Garlic

Principal Proposed Uses
• Common Cold (Prevention); Heart Disease (Prevention); Insect Repellent

Other Proposed Uses
• Athlete's Foot; "Blood Thinning"; Cancer Prevention; Candida; Diabetes; Hypertension; Immune Support; Middle Ear Infections (Reducing Pain); Topical Antibiotic; Vaginal Infections; Yeast Hypersensitivity

Probably Not Effective Uses
• Oral Antibiotic; High Cholesterol; Ulcers

The story of garlic's role in human history could fill a book, as indeed it has, many times. Its species name, sativum, means cultivated, indicating that garlic does not grow in the wild. So fond have humans been of this herb that garlic can be found almost everywhere in the world, from Polynesia to Siberia.

From Roman antiquity through World War I, garlic poultices were used to prevent wound infections. The famous microbiologist Louis Pasteur performed some of the original work showing that garlic could kill bacteria. In 1916, the British government issued a general plea for the public to supply it with garlic in order to meet wartime needs. Garlic was called Russian penicillin during World War II because, after running out of antibiotics, the Russian government turned to this ancient treatment for its soldiers.

After World War II, Sandoz Pharmaceuticals manufactured a garlic compound for intestinal spasms, and the Van Patten Company produced another for lowering blood pressure.

What Is Garlic Used for Today?

Garlic is widely used as an all-around treatment for preventing or slowing the progression of atherosclerosis (the cause of most heart attacks and strokes). However, there is actually relatively little in the way of meaningful evidence that it works for this purpose. The balance of the evidence suggests that garlic is not effective for treating high cholesterol; there is only minimal evidence that it offers any benefits for people with high blood pressure. According to some, but not all, studies, garlic might have blood-thinning effects, but whether this translates into any medical benefit remains unclear.

One study found preliminary evidence that use of garlic could enhance blood sugar control in diabetes.

Garlic has a long folkloric history as a treatment for colds and is commonly stated to strengthen the immune system. However, up until 2001, there was no supporting evidence for this use. Since then, however, evidence including a well-designed double-blind study does suggest that regular use of garlic extract can help prevent colds.

In addition, folklore suggesting that garlic ingestion can ward off insect bites may have some truth to it, at least when garlic is taken regularly for several weeks.
When applied topically, garlic can kill fungi, and there is preliminary evidence suggesting that ajoene, a compound derived from garlic, might help treat athlete's foot. Topical garlic can also kill bacteria on contact; however, if you take garlic by mouth, it will not work like an antibiotic throughout your system. Furthermore, oral garlic has failed to prove effective for killing Helicobacter pylori, the stomach bacteria implicated as a major cause of ulcers.

Traditionally, garlic was often combined with the herb mullein in oil products designed to reduce the pain of middle ear infections (otitis media, not external ear infections known commonly as swimmer’s ear), and two double-blind studies support this use. Note: While these products may reduce pain, it is very unlikely that they have any actual effect on the infection because the eardrum prevents them from reaching the site of infection.

Preliminary evidence, including one small double-blind trial suggests that regular intake of garlic as food or as aged garlic supplements may reduce risk of various forms of cancer.

Based on extremely weak evidence, garlic has been proposed as a treatment for problems related to the yeast Candida albicans, such as vaginal yeast infections, oral yeast infections (thrush), and the purported condition discussed in some alternative medicine circles as yeast hypersensitivity syndrome.

What Is the Scientific Evidence for Garlic?

Atherosclerosis

Scant evidence hints that garlic might help prevent atherosclerosis, the most common cause of heart attacks and strokes.

Garlic preparations have been found to slow hardening of the arteries in animal studies.

In a double-blind, placebo-controlled study that followed 152 people for 4 years, standardized garlic powder at a dosage of 900 mg daily significantly slowed the development of atherosclerosis as measured by ultrasound.

Unfortunately, this study suffered from some statistical problems that make its results less than fully reliable.

An observational study of 200 people measured the flexibility of the aorta, the main artery exiting the heart. Participants who took garlic showed more flexibility, indicating less atherosclerosis. However, because this was not a double-blind trial, its results prove little.

Heart Attack Prevention

In one study, 432 people who had suffered a heart attack were given either garlic oil extract or no treatment over a period of 3 years. The results showed a significant reduction of second heart attacks and about a 50% reduction in death rate among those taking garlic.

