Some collection about effect of Garlic for reducing Cholesterol

Cholesterol - a white, waxy substance found in the blood plasma - is essential to life. However overly high cholesterol levels can have serious health implications on the cardiovascular system in particular leading to *atherosclerosis*. Excessive levels can be an indicator of increased risk of heart attack and/or stroke.

If you suspect that you have a cholesterol problem it is essential that you discuss it with your doctor.

Whilst all cholesterol was once considered harmful, it is now recognised that it comes in two distinct forms: one "good", the other "bad".

Good and Bad Cholesterol

HDL and LDL

Cholesterol comes in two forms: high-density lipoproteins (HDLs) and low-density lioproteins (LDLs). Of these, HDLs are generally called "good" cholesterol whilst LDLs are "bad". For more detail see the LDL & HDL cholesterol page.

2005 UK recommendations (from the Joint British Societies - JBS2) are total cholesterol below 4.0mmol/l, "bad" cholesterol below 2.0mmol/l (1). Obviously these are general guidelines which may not be appropriate for everyone.

The Possible Effect of Garlic on Cholesterol Levels

Garlic has been reputed to assist the heart for centuries and has been used in herbal medicines for all manner of conditions. Garlic & cholesterol reduction are frequently mentioned together.

Modern medical science suggests one reason garlic might reduce cholesterol: garlic is a proven *anti-oxidant* (2). This property might help to prevent LDLs from being oxidised. In this way the cholestrol build-up that clogs the arteries could perhaps be reduced by garlic.

In recent decades, numerous scientific studies have been conducted to test the claims that garlic can help lower cholesterol levels. These studies involve measuring the cholesterol and triglyceride levels of patients taking garlic supplements compared with a control group of patients taking a placebo. Unfortunately the results are not conclusive (3).

Some studies have shown a reduction in total cholesterol levels and/or LDL levels in those taking garlic. Other medical studies have shown no significant difference between the levels of those taking garlic and those taking a placebo. A study published in 2007 (4) tested raw garlic and two popular garlic supplements (Garlicin and Kyolic). The study concluded that: "None of the forms of garlic used in this study, including raw garlic, when given at an approximate dose of a 4-g clove per day, 6 d/wk for 6 months, had statistically or clinically significant effects on LDL-C or other plasma lipid concentrations in adults with moderate hypercholesterolemia."

Cholesterol and Garlic: The Verdict

Can Garlic Lower Cholesterol Levels?

Whilst some individual studies have shown that garlic can be effective in reducing "bad" cholesterol (LDLs), the overall body of evidence is inconclusive. In particular the 2007 study appears to shed serious doubt on the reality behind garlic's reputation in this area. Thus it would be unwise to draw a definite conclusion that garlic can be used to combat "bad" cholesterol foods.

How then do we explain those studies that *do* show garlic works as a cholesterol treatment? Do we simply discard them as using flawed methodology? If - for the sake of argument - we assume there is some validity in those that found links, how do we explain the different findings? One possibility is that the efficacy of garlic in combatting cholesterol etc depends upon some other, unknown factor - for example the exact variety or manner of preparation of the garlic. Since this factor is unknown, it is not possible to design tests to eliminate it. Another possibility is that the reputed cholesterol lowering properties of garlic are effective only for specific subgroups of the population.

If you are concerned about elevated cholesterol levels then you should *not* turn to garlic as an alternative to medical treatment - get advice from your doctor. However if your doctor approves then you might like to consider eating more garlic as part of a balanced diet "just in case". If nothing else it's a tasty alternative to salt.

Effect of garlic on total serum cholesterol. A meta-analysis.

Warshafsky S, Kamer RS, Sivak SL.

Department of Medicine, New York Medical College, Valhalla 10595.

