

Health benefits of Allicin and other compounds present in Garlic (A Review)



CHEMISTRY

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ABSTRACT

lipids are form of fats that circulate in our blood in the form of lipoproteins. Within certain specified range Lipids are useful for various functions of the body. Elevated lipid level is harmful and it is linked with certain type of diseases such as atherosclerosis. People use statins to lower the elevated lipids, but such compounds (statins) have many side effects. The allicin present in garlic is beneficial to reduce the elevated serum lipid levels. In addition to this garlic has many more beneficial effects on human body.

Triglycerides and cholesterol are separate types of lipids that circulate in blood. Triglycerides store unused calories and provide our body with energy, and cholesterol is used to build cells and certain hormones. Because triglycerides and cholesterol can't dissolve in blood, they circulate throughout body with the help of proteins that transport the lipids (lipoproteins)

Cholesterol is essential for normal body functions that include preserving the integrity of cell membranes, facilitating cell signalling, maintaining the myelin sheath, and synthesizing steroid hormones, vitamin D, and coenzyme Q10. Allopathy recommends the use of statins to reduce elevated serum lipids. Inhibition of cholesterol synthesis by statin drugs may interfere with these essential pathways, resulting in detrimental effects for some patients.

Carbohydrates, fat, or protein present in our food which is not consumed by our body are chemically converted into triglycerides. These are then bundled together into globules, and are transported through the blood by lipoproteins

One part of triglycerides is formed by body and remaining part comes from food which we eat. The extra calories of food are stored in fat cells in form of triglycerides for later use. Triglycerides are measured using a common test called a lipid profile (after fasting of 12 hours) It's the same blood test that checks "good" and "bad" cholesterol levels.

The range for triglycerides in serum is Normal: Less than 150 mg/dL, Borderline High: 150 - 199 mg/dL, High: 200 - 499 mg/dL, and Very High: 500 mg/dL or above

Elevated serum lipid levels increases risk of cardiovascular disease, particularly with coronary events and atherosclerosis, most of the patients use statins to lower cholesterol.

Medicinal use of garlic (*Allium sativum*) has existed for centuries (Dausch 1990, Han 1993). Garlic has many cardiovascular benefits.

Also it has been found that that garlic can reduced plasma lipids, especially total cholesterol and LDL cholesterol in humans (Arora and Arora 1981, Bordia 1981, Jain et al. 1993, Lau et al. 1987, Steiner et al. 1996, Yeh et al. 1997, Zimmerman and Zimmerman 1990). The cholesterol-lowering properties of garlic have been linked to the inhibition of cholesterol synthesis and the suppression of LDL oxidation.

Studies have shown that garlic can be helpful in certain forms of cancer, including stomach, colon and laryngeal cancers (Buiatti et al. 1991, Mei et al. 1989, Steinmetz et al. 1994, Sumiyoshi and Wargovich 1990, Zheng et al. 1992).

In addition, garlic has been shown to possess antithrombotic (Srivastava and Tyagi 1993), antiplatelet aggregation and anti-oxidative properties (Kiesewetter et al. 1993, Sendl et al. 1992,

Yamasaki et al. 1994). The cardiovascular-protective effects of garlic have also been evaluated extensively in recent years.

It has also been reported that garlic reduced blood pressure (Ernst 1987, Silagy and Neil 1994a, Steiner et al. 1996) and stimulated fibrinolytic activity (Arora et al. 1981, Ernst 1987)

Some of the sulfur compounds such as allicin, ajoene, S-allyl-cysteine (SAC), 3 diallyl disulfide (DADS), S-methylcysteine sulfoxide, and S-allylcysteine sulfoxide may be responsible for the therapeutic properties of garlic (Chi et al. 1982).

Despite the general medical advice, evidence is weak for garlic to cause harmful interactions if taken in addition to blood-thinning, blood-sugar-regulating, or anti-inflammatory medications.

Physicians and patients need to be mindful, however, of a potentially harmful interaction of garlic with protease inhibitors in antiretroviral therapy.

In comparison, standard drug therapy with statins can elicit more debilitating and sometimes serious side effects in some patients, including muscular pain, sexual dysfunction, cognitive impairment, increased risk of diabetes, and mood disorders that include aggressive behavior, anxiety, and irritability

Chemicals responsible for beneficial activities of garlic Allicin (allyl 2-propenethiosulfinate or diallyl thiosulfinate) is thought to be the principal bioactive compound present in aqueous garlic extract or raw garlic homogenate. When garlic is chopped or crushed, alliinase enzyme, present in garlic, is activated and acts on alliin (present in intact garlic) to produce allicin. Other important sulfur containing compounds present in garlic homogenate are allyl methyl thiosulfonate, 1-propenyl allyl thiosulfonate and γ -L-glutamyl-S-alkyl-L-cysteine.

The beneficial activities of garlic are lost when it is heated to higher temperatures because at high temperature the enzyme alliinase responsible for converting alliin (S-allyl cysteine sulphoxide) to allicin is inactivated by heat.

CONCLUSIONS

Elevated serum lipid levels increases risk of cardiovascular disease. The patients which have high levels of lipids use statins to reduce the lipids. These drugs (statins) have serious side effects. Studies have shown that garlic along with many other additional benefits can be used to reduce elevated total serum cholesterol on a clinically significant level. Also Garlic has additional cardiovascular benefits, such as lowering blood pressure in hypertensives, increasing fibrinolytic activity, and reducing platelet aggregation. Hence garlic and other preparations of garlic may be incorporated in the food which we consume daily. The allicin which is present in garlic gets destroyed when garlic is heated above 60°C, so raw garlic has more health benefits as compared to the garlic which is part of cooked dishes.

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