

The Longwood Herbal Task Force
(<http://www.mcp.edu/herbal/default.htm>) and
The Center for Holistic Pediatric Education and Research
(<http://www.childrenshospital.org/holistic/>)

Clinician Information Summary

GARLIC

(*Allium sativum*)

SUMMARY

Garlic's principal medicinal uses are to lower blood pressure and cholesterol, fight infections, and prevent cancer. The active constituents are sulfur-containing compounds that are rapidly absorbed and metabolized. Numerous randomized trials suggest that garlic lowers total cholesterol concentrations by approximately 10%, favorably altering HDL/LDL ratios. Randomized trials also support garlic's effectiveness as a mild antihypertensive, lowering blood pressure by 5-7%. Garlic inhibits platelet aggregation and enhances fibrinolytic activity, reducing clots on damaged endothelium. Garlic's *in vitro* antiviral and antibacterial effects have not been evaluated in controlled trials in humans. Human epidemiologic data, *in vitro* studies and animal data suggest that garlic may help prevent some solid tumors, but no randomized trials have evaluated its effectiveness as a therapeutic agent in oncology. There are no studies evaluating its effectiveness in treating children or pregnant or nursing women. Garlic is safe when eaten as food, though it can cause gastrointestinal irritation and halitosis. Given its effects on platelet aggregation, garlic supplements should be used cautiously in the perioperative period and by patients taking anticoagulant medications or herbs. Prolonged topical use in poultices has been associated with moderate burns.

POPULAR USES: Cardiovascular: antilipemic antihypertensive, anticoagulant; antimicrobial; cancer prevention.

CHEMICAL CONSTITUENTS: Sulfur compounds (alliin, allicin, ajoene, allylpropyl disulfide and others), allinase, arginine, selenium, tellurium and others

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SCIENTIFIC DATA

In vitro: Garlic significantly reduces cholesterol synthesis in hepatocytes. In isolated blood vessels, garlic has vasodilating effects. Garlic exerts antiplatelet/anticoagulant effects by interfering with cyclo-oxygenase-mediated thromboxane synthesis. Fresh garlic and ajoene inhibit platelet aggregation; ajoene synergistically potentiates the antiaggregatory action of prostacyclin and indomethacin. Garlic and its constituents enhance a variety of immunologic functions *in vitro*. Garlic and its sulfur compounds are antioxidants. Raw garlic has antiviral activity against numerous viruses, antibacterial activity against both gram negative and gram positive bacteria, and antifungal effects against numerous dermatophytes, including *Candida albicans*. Allicin has antiparasitic activity against *Entamoeba histolytica*, *Ascaris lumbricoides* and *Giardia lamblia*. Garlic also protects against DNA damage and inhibit tumor growth *in vitro*.

In animals: Garlic lowers hyperlipidemia in rats, mice, rabbits and chickens fed high cholesterol diets. In rats and dogs, garlic lowers blood pressure. In diabetic animals, garlic lowers hyperglycemia. Garlic inhibits chemically-induced platelet aggregation in mice and rabbits. In mice, garlic supplements provide synergistic protection with influenza vaccine against influenza infections. In animals, garlic extracts have significant antifungal effects and antibacterial activity against *Shigella flexneri*. Garlic inhibits the genotoxic effects of known carcinogens, slows the growth of implanted tumors, reduces the risk of spontaneously-occurring and chemically-induced tumors and inhibits initiation and promotion phases of carcinogenesis in animals.

In humans: In numerous randomized controlled trials in hypercholesterolemic adults, garlic powder supplements lower cholesterol by an average of 10% ; garlic oil is less effective. In randomized controlled trials in hypertensive adults, garlic lowers blood pressure by an average of 7%. In randomized controlled trials in adults over 50 years old, garlic reduces arterial plaque volume and enhances vascular elasticity. In case series and randomized, controlled trials in healthy adults and in those with vascular disease, garlic supplementation (600-800 mg daily) reduces platelet aggregation and enhances fibrinolysis. There are no

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reliable trials proving garlic's effectiveness in treating bacterial infections. There are no randomized controlled trials comparing garlic to standard antifungal or antihelminthic medications, although in one case study topically garlic was more effective than tolinaftate against *Microsporum canis* infection. Numerous epidemiologic studies suggest that diets rich in garlic are associated with reduced risks of several kinds of solid tumors, but no studies have specifically evaluated garlic as an adjunctive or sole therapy for any kind of cancer.

TOXICITY AND SIDE EFFECTS

Allergic reactions to garlic have been reported.

Side effects: Halitosis, gastritis, heartburn, nausea, vomiting, diarrhea, flatulence, mild orthostatic hypotension, flushing, tachycardia, headache, insomnia, sweating and dizziness. Prolonged topical use may result in irritant burns.

Interactions with other medications: Garlic may potentiate the effects of anticoagulant medications and herbs and appears to have mild antihypertensive effects.

Contraindications: Hypersensitivity to garlic, gastritis, unstable diabetes (due to potential hypoglycemic effects), organ transplants and acute autoimmune disorders such as rheumatoid arthritis (due to potential immunostimulation). Garlic is also contraindicated in those who are about to have or who have recently had surgery, due to its potential anticoagulant effects.

Pregnancy: Despite garlic's widespread traditional use as an abortifacient, there are no epidemiologic studies suggesting an association between garlic intake and miscarriage. One study in rats suggests that garlic extracts do not have any abortifacient effects.

Lactation: Maternal garlic intake appears to promote infant nursing behavior.

Childhood: No data.

ADDITIONAL RESOURCES

- HOME: <http://www.mcp.edu/herbal/default.htm>
- Garlic Complete Monograph: <http://www.mcp.edu/herbal/garlic/garlic.pdf>
- Garlic Patient Fact Sheet: <http://www.mcp.edu/herbal/garlic/garlic.ph.pdf>