Editorial

Health Advantages of Garlic

Mohsin Masud Jan
Editor

People have used garlic as food and medicine. In fact, eating garlic may have a number of health advantages. Garlic has powerful smell due to organic sulfur compound called Allicin.

Chronic non-communicable diseases, including cardiovascular diseases, chronic respiratory diseases, cancers, and diabetes, cause 41 million deaths annually. Glucose and lipids are crucial for energy, and their dysregulation can lead to atherosclerosis, diabetes, and fatty liver disease. Dyslipidemia, with high total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), and low high-density lipoprotein cholesterol (HDL-C), is a major cardiovascular risk factor. Current treatments for metabolic diseases focus on symptom relief and have side effects. Garlic, rich in compounds like allicin, shows potential in regulating glucose and lipids. Further research is needed to understand its mechanisms, optimal dosage, and long-term effects.

According to a study, four databases- Embase, PubMed, Cochrane Library, and Web of Science were searched up to February 2024 using terms related to garlic, glucose, and lipid metabolism. Additional eligible trials were identified through manual searches, and the study adhered to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020. Inclusion criteria were randomized clinical trials over two weeks, reporting outcomes like Hemoglobin A1c (HbA1c), fasting blood glucose (FBG), TC, HDL-C, LDL-C, and TG, involving adults aged 18 or older, with a placebo control group. Exclusions included non-garlic interventions, combined supplements, pregnant participants, non-clinical studies, and incomplete data.

Two researchers independently extracted data, including study details, sample size, demographics, and mean and standard deviation values for glucose and lipid indicators. Study quality was assessed using Cochrane Collaboration tools, evaluating bias risk factors.

Garlic significantly improved FBG, HbA1c, TC, LDL, and HDL levels but did not affect TG. Various forms of garlic, such as raw garlic, aged garlic extract, and garlic powder tablets, were effective. Despite some publication bias and variations in interventions, garlic's benefits on blood glucose and lipid profiles were evident.[1]

Effects of garlic on cardiovascular diseases

Research also indicates that garlic can have a positive impact on your arteries and blood pressure. Garlic and its preparations have been widely recognized as agents for prevention and treatment of cardiovascular diseases. The wealth of scientific literature supports the proposal that garlic consumption have significant effects on lowering blood pressure, prevention of atherosclerosis, reduction of serum cholesterol and triglyceride, inhibition of platelet aggregation, and increasing fibrinolytic activity (Chan et al, 2013)[2]. Both experimental and clinical studies on different garlic preparations demonstrate these favorable cardiovascular effects.

In another study, 200 mg of garlic powder was given three times daily, in addition to hydrochlorothiazide-triamterene baseline therapy, produced a mean reduction of systolic blood pressure by 10-11 mmHg and of diastolic blood pressure by 6-8 mmHg versus placebo. However, these data are insufficient to determine if garlic provides a therapeutic advantage versus placebo in terms of reducing the risk of cardiovascular morbidity in patients diagnosed with hypertension (Stabler et al, 2012)[3].

Long term application of garlic and its preparations on experimental atherosclerosis induced by a high cholesterol diet, showed 50% reduction in atheromatous lesions, particularly in the aorta. Most of human studies on lipid lowering effects of garlic and garlic preparations described significant decrease in serum cholesterol and triglyceride (Gardner et al, 2001; Ziaei et al, 2001)[4,5]. A meta-analysis including 39 primary trials of the effect of 2 months administration of garlic preparations on total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, and triglycerides was performed (Ried et al, 2013b)[6]. The results suggest garlic is effective in reduction of total serum cholesterol by 17±6 mg/dL and low-density lipoprotein cholesterol by 9 ± 6 mg/dL in subjects with elevated total cholesterol levels (>200 mg/dL). An 8% reduction in total serum cholesterol is of clinical relevance and is associated with a 38% reduction in risk of coronary events at 50 years of age. High-density lipoprotein cholesterol levels improved only slightly, and triglycerides were not influenced significantly. Garlic was highly tolerable in all trials and was associated with minimal side effects.

Anti-tumor effect of garlic

Many in vitro and in vivo studies have suggested possible cancer-preventive effects of garlic preparations and their respective constituents. Garlic has been found to contain a large number of potent bioactive compounds with anticancer properties, largely allylsulfide derivatives. Different garlic derivatives have been reported to modulate an increasing number of molecular mechanisms in carcinogenesis, such as DNA adduct formation, mutagenesis, scavenging of

free radicals, cell proliferation and differentiation as well as angiogenesis. The growth rate of cancer cells is reduced by garlic, with cell cycle blockade that occurs in the G2/M phase (Capasso, 2013)[7].

Diabetes mellitus

Although experimental studies demonstrated a clear hypoglycemic effect of garlic, the effect of garlic on human blood glucose is still controversial. Many studies showed that garlic can reduce blood glucose level in diabetic animals. Garlic was effective in reduction of blood glucose in streptozotocin- as well as alloxan-induced diabetes mellitus in rats and mice (Ohaeri, 2001)[8]. Short term benefits of garlic on dyslipidemia in diabetic patients were shown (Ashraf et al, 2005)[9]. Garlic significantly reduced serum total cholesterol and LDL cholesterol and moderately raised HDL cholesterol as compared with placebo in diabetic patients (Ashraf et al, 2005)[9]. S-allyl cysteine, a bioactive component derived from garlic, restored erectile function in diabetic rats by preventing reactive oxygen species formation through modulation of NADPH oxidase subunit expression(Yang et al, 2013)[10].