OBJECTIVE: To assess the size and consistency of garlic's effect on total serum cholesterol in persons with cholesterol levels greater than 5.17 mmol/L (200 mg/dL). DATA SOURCES: Clinical trials were identified by a computerized literature search of MEDLINE and by an assessment of the bibliographies of published studies and reviews. STUDY SELECTION: Trials were selected if they were randomized and placebo-controlled and if at least 75% of their patients had cholesterol levels greater than 5.17 mmol/L (200 mg/dL). Studies were excluded if they did not provide enough data to compute effect size. Five of 28 studies were selected for review. DATA EXTRACTION: Details of study design, patient characteristics, interventions, duration of therapy, and cholesterol measurements were extracted by one author and were verified by another. DATA SYNTHESIS: Study quality was evaluated by multiple reviewers using a closed-ended questionnaire. Patients treated with garlic consistently showed a greater decrease in total cholesterol levels compared with those receiving placebo. Meta-analysis of homogeneous trials estimated a net cholesterol decrease attributable to garlic of 0.59 mmol/L (95% CI, 0.44 to 0.74) (23 mg/dL [CI, 17 to 29]) (P < 0.001). CONCLUSIONS: Meta-analysis of the controlled trials of garlic to reduce hypercholesterolemia showed a significant reduction in total cholesterol levels. The best available evidence suggests that garlic, in an amount approximating one half to one clove per day, decreased total serum cholesterol levels by about 9% in the groups of patients studied.

Health Effects of Garlic

ELLEN TATTELMAN, M.D., Albert Einstein College of Medicine of Yeshiva University, Bronx, New York

Garlic has long been used medicinally, most recently for its cardiovascular, antineoplastic, and antimicrobial properties. Sulfur compounds, including allicin, appear to be the active components in the root bulb of the garlic plant. Studies show significant but modest lipid-lowering effects and antiplatelet activity. Significant blood pressure reduction is not consistently noted. There is some evidence for antineoplastic activity and insufficient evidence for clinical antimicrobial activity. Side effects generally are mild and uncommon. Garlic appears to have no effect on drug metabolism, but patients taking anticoagulants should be cautious. It seems prudent to stop taking high dosages of garlic seven to 10 days

before surgery because garlic can prolong bleeding time. (Am Fam Physician 2005;72:103-6. Copyright© 2005 American Academy of Family Physicians.)

Garlic (Allium sativum) has been used for thousands of years for medicinal purposes. Sanskrit records show its medicinal use about 5,000 years ago, and it has been used for at least 3,000 years in Chinese medicine. The Egyptians, Babylonians, Greeks, and Romans used garlic for healing purposes.1 In 1858, Pasteur noted garlic's antibacterial activity, and it was used as an antiseptic to prevent gangrene during World War I and World War II.2

Historically, garlic has been used around the world to treat many conditions, including hypertension, infections, and snakebites, and some cultures have used it to ward off evil spirits. Currently, garlic is used for reducing cholesterol levels and cardiovascular risk, as well as for its antineoplastic and antimicrobial properties.1

Pharmacology

The root bulb of the garlic plant is used medicinally. It can be used fresh, dehydrated, or as a steam-distilled oil.

Garlic has a high concentration of sulfur-containing compounds. The thiosulfinates, including allicin, appear to be the active substances in garlic. Allicin is formed when alliin, a sulfur-containing amino acid, comes into contact with the enzyme alliinase when raw garlic is chopped, crushed, or chewed. Dried garlic preparations containing alliin and alliinase must be enteric coated to be effective because stomach acid inhibits alliinase. Because alliinase also is deactivated by heat, cooked garlic is less powerful medicinally. The antimicrobial, hypolipidemic, antioxidant, and antithrombotic effects that have been attributed to garlic are thought to be related to allicin and other breakdown products. The antineoplastic effects may be related to the sulfur compounds or to other, unknown components.1

Uses and Efficacy

Garlic has been studied extensively in vitro, in animal and human clinical trials, and in epidemiologic evaluations for its multiple medicinal properties. The quality of human trials has been variable, making comparisons among the trials difficult. Some trials are not well blinded; some are only of short duration; some have only small numbers of patients; and many are not well controlled. In addition, many different garlic preparations have been used, with unpredictable release of active ingredients.

