

Garlic as a Lipid Lowering Agent—A Meta-Analysis

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Introduction

This meta analysis (grouping of several studies) looks into how consuming garlic affects our blood cholesterol levels.

Conclusions

- Garlic effectively reduces blood cholesterol levels, with doses up to 900 mg of powdered garlic being the most effective and one medium clove of non-powdered being second most effective.
- The longer garlic is consumed, the better the results (up to 3 months).

Amendments

Study Design & Additional Information

Researchers looked through the literature, pick out studies that fit a set criteria, then compile the data into one place to compare the totality of the results from multiple studies.

ORIGINAL PAPERS

Garlic as a lipid lowering agent— a meta-analysis

ABSTRACT—Garlic supplements may have an important role to play in the treatment of hypercholesterolaemia. To determine the effect of garlic on serum lipids and lipoproteins relative to placebo and other lipid lowering agents, a systematic review, including meta-analysis, was undertaken of published and unpublished randomised controlled trials of garlic preparations of at least four weeks' duration. Studies were identified by a search of MEDLINE and the ALTERNATIVE MEDICINE electronic databases, from references listed in primary and review articles, and through direct contact with garlic manufacturers. Sixteen trials, with data from 952 subjects, were included in the analyses. Many of the trials had methodological shortcomings. The pooled mean difference in the absolute change (from baseline to final measurement in mmol/l) of total serum cholesterol, triglycerides, and high-density lipoprotein (HDL)-cholesterol was compared between subjects treated with garlic therapy against those treated with placebo or other agents. The mean difference in reduction of total cholesterol between garlic-treated subjects and those receiving placebo (or avoiding garlic in their diet) was -0.77 mmol/l (95% CI: -0.65 , -0.89 mmol/l). These changes represent a 12% reduction with garlic therapy beyond the final levels achieved with placebo alone. The reduction was evident after one month of therapy and persisted for at least six months. In the dried garlic powders, in which the allicin content is standardised, there was no significant difference in the size of the reduction across the dose range of 600–900 mg daily. Dried garlic powder preparations also significantly lowered serum triglyceride by 0.31 mmol/l compared to placebo (95% CI: -0.14 , -0.49). HDL-cholesterol was non-significantly lowered by 0.04 mmol/l (95% CI: -0.11 , 0.03 mmol/l). Side-effects from garlic therapy, other than odour, were rare. In conclusion, use of garlic therapy, either as dried garlic preparations (in doses as low as 600 mg per day) or as fresh, high allicin yielding garlic (10–20 g per day) appears significantly to reduce total serum cholesterol over a 1–3 months period. However, more rigorously designed and analysed trials are needed.

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Introduction

Garlic (*Allium sativum*) was used as a remedy for a wide variety of ailments from as early as 1500 BC [1]. Recently most attention has been paid to the possible cardioprotective actions of garlic [2]; these include a lipid lowering action [1], antioxidant activity [3], antiplatelet action [4], favourable haemostatic effects [5] and haemodynamic properties [6].

Allicin, the principal active compound in a garlic bulb, is thought to be responsible for most of the pharmacological activity. Crushing the garlic clove activates the enzyme allinase and converts alliin to allicin. In addition to allicin, other biologically active compounds can be extracted from garlic, including alin, ajoene and various oils, mucilage and albumin [2].

The first clinical trials of garlic appeared in the literature in the late 1970s, but many suffered from significant methodological shortcomings. These included inappropriate methods of randomisation, lack of controls, poorly characterised patient groups, short duration, insufficient statistical power leading to the likelihood of a type II error, and failure to undertake an intention-to-treat analysis. Because of these problems, the authors of an overview of garlic in 1989 concluded that there was inadequate scientific justification to recommend garlic supplementation to reduce cardiovascular risk [2]. Thirteen clinical studies were identified in this earlier report, but only nine of them were randomised controlled trials. No quantitative techniques were used to estimate the size of an overall treatment effect.

Since then, a further nine randomised controlled trials have been published and commercial garlic preparations are now more widely available. Only some of the dried powder preparations contain a standardised amount of allicin [7].

