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# Garlic (Lahsun) – An Immunity Booster against SARS-CoV-2

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## Abstract

In early 2020, many scientists are hastening to discover novel drugs and vaccines against the Corona virus, and treatments for Corona virus disease 2019 (COVID-19), because, the disease which was named as COVID-19, a life threatening viral disease which affected first in China and quickly spread throughout the world. Garlic products are used as sources of medicine in many ways in human beings in their daily life. As a result, researchers from various disciplines are now directing their efforts towards discovering the medicinal values of garlic on human health. The main interest of researchers in the medicinal values of garlic is its broad-spectrum therapeutic effect with minimal toxicity. Garlic contains a higher concentration of sulfur compounds which are answerable for its medicinal effects. Garlic extract has antimicrobial activity against many genera of bacteria, fungi and viruses. Garlic has been scientifically observed to have its anti-oxidant, anti-inflammatory, and anti-stress properties, anti-cancer, cardiovascular disease, anti-diabetic property, immunity booster and antimicrobial effects etc.

## Introduction

Garlic (*Allium sativum*) is a species in the onion genus, *Allium*. Its close relatives include the onion, shallot, leek, chive and Chinese onion. It is native to Central Asia and has long been a common seasoning worldwide, with a history of several thousand years of human consumption and use. Garlic has been used as a traditional remedy and possesses various therapeutic functions. Aged garlic extract has been shown to be more potent compared to raw garlic in many of the therapeutic properties of garlic (Gardner *et al.*, 2007). Corona virus disease 2019 (COVID-19) is a life threatening viral disease which was affected first in China and quickly spread throughout the world. According to the WHO data, as on August 1<sup>st</sup> week of 2020, there are more than 2.30 crores peoples in the world affected by COVID-19, out of these; more than 7.40 lakhs peoples are died. In this emergency situation, it is very difficult to discover novel drugs with all clinical trials and also check the side effects, adverse effects, etc. Hence, it is important to treat with some natural remedies which are using regularly in our diet for COVID-19. Garlic (*Allium sativum* L.) is one of the oldest cultivated plants used for food and medicine its uses have been well recognized. The domestic Alliums (garlic) contain high concentrations of organic sulphur compounds especially in the vegetative tissue of the swollen leaf bases and leaves. Changing life style and poor dietary habitats often lead to progression and pathogenesis of maladies such as cardiovascular complications, cancer, and immune dysfunction.

## Nutritional Values

Garlic paste is applied on blisters of the skin. It also precipitates menstruation and helps to expel the after birth. Garlic is very good for cold temperaments, for

those who are phlegmatic, and for those who have Garlic is hot and dry, relieves pain caused by the colds and acts like an antidote for bites. When expressed per 100 grams, garlic contains several nutrients in rich amounts (20% or more of the DV), including vitamins B6 and C and the dietary minerals manganese and phosphorus. Per 100 gram serving, garlic is also a moderate source (10–19% DV) of certain B vitamins, including thiamin and pantothenic acid, as well as the dietary minerals such as calcium, iron and Zinc. The composition of raw garlic is 59% water, 33% carbohydrates, 6% protein, 2% dietary fiber, and less than 1% fat.

#### Chemical Compounds in Garlic

- (E)-ajoene (CID 5386591);
- (Z)-ajoene (CID 9881148);
- Allicin (CID 65036);
- Alliin (CID 87310);
- Allixin (CID 86374);
- $\gamma$  glutamyl-S-2-propenyl cysteine (CID 11346811);
- Diallyl disulfide (CID 16590);
- Methyl allyl disulfide (CID 62434);
- S-allyl-cysteine (CID 97939050);
- 1,2-vinyldiithin (CID 90814902) [Figure 1]

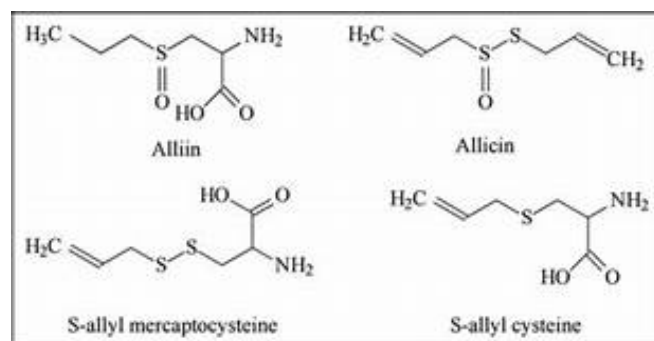


Figure 1: Chemical structure of the active constituents of Garlic

## Medicinal Values

Garlic has been used as a traditional medicine and holds a strong impact on a number of CVD risk factors including high serum lipids, blood pressure, plasma viscosity, and platelet aggregation. Garlic supplement have a significant favorable effect on cholesterol, LDL-cholesterol, and HDL-cholesterol, and also beneficial in reducing blood pressure and oxidative stress in hypertensive individuals (Dhawan and Jain, 2004) and these positive influences of garlic are dose dependent. Preventive effects of S-allyl cysteine sulfoxide (SACS) in isoproterenol (ISO)-induced myocardial ischaemia. Garlic acts as a stimulant, antiseptic, anthelmintic, antihypertensive, antisorbatic, carminative, diuretic, diaphoretic, expectorant and for the relief of rheumatic pains (Fig. 2). A daily dose of 1 ml/kg body weight of garlic