lipid-lowering effects

Many randomized clinical trials have studied the effects of garlic on lipid levels. Results from two meta-analyses conducted in 19933 and 19944 of garlic's effect on total cholesterol show a significant reduction in total cholesterol levels (9 to 12 percent) compared with placebo. Since then, additional, better-designed trials have been published, with conflicting results.5-8 A meta-analysis published in 20009 that included these trials concluded that garlic is superior to placebo in reducing total cholesterol levels, but that the extent of the effect is modest (4 to 6 percent). A more recent meta-analysis10 of placebo-controlled trials using standardized dried garlic powder showed significant reductions in total cholesterol levels (19.2 mg per dL [0.50 mmol per L]), low-density lipoprotein cholesterol levels (6.7 mg per dL [0.20 mmol per L]) and triglyceride levels (21.1 mg per dL [0.24 mmol per L]) at eight to 12 weeks; these reductions were not sustained at six months of treatment. This difference in reduction may be due to differences in the studies (i.e., shorter or longer follow-up periods, fewer long-term studies, time-dependent effects of garlic,11 or nonadherence in the studies of longer duration).

A European trial12 comparing garlic with a commercial lipid-lowering drug (bezafibrate, a fibric acid derivative not available in the United States) found them to be equally effective in decreasing lipids to a statistically significant extent. One trial13 of garlic extract treatment in children with hypercholesterolemia found no adverse effects, but also no significant beneficial effect on lipid levels. A trial testing garlic's effect on lipid levels, sponsored by the National Center for Complementary and Alternative Medicine, is underway.14

Strength of Recommendation Key clinical recommendations	Label	References
Patients should be advised that garlic has a modest, short-term, lipid-lowering effect.	C	5 to 13
Patients at risk of thrombosis should be advised that garlic may have a modest but significant effect on platelet aggregation compared with placebo.	C	10
Patients should be advised that there may be a reduction in the risk ofcancer, particularly stomach and colon cancer, with high consumption of garlic and other allium vegetables (e.g., onions, leeks, shallots, chives).	C	11, 20, 21

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, opinion, or case series. For information about the SORT evidence rating system, see page 15 or http://www.aafp.org/afpsort.xml.

antihypertensive effects

The antihypertensive effects of garlic have been studied but remain controversial. In a 1994 meta-analysis15 assessing the effect of garlic on hypertension, three trials showed significant reductions in systolic blood pressure (7.7 mm Hg greater reduction), and four trials showed reductions in diastolic blood pressure (5 mm Hg greater reduction) with garlic treatment compared with placebo. In a more recent meta-analysis,10 23 placebo-controlled trials were analyzed. Only three trials showed a statistically significant reduction in diastolic blood pressure (2 to 7 percent), and one showed a statistically significant reduction in systolic blood pressure (approximately 3 percent) in patients treated with garlic compared with placebo.

other cardiovascular-related effects

A recent review10 of 10 trials assessing the effect of garlic on thrombotic risk showed modest but significant decreases in platelet aggregation with garlic compared with placebo, but mixed results on fibrinolytic activity and plasma viscosity were reported. The same review analyzed 12 trials of garlic supplementation in diabetic and nondiabetic adults; only one trial showed a significant decrease in glucose levels in nondiabetic patients who took garlic when compared with placebo. Atherosclerotic plaque volume reduction in humans also has been noted in two trials comparing garlic treatment with placebo.16-18 One observational study19 showed that regular garlic powder intake weakened age- and pressure-related increases in aortic stiffness.

antineoplastic effects

Epidemiologic evidence, primarily from case-control and some cohort studies, has shown a decreased risk of stomach and colon cancer with the high consumption of garlic and other allium vegetables (e.g., onions, leeks, shallots, chives), but many of these studies were not well controlled.11,20,21 In one cohort study, garlic supplementation did not confer the same protective benefit,11 but there are no studies assessing the use of particular garlic supplements and cancer incidence.21

antimicrobial effects

Small studies have shown that garlic exerts antimicrobial activity against gram-positive and gram-negative bacteria, viruses, fungi, and parasites.2 Topical and dietary garlic traditionally has been used in the treatment of infections-particularly digestive, respiratory, and dermatologic infections-ranging from diarrhea and vaginitis to colds and warts, but few good clinical studies support this use.