Antifungal properties

Antifingal activity was first established in 1936 by Schmidt and Marquardt whilst working with epidermophyte cultures (Lemar KM, et al, 2002)[11]. Many fungi are sensitive to garlic, including Candida (Yousuf S, et al, 2011)[12], Torulopsis, Trichophyton, Cryptococcus, Aspergillus, Trichosporon, and Rhodotorula. Garlic extracts have been shown to decrease the oxygen uptake, reduce the growth of the organism, inhibit the synthesis of lipids, proteins, and nucleic acids, and damage membranes.

Antiviral properties

In comparison with the antibacterial action of garlic, very little work has been done to investigate its antiviral properties. The few studies have reported that garlic extract showed in vitro activity against influenza A and B, cytomegalovirus, rhinovirus, HIV, herpes simplex virus 1, herpes simplex virus 2, viral pneumonia, and rotavirus. Allicin, diallyl trisulfide and ajoene have all been shown to be active.

Garlic Boosts Immune Function: Compounds in garlic support the immune system's ability to combat pathogens. Alliin is a substance that is present in whole garlic. This compound transforms into allicin (with a c), the primary active component of garlic, when garlic is chewed or crushed. Sulphur is a component of allicin, which is what gives garlic its distinct flavour and aroma. However, because allicin is unstable, it quickly breaks down into other sulfur-containing substances that are thought to be the source of garlic's therapeutic benefits. When certain types of white blood cells in the body come into contact with viruses like those that cause the common cold or flu, these substances have been shown to enhance the body's response to fight the disease.

Garlic Prevent Colds and Flu: The ability of garlic to treat and prevent colds and the flu has been demonstrated. Garlic may shorten both the length of your illness and your risk of getting sick at all, according to studies. Additionally, it might make symptoms less severe. In one experiment, 146 healthy volunteers were given 3 months of either garlic supplements or a placebo. The risk of catching a cold was reduced by 63% in the garlic group. The length of time it took for each group to recover from a cold, however, was not significantly different. According to a different study, subjects who consumed 2.56 grammes of aged garlic extract daily during the cold and flu season had significantly fewer colds than those who received a placebo. Additionally, their colds were not as bad. If you frequently get the flu or a cold, eating garlic may help you experience fewer symptoms or even avoid getting sick at all. A review of the evidence, however, revealed that many of the studies looking into how garlic affects the common cold were of low quality. It's also unclear whether taking garlic regularly is necessary or whether it can be used as a temporary remedy when you first become ill.

Effect of Garlic as an anti-inflammatory

Research has shown that garlic oil works as an anti-inflammatory. If you have sore and inflamed joints or muscles, rub them with garlic oil. The Arthritis Foundation even recommends it to help prevent cartilage damage from arthritis.

Clears up skin

Garlic's antibacterial properties and antioxidants can clear up your skin by killing acne-causing bacteria. One study shows rubbing raw garlic over pimples can clear them away.

REFERENCES

1. Zhao X, Cheng T, Xia H, Yang Y, Wang S. Effects of Garlic on Glucose Parameters and Lipid Profile: A Systematic Review and Meta-Analysis on Randomized Controlled Trials. Nutrients 2024, DOI- 10.3390/nu16111692.
2. Chan JY, Yuen AC, Chan RY, Chan SW. A review of the cardiovascular benefits and antioxidant properties of allicin. Phytother Res 2013; 27:637–646.
3. Stabler SN, Tejani AM, Huynh F, Fowkes C. Garlic for the prevention of cardiovascular morbidity and mortality in hypertensive patients. Cochrane Database Syst Rev 2012:8.
4. Gardner CD, Chattejee LM, Carlson JJ. The effect of a garlic preparation on plasma lipid levels in moderately hypercholesterolemic adults. Atherosclerosis 2001;154:213–220.
5. Ziaei S, Hantoshzadeh S, Rezasoltani P, Lamyian M. The effect of garlic tablet on plasma lipids and platelet aggregation in nulliparous pregnants at

high risk of preeclampsia. Eur J Obstet Gynecol Reprod Biol 2001;99:201–206.
6. Ried K, Toben C, Fakler P. Effect of garlic on serum lipids: an updated meta-analysis. Nutr Rev 2013b;71:282–299.
7. Capasso A. Antioxidant action and therapeutic efficacy of Allium sativum L. Molecules 2013; 18:690–700.
8. Ohaeri OC. Effect of garlic oil on the levels of various enzyme in the serum and tissue of streptozotocin diabtic rats. Biosci Rep 2001;21: 19–24.
9. Ashraf R, Aamir K, Shaikh AR, Ahmed T. Effects of garlic on dyslipidemia in patients with type 2 diabetes mellitus. J Ayub Med Coll Abbottabad 2005;17:60–64.
10. Yang J, Wang T, Yang J, Rao K, Zhan Y, Chen RB, et al. S-allyl cysteine restores erectile function through inhibition of reactive oxygen species generation in diabetic rats. Androl 2013:487–494.
11. Lemar KM, Turner MP, Lloyd D. Garlic (Allium sativum) as an anti-Candida agent: a comparison of the efficacy of fresh garlic and freeze-dried extracts. J Appl Microbiol 2002;93:398–405.
12. Yousuf S, Ahmad A, Khan A, Manzoor N, Khan LA. Effect of garlic-derivedallyl sulphides on morphogenesis and hydrolytic enzyme secretion in Candidaalbicans. Med Mycol 2011;49:444–448