed for MEDLINE]