Contraindications, Adverse Effects, Interactions

The ingestion of one to two cloves of raw garlic per day is considered safe in adults. The most common side effect of ingested garlic is breath and body odor. Consumption of excessive amounts of raw garlic, especially on an empty stomach, can cause gastrointestinal upset, flatulence, and changes in the intestinal flora.1,10 There have been reports of allergic dermatitis, burns, and blisters from topical application of raw garlic.10

Garlic appears to have no effect on drug metabolism,22 although recent studies23,24 in healthy volunteers show conflicting results related to garlic's effect on protease inhibitor pharmacokinetics. It has been suggested that patients taking anticoagulants use caution when taking garlic because of its antithrombotic properties.10,22 It seems prudent to stop taking high dosages of garlic seven to 10 days before surgery because garlic can prolong bleeding time and has been associated (in one case report) with spontaneous spinal epidural hematoma.10,25

Dosage

The effective dosage of garlic has not been determined. Dosages generally recommended in the literature for adults are 4 g (one to two cloves) of raw garlic per day, one 300-mg dried garlic powder tablet (standardized to 1.3 percent alliin or 0.6 percent allicin yield) two to three times per day, or 7.2 g of aged garlic extract per day.

Final Comment

Large, long-term, fully blinded, and well-controlled studies using a standardized preparation of garlic with known active components are necessary. They will allow reliable evaluation of garlic's effect on cardiovascular risk and, more important, on the end points of heart attack and stroke.

A diet rich in allium vegetables seems to be a good choice with low-risk antineoplastic potential, and good taste as a beneficial side effect. Table 1 outlines the efficacy, safety, tolerability, dosage, and cost of garlic.

Does Eating Garlic Lower Cholesterol?

Russell S. Kamer, MD; Stephen Warshafsky, MD; and Steven L. Sivak, MD

IN RESPONSE:

Drs. Lerner and Hulley mention only the null studies excluded, but most of the excluded studies favored garlic. Our objective was to study the effect of garlic on hypercholesterolemic patients, and we included trials in which most patients had cholesterol levels greater than 200 mg/dL. Most studies did not enroll patients based on cholesterol levels alone but rather on the presence of coronary artery disease, diabetes, hypertension, or hyperlipidemia of varying definitions. Thus, an arbitrary percentage cutoff was necessary. One study of 33 patients [1] showing no effect of garlic was excluded, but so was another randomized, placebo-controlled study (68 patients) that showed a 23% reduction in cholesterol levels that was associated with garlic [2].

We agree that including missing data would give more precise estimates. The study with null results had a short-duration, crossover design and no washout period [3]. As Dr. Hulley has stated, the crossover design is disadvantageous because of "an added complexity of analysis and interpretation created by the elusive problem of carryover effects" [4]. Therefore, one cannot assume that garlic had no effect unless data from the first period were reported. Again, a study showing a positive effect of garlic was also excluded for failure to meet this criterion [5].

We did a sensitivity analysis on noncontrolled trials to be sure that we did not overlook studies showing no effect and to examine the magnitude and consistency of garlic's effect. The cholesterol-lowering effect of garlic in these eight studies was homogeneous and seen in the garlic-treated arms of the primary analysis. By contrast, meta-analysis showed that placebo groups had a 4% decrease in serum cholesterol levels, a better estimate of "regression to the mean" or "placebo effect".

Because the quality of the included trials and their appearance in unfamilar journals also concerned us, we did a comprehensive, critical quality assessment and reported the results in both the body of the paper and in the appendix.

Millions of people already take garlic supplements for their alleged health benefits. On the basis of our rigorous, unbiased, quantitative review of the literature, we believe that garlic does indeed lower cholesterol levels.

Garlic Benefits - Can Garlic Lower Your Cholesterol?

Garlic Benefits and More

By Jennifer Moll, About.com

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If you are wondering how to lower cholesterol naturally, you may not be aware of how garlic benefits your cholesterol levels.

