

Garlic (*Allium sativum* L.): A Brief Overview

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BRIEF REPORT

Allium sativum (Liliaceae), known as garlic, is a strongly aromatic bulb crop. Garlic (*Allium sativum* L. fam. Alliaceae) is one of the most researched and best-selling herbal products on the market. Garlic grows in temperate and tropical regions all over the world. *A. sativum* is the most commonly consumed bulb after onion. Garlic is extensively used as a medicine worldwide and is widely used as a food ingredient-spice and aphrodisiac. *A. sativum* is used to relieve problems, such as coughs and fevers or applied externally to prevent graying of hair and to improve skin conditions, such as eczema and scabies as well as to treat tetanus and lungs inflammation. Garlic contains diverse bioactive compounds, such as alliin, ajoene, diallyl trisulfide, diallyl disulfide, diallyl sulfide, allicin, and S-allyl-cysteine. Many studies have shown that garlic and its bioactive constituents exhibit anti-inflammatory, antioxidant, antifungal, antibacterial, cardiovascular protective, immunomodulatory, hepatoprotective, anticancer, digestive system protective, neuroprotective, anti-diabetic, anti-obesity, and renal protective properties. *Allium sativum* is an excellent natural source of bioactive sulfur-containing compounds and has promising applications in the development of functional foods or nutraceuticals for the prevention and management of certain diseases. *Allium sativum*, is used widely as a flavoring in cooking, but it has also been used as a medicine throughout ancient and modern history; it has been taken to prevent and treat a wide range of conditions and diseases.

Few fast facts on garlic (*Allium sativum*)

- In many countries, garlic has been used medicinally for centuries.
- Garlic may have a range of health benefits, both raw and cooked.
- It may have significant antibiotic properties.

The active ingredients of garlic include enzymes (e.g. alliinase), sulfur-containing compounds such as alliin and compounds produced enzymatically from alliin. The enzyme alliinase responsible for converting alliin to allicin is inactivated by heat. The main active ingredient is Allicin and the source of garlic's distinctive odor depends on processing method. Allicin is unstable, and changes into different chemicals rather quickly. Garlic (*Allium sativum*

L.) is a valuable spice and a popular remedy for various ailments and physiological disorders. Adverse effects of oral ingestion and topical exposure of garlic include body odor, allergic reactions, acceleration in the effects of anticoagulants and reduction in the efficacy of anti-AIDS drug Saquinavir. Garlic powder is a simply dehydrated, pulverized garlic clove.

Preparations of garlic are available as tablets, capsules, syrup, tinctures and oil. Ointment form, garlic has been used externally for treatment of ring worm; boiled with vinegar and sugar for treatment of asthma; made into an infusion for treatment of epilepsy; pounded with honey for use against rheumatism; and mixed with milk for use as a vermifuge. Garlic oil has been shown to possess biological properties such as antitumor and antioxidant effects. When garlic is subjected to cold aging process, organosulphur compounds, such as s-allyl cysteine, s-allyl mercaptocysteine, and several sulphur-containing amino acids, are produced. Clinically, garlic has been evaluated for a number of purposes, including treatment of hypertension, hypercholesterolemia, diabetes, rheumatoid arthritis, cold or the prevention of atherosclerosis and the development of tumors. Intake of high-fat meals causes a significant increase in serum triglyceride and cholesterol levels, the use of garlic (and onion as well) prevents the hypercholesterolemia induced by high-fat meal. The level of cholesterol, triglyceride, phospholipid and β -lipoproteins were the lowest in the individuals consuming liberal amounts of garlic and onion. These results indicate that routine consumption of onion and garlic in the diet has a beneficial effect in maintaining the serum lipids at low or normal levels. Garlic can also protect the heart. Garlic has been shown to increase Na^+/K^+ -ATPase protein levels and reduce cardiac hypertrophy. In addition, adding garlic and fenugreek into the diet improved pathological changes of heart tissues. Use of garlic in the prevention of heart disease has been advocated by prominent researchers. Instead of several clinical tests, garlic is not yet widely recognized by medical authorities. Allicin enhanced the anticancer effect of tamoxifen in mice and reduce the liver injury caused by tamoxifen treatment. Allicin improved the tamoxifen-induced changes in the levels of superoxide dismutase, glutathione, aspartate aminotransferase, alkaline phosphatase, and alanine aminotransferase. Additionally, garlic had a protective effect against febrile neutropenia in patients who received chemotherapy for hematological malignancies in the lower-risk febrile neutropenia. Garlic oil was shown to enhance

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the activities of hepatic antioxidant enzymes, block metabolic activation of 1,3-dichloro-2-propanol, and reduce apoptosis in the liver, indicating a protective effect against liver injury.

Recent studies have also shown that garlic and its active constituents can protect against diverse cancers, such as colorectal, lung, gastric,

and bladder cancers. In the future, more biological functions of garlic should be evaluated, and the relative compounds of garlic need to be separated and identified. More clinic trials should be carried out to confirm the health benefits of garlic on humans, and special attention should be paid to the side effects/safety of garlic.