High Cholesterol

A number of studies published in the 1980s and early 1990s found evidence that garlic preparations can reduce high cholesterol. However, virtually all subsequent studies have failed to find any significant benefit. One carefully designed study failed to find benefits with raw garlic, garlic powder, or aged garlic. The accumulating impact of these repeated negative results indicates that garlic is not, in fact, effective for improving cholesterol profile.

Hypertension (High Blood Pressure)
Numerous studies have found weak evidence that garlic lowers blood pressure slightly, perhaps in the neighborhood of 5% to 10% more than placebo. It remains unclear whether garlic supplements can help patients with high blood pressure safely eliminate or avoid antihypertensive medications.

One study followed 47 subjects with an average starting blood pressure of 171/101. Over a period of 12 weeks, half were treated with 600 mg of garlic powder daily standardized to 1.3% alliin, while the other half were given placebo. The results showed a statistically significant drop of 11% in the systolic blood pressure and 13% in the diastolic pressure. In comparison, blood pressure fell in the placebo group by 5% and 4%, respectively. However, this study suffers from a significant problem: the average starting blood pressure of the placebo and the treated groups were quite different, making comparisons unreliable.

### Cold Prevention

The herb garlic has a long history of use for treating or preventing colds. However, up until 2001, there was no scientific evidence that it actually works for this purpose. A US study reported in that year does provide meaningful preliminary evidence that garlic might possess cold-fighting powers. In this 12-week, double-blind, placebo-controlled trial, 146 people received either placebo or a garlic extract between November and February. The results showed that participants receiving garlic were almost two-thirds less likely to catch cold than those receiving placebo. Furthermore, participants who did catch cold recovered about one day faster in the garlic group as compared to the placebo group.

A study performed in Russia also reported benefits.

Thus, regular use of garlic might help prevent colds. However, there is no evidence as yet that if you take garlic at the onset of a cold you will recover more quickly.

### Insect Repellent

A 20-week, double-blind, placebo-controlled crossover trial followed 80 Swedish soldiers and measured the number of tick bites received during the garlic and the placebo treatments. The results showed a modest but statistically significant reduction in tick bites when soldiers consumed 1,200 mg of garlic daily for 8 to 10 weeks. Unfortunately, the type of garlic used in this study was not stated.

However, another study failed to find one-time use of garlic helpful for repelling mosquitoes.

### Cancer Prevention

Evidence from observational studies suggests that garlic may help prevent cancer, particularly cancer of the stomach and colon. In one of the best of these trials, the Iowa Women's Study, a group of 41,837 women were questioned as to their lifestyle habits in 1986 and then followed continuously in subsequent years. At the 4-year follow-up, questionnaires showed that women whose diets included significant quantities of garlic were approximately 30% less likely to develop colon cancer.

The interpretations of studies like this one are always a bit controversial. For example, it's possible that the women who ate a lot of garlic also made other healthful lifestyle choices. While researchers looked at this possibility very carefully and concluded that garlic was a common factor, it is not clear that they are right. What is really needed to settle the question is an intervention trial, where some people are given garlic and others are given a placebo. However, none has yet been performed that evaluated garlic for cancer prevention.

### Antimicrobial

There is no question that raw garlic can kill a wide variety of microorganisms by direct contact, including fungi, bacteria, viruses, and protozoa. A double-blind study reported in 1999 found that a cream made from the garlic constituent ajoene was just as effective for fungal skin infections as the standard drug terbinafine. These findings may explain why garlic was traditionally applied directly to wounds in order to prevent infection (but...
keep in mind that it can burn the skin). Nevertheless, there is no real evidence that taking garlic orally can kill organisms throughout the body. Thus, it's not an antibiotic in the usual sense. It's more of an antiseptic.

Oral garlic could theoretically offer benefits against organisms in the stomach or intestines because it can come into direct contact with them. However, there is only the scantiest evidence as yet that it works for any specific infection of this type. For example, despite test tube evidence that garlic can kill Helicobacter pylori (the cause of ulcers), studies in people have not been promising.

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**Dosage**

A typical dosage of garlic is 900 mg daily of a garlic powder extract standardized to contain 1.3% alliin, providing about 12,000 mcg of alliin daily, or 4-5 mg of “alliin potential.” Alliin-free aged garlic is taken at a dose of 1 to 7.2 g daily.