Garlic (*Allium sativum*) is a plant closely related to the leek and the onion. Known for its distinctive odor, it has also been designated the name "the stinking rose." Garlic has a variety of useful purposes. It is mostly known for the flavor it adds to a variety of foods. Additionally, garlic contains the chemical allicin, which has been shown to kill bacteria and fungi, and alleviate certain digestive disorders. It also lowers the clotting properties of blood. But the most notable attention garlic has received over recent years is its possible usefulness in lowering cholesterol levels.

Does Garlic Actually Work?

Garlic is one of the most widely purchased herbal supplements used to lower cholesterol levels. So, does it work? Yes and no. Most of the research studies involving both animals and humans suggest that garlic can lower cholesterol levels. In most of the studies that produced cholesterol lowering results, about one-half gram or one gram of garlic was consumed a day. Additionally, it seemed that the garlic lowered total cholesterol and triglyceride levels by up to 20 mg/dL in humans. LDL cholesterol ("bad" cholesterol) levels were very modestly lowered (if at all) whereas HDL cholesterol ("good" cholesterol) was not affected by the administration of garlic. The cholesterol-lowering abilities of garlic appear to be dose-dependent. That is, the more garlic you take, the lower your cholesterol will drop. In the very few studies that looked at the long-term effects of cholesterol, it appears that the cholesterol-lowering effect of garlic may be only temporary.

Additionally, there is some debate as to which form (powder, extract, oil, tablet, raw) of garlic is the best in lowering cholesterol levels. Some studies suggest that garlic powder may have lower amounts of allicin, one of the active ingredients in garlic. This, too, remains under debate.

It is important to note that these studies are very conflicting. While there are many studies that conclude garlic works well to lower cholesterol levels, there are also other studies that conflict with this, contending garlic is ineffective in lowering cholesterol. Therefore, until more studies are

performed, garlic may not be the best choice for you if you are solely relying on it to lower your cholesterol.

What Should I Know About Taking Garlic?

Most of the studies that examined the effectiveness of garlic on cholesterol used anywhere from 500 –1000 mg of cholesterol in their study. The garlic preparations vary widely, from powders used in tablets to raw garlic used in cooking.

- **Be sure to tell your health care provider that you are taking garlic supplements to lower your cholesterol, since they may interact with certain disease conditions or medications you are taking.**
- **The most notable side effect of garlic is the presence of its persistent, distinctive odor being present on your breath and body. Some commercial preparations may boast of lowering this side effect, but you should still be aware that this undesirable side effect might occur.**
- **Additionally, if you are taking any type of blood thinner (anticoagulants like Coumadin®,) or need surgery soon, you should not take garlic without first consulting your health care provider because this may lower your ability to clot your blood.**
- **Although there is not a definite limit on how much garlic you can consume a day, some studies have suggested that too much garlic may be harmful to your liver. One study concluded that doses of garlic above 0.25 g/kg and above per day may harm your liver. For instance, if you weighed 150 lbs, this would roughly equal to consuming 70 grams of garlic today. This would be equivalent to eating 18 cloves of garlic or taking over 100 commercially available tablets (1 tablet = 400 mg).**

Tips for lowering cholesterol: the effects of garlic

This article discusses the benefits of taking garlic to lower cholesterol.

Cholesterol
is a substance that is found in many of the foods that we consume. Although cholesterol is important to maintain healthy cells in the body, cholesterol levels can become so high that they can be harmful to your health.

Studies have shown that high cholesterol can lead to heart disease and stroke. Eating foods that are high in cholesterol can cause your cholesterol level to rise to dangerous levels. Another condition that can occur as a result of high cholesterol is blocked arteries. It is very important to keep your cholesterol down to maintain a healthy heart and body.

Some studies have shown that garlic can be used to lower your cholesterol and blood pressure. A substance called allicin, which is found in garlic, is believed to lower cholesterol. Studies have also shown that garlic can reduce the risk of certain types of cancer and can be used as an antibiotic. Along with the health benefits that garlic provides, it can add flavor to your recipes. The best way to consume garlic is to eat the raw cloves although most people will not enjoy eating raw garlic cloves. Cooking the garlic seems to make it easier on your digestive system. If you don't like the flavor of the garlic but you desire the health benefits that it can provide, you can purchase garlic tablets. To obtain the desired results, you will have to take the garlic for several weeks. Some people who consume garlic may find that it gives them heartburn and nausea. You might also find that you will have bad breath or body odor from consuming large amounts of garlic. Garlic comes out in your sweat which is why you might notice body odor. If you experience these symptoms and it becomes bothersome, discontinue use or try the tablet form.