Figure 2: Medicinal health benefits of raw Garlic

extract for sixth months can result in significant reduction in oxidant (free radical) stress in the blood of patients with atherosclerosis and cholesterol circulating in the blood stream. Garlic has ability to prevent these oxidation reactions which may explain some of its beneficial effects in atherosclerotic

Table 1: Potential health benefits of Garlic

Anti bacterial	It was Louis Pasteur who first discovered the anti microbial properties of garlic in 1858. It is a primarily medicine in Ayurveda for Salmonella, E Coli, Klebsiella, Bacillus subtilis, Helicobacter etc. This property in the herb is primarily attributed to the presence of allicin.
Hepatotoxicity	Garlic extract could protect liver cells from toxic agents primarily caused by acetaminophen induced hepatotoxicity. In the clinical study it was also found that adding garlic in daily diet could also increase the antioxidant defense of the body.
Helpful in the prevention of diabetes	Garlic extract not only is beneficial in diabetes but is also very effective in lowering the insulin resistance in diabetes patients. Volatile sulfur compounds like alliin, allicin etc. present in this herb makes it one of the very effective remedy for this problem.
Reducing cardiovascular diseases	It helps in lowering of the blood pressure, helps in reducing serum cholesterol, triglyceride, lowers platelet aggregation, prevents atherosclerosis and many more. It was found that in more than 80% of the patients it helped to lower the blood pressure in high blood pressure affected patients.
Anticancer	Of the many favorable actions of garlic, inhibition of the growth of cancer is perhaps the most prominent. It has several synergistic effects that either prevent or possibly may fight cancer. The action of garlic has been attributed to stimulate immune effectors cells including T-cell and natural killer cells.

Table : Continue...

Atherosclerosis and hyperlipidaemia	Health claims advertizing garlic’s universal ability to lower cholesterol level and decrease lipid peroxidation in order to inhibit plaque formation. In vitro studies clearly have shown that, it has an ability to suppress low density lipoprotein (LDL) and an increased resistance of LDL to oxidation.
Antiviral	Garlic and its sulfur constituents verified antiviral activity against coxsackie virus species, herpes simplex virus types 1 and 2, influenza B, vesicular stomatitis virus, human immunodeficiency virus type 1 and human rhinovirus type 2.
As natural blood thinner	Platelets and fibrin play great role in blood clotting and higher amount of fibrin in blood can cause heart attack. Garlic constituents can reduce fibrin formation and also help reduce the fibrin existing in the blood even better than aspirin.

cardiovascular diseases. So the most potent anti-viral food items such as garlic, ginger, turmeric, acid lime, aonla, spinach, broccoli etc. must be included in ones diet to boost up the immune system and protect body against infectious diseases (De, L.C. and De, T, 2020).

### The Potential Use of Garlic Extracts in SARS-COV-2 Treatment

**W**ith the arrival of frightening viral diseases like SARS-COV-2 (Severe acute respiratory syndrome corona virus 2), boosting immunity system is receiving a new attention. Because these types of viral diseases have no effective cures or treatments, strengthening the body’s ability to fight off infection has become even more important. Garlic has abundant sulfur containing amino acids and other compounds that seem to initiate increased activity in the immune system. It is one of the impressive conductors of the body’s immune system which stimulates immune function by making macrophages or killer cells more active. In USA, trials in HIV/AIDS patients have demonstrated the enhancement of natural killer cells activity using garlic extracts; and Chinese studies with viral infections in bone marrow transplant patients have demonstrated a “potent antiviral activity”.

### Conclusion

**G**arlic, from crushed to capsules, and is consumed throughout the world. Traditional medicine has been a productive resource for revealing novel lead molecules

for modern drug discovery. Consequently, natural products derived from medicinal herbs are also potential candidates for immune boosting in human body. Fresh and powdered garlic are popular for food flavor and should continue to be used. Today, with the ever-growing resistant organisms, taking of garlic extract remains a powerful antimicrobial and immune boosting agent. Clearly more studies are needed to refine the use and improvement of the efficacy of this important medicinal plant against severe acute respiratory syndrome Corona virus 2 (SARS-CoV-2) to overcome this pandemic condition.

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