Alliin is a relatively odorless substance found in garlic. When garlic is crushed or cut, an enzyme called allinase is brought in contact with alliin, turning it into allicin. Allicin is responsible for much of the typical odor of garlic. It is very active chemically and probably helps the garlic bulb defend itself from attack by insects and other threats. However, allicin is unstable, and soon breaks down into a variety of other substances. When garlic is ground up and encapsulated, the effect is similar to cutting the bulb: Alliin contacts allinase, yielding allicin, which then breaks down. Unless something is done to prevent this process, garlic powder won't have any alliin or allicin left by the time it is purchased.

Some garlic producers believe that alliin and allicin are not essential for garlic’s effectiveness and do not worry about this. Aged garlic, for example, has very little of either compound. But other manufacturers believe that allicin is the primary active ingredient in garlic. Because allicin is an unstable chemical, these manufacturers are faced with a challenge.

One solution might be to chemically stabilize allicin so that it doesn’t break down. However, allicin has a strong garlic smell, and a relatively odorless product is preferable. Many manufacturers of garlic powder products seek to stabilize the alliin in the product, and to do so in such a way that the alliin converts to allicin after it is consumed. How well their methods work remain a matter of controversy.

**Note:** Do not confuse essential oil of garlic with garlic oils. The term “garlic oil” refers to garlic extracted by means of oil. Garlic essential oil is the pure oily component of the herb, and, like other essential oils, it is potentially toxic.

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**Safety Issues**

As a commonly used food, garlic is on the FDA’s GRAS (generally recognized as safe) list. Rats have been fed gigantic doses of aged garlic (2,000 mg per kilogram body weight) for 6 months without any signs of negative effects. Long-term treatment with standardized garlic powder at a dose equivalent to three times the usual dose, along with fish oil, produced no toxic effects in rats.

The only common side effect of garlic is unpleasant breath odor. Even "odorless garlic" produces an offensive smell in up to 50% of those who use it.

Other side effects occur only rarely. For example, a study that followed 1,997 people who were given a normal dose of deodorized garlic daily over a 16-week period showed a 6% incidence of nausea, a 1.3% incidence of dizziness on standing (perhaps a sign of low blood pressure), and a 1.1% incidence of allergic reactions. There were also a few reports of bloating, headaches, sweating, and dizziness.
When raw garlic is taken in excessive doses, it can cause numerous symptoms, such as stomach upset, heartburn, nausea, vomiting, diarrhea, flatulence, facial flushing, rapid pulse, and insomnia.

Topical garlic can cause skin irritation, blistering, and even third-degree burns, so be very careful about applying garlic directly to the skin.  

Since garlic might "thin" the blood, it is probably imprudent to take garlic pills immediately prior to or after surgery or labor and delivery, because of the risk of excessive bleeding.  

Similarly, garlic should not be combined with blood-thinning drugs, such as warfarin (Coumadin), heparin, aspirin, clopidogrel (Plavix), ticlopidine (Ticlid), or pentoxifylline (Trental). In addition, garlic could conceivably interact with natural products with blood-thinning properties, such as ginkgo, policosanol, or high-dose vitamin E. However, a placebo-controlled study found that actual raw garlic consumed in food at the fairly high dose of 4.2 mg once daily did not impair platelet function. In addition, volunteers who continued to consume the dietary garlic for a week did not show any change in their normal platelet function.

Garlic may also combine poorly with certain HIV medications. Two people with HIV experienced severe gastrointestinal toxicity from the HIV drug ritonavir after taking garlic supplements. Garlic might also reduce the effectiveness of some drugs used for HIV.

Garlic is presumed to be safe for pregnant women (except just before and immediately after delivery) and nursing mothers, although this has not been proven.

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**Interactions You Should Know About**

If you are taking:

- Blood-thinning drugs such as warfarin (Coumadin), heparin, aspirin, clopidogrel (Plavix), ticlopidine (Ticlid), or pentoxifylline (Trental): Do not use garlic except on medical advice.
- Ginkgo, policosanol, or high-dose vitamin E: Taking garlic at the same time might conceivably cause a risk of bleeding problems.
- Medications for HIV: Do not use garlic.

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**References [+ ]**


25. Santos OS de A, Johns RA. Effects of garlic powder and garlic oil preparations on blood lipids, blood


84. Sivam GP. Protection against *Helicobacter pylori* and other bacterial infections by garlic. *J Nutr.* 2001;131(3 suppl):1106S-1108S.