If you have concerns about your cholesterol levels you should discuss this with your doctor before trying to treat yourself with garlic or any other products. Garlic will not be able to lower your cholesterol enough if it is very high. Some people require medications to lower their cholesterol levels. Keep in mind that if you are taking any medications that are blood thinning, including aspirin, you should not use large amounts of garlic without your Doctor's knowledge and advice.

There are a few side effects that could occur after you begin taking garlic. Since garlic thins the blood bleeding can be a problem. If you take a lot of garlic and need to have a surgical procedure you will need to inform your doctor that you have been taking large amounts of garlic.

There are also people who have reported an allergic reaction when consuming large amounts of garlic. Such reactions have included asthma and severe skin rashes.

If you have been taking a large amount of garlic and you develop a skin rash or any other unusual symptoms you could be having an allergic reaction. Stop taking the garlic and seek medical attention as soon as possible. Allergic reactions can be very serious.

Although there is always a chance that you could experience side effects, most people can safely consume garlic without any problems. If you can tolerate taking it and are not bothered by side effects, garlic could be very beneficial to your health.

Garlic and Cholesterol

by Bryan Muscat and Sara Farnworth

A key risk factor for the increase of cardiovascular and cerebrovascular disease is high serum cholesterol concentration. Studies conducted prior to this experiment showed that garlic aided the reduction of serum cholesterol and was active in reducing hypocholesterolemia. It was recognized that many studies neglected to monitor vital signs, body weight, blood chemistry, and liver functions. Any one of these factors has a great affect on serum cholesterol levels and therefore should be monitored in order to have accurate results.

The authors of this study (Steiner M, Khan AH, Holbert D, Lin RI, 1996) attempted to measure the effects of garlic on the total cholesterol levels in a given sample of subjects in a double-blind crossover study. The test group was made up of fifty-two men of ages 32 to 68 . Their total cholesterol concentration needed to be between 5.7 and 7.5 mmol/L. Blood lipids were measured several times throughout the experiment, as well as cholesterol levels, body weight, and blood pressure. The subjects were given nine pills to be evenly divided into three doses taken daily. The groups were randomly divided into a garlic group and a placebo group. The garlic group was given pills that contained 800mg of aged garlic extract (AGE), the placebo group received an identical looking pill containing 600mg cornstarch, 99.5 mg microcrystaline cellulose, 0.5mg caramel, and 3.5mg magnesium stearate (plecebo). Both groups were monitored for six months. At the end of the first six month period the groups were reversed (crossed over). The results from both groups in the first six month period were compared, as were the two groups in the final four month period.

Total serum cholesterol concentration was significantly lowered in the groups using AGE. The highest reduction in blood serum cholesterol in relation to the placebo group was observed at 6.1%. The results were higher when compared to the baseline group, with a reduction of 7.0%. Low density lipoprotein (LDL) levels were observed to be reduced by 4.0% when compared to the baseline and 4.6% when compared to the placebo group. This lowering of LDL was apparent in the time frame from the first to the fortieth day. After the fortieth day the effects of garlic on LDL began to level off. When high density lipoprotein (HDL) levels were examined there was no significant changes in any of the groups observed.

Experiments done prior to this study reported results of a 9 to12 percent reduction in blood cholesterol levels. The authors of this study concluded that those levels were too high. Their results fell into a range of 5 to 8 percent. This study also was able to conclude that there was no significant effect of garlic on HDL levels. However it was shown that garlic reduced LDL levels. The authors, by consistent monitoring, were able to conclude that aged garlic extract did not influence the general blood chemistry. There was also no changes to thyroid or liver functions as a result of the presence of garlic. The authors did acknowledge the need for better compliance to specified dosages. They felt that as a result of poor compliance these results could have been acquired using lower dosages.