Garlic supplements may have an important role to play in the treatment of hypercholesterolaemia. At least 25% of men and women aged 25–59 years have total cholesterol concentrations exceeding 6.4 mmol/l [8], which is associated with a markedly increased relative risk of premature ischaemic heart disease [9]. Since garlic products are quite acceptable to the public it is important to establish their efficacy. It was therefore decided to undertake a meta-analysis to combine the evidence that now exists. We had three *a priori* hypotheses:

- garlic acts as a lipid-lowering agent in human subjects, reducing total cholesterol and serum triglyceride whilst elevating high density lipoprotein (HDL);

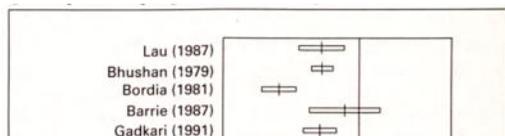


Figure 2

This figure merely shows if there is a difference with the consumption of non-powder and powdered forms of garlic

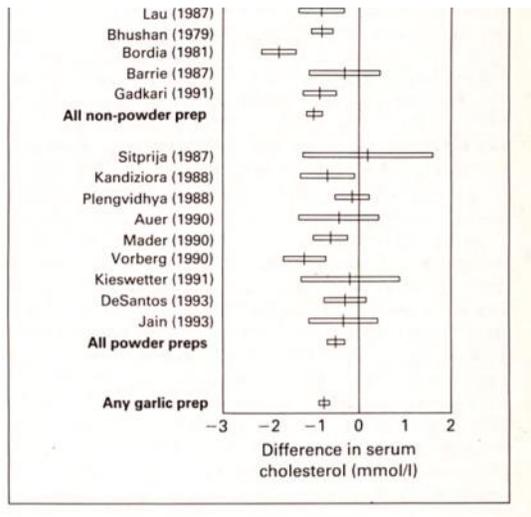


Figure 2

This figure merely shows if there is a difference with the consumption of non-powder and powdered forms of garlic across a series of different studies (of varying strengths, with those having large holes in their methodology removed - not shown). If the bars are in the minus section, that means garlic has an effect on lowering cholesterol.

Primary Results:

- Garlic has a mild to moderate effect on cholesterol.
- It seems, powdered formulations have less of an effect than non-powdered forms.

Take Away: Garlic reduces cholesterol, but is more potent in its non-powdered form.

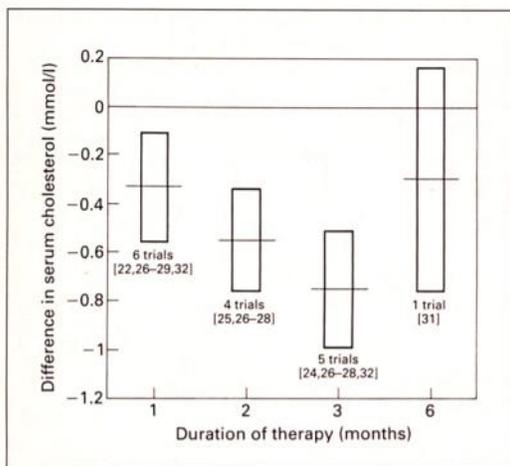


Figure 3

This figure shows the effect of consuming garlic over time (1,2,3, or 6 months), with more in the "negative" implying a greater effect.

Primary Results:

- With increasing time consuming garlic, there is a greater effect reducing cholesterol. Except in the 6 month condition, but that was a single study, compared to the other time conditions.

Take Away: Garlic likely has a continued beneficial effect the longer one takes it.

Garlic consuming participants lowered their cholesterol by 0.77mmol/l, but non-powdered consumers saw a greater effect of 0.99 mmol/L drop, compared to powdered garlic (0.51 mmol/l reduction in cholesterol). However, there was greater heterogeneity in the non-powdered condition, so the consistency of the effect was greater in the powdered condition.

Increasing dosages did not have a greater effect, and the effective dose was 600-900mg of powder. That equates to roughly one medium sized clove of garlic.