



## **Medicinal values and therapeutic effects of garlic: A Review**

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### **ABSTRACT**

*The objective of this review is to update and assess the medicative properties of garlic includes immune functions, medicament activities, antifungal activities, antiviral activities, detoxification, anti-oxidant agent, stop protoplasm aggregation, lowering of cholesterol, a bar of sclerosis, antithrombotic, antitumor effects. Throughout history, many various cultures have recognized the potential use of garlic for bar and treatment of various diseases. Recent studies support the consequences of garlic and its extracts during a wide selection of applications. Although garlic produces a large number of sulfide compounds from a few sulfur-containing amino acids, their functions are different from one another like allicin, diallyl, mono, di, tri, tetra, Hexa and hepta sulfides, vinylidithiins and ajoenes. Allyl, propyl disulfide and other organic sulphide or sulphur compound diallyl disulphide, allinase, alliin(S- allyl cysteine sulphoxide). The chemical constituents of garlic have conjointly been investigated for the treatment of upset, cancer, diabetes, force per unit area, arteriosclerosis and hyperlipaemia and extremely praised by many authors. Therefore, this paper is reviewed to inspire and impress the young researchers regarding the medicative values of garlic.*

**Key words:** Antibacterial, antifungal, antiviral, anticancer, antimicrobial.

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### **INTRODUCTION**

Dietary factors play a key role within the development of varied human diseases. Across cultures, there is a unit many various dietary patterns that area unit believed to market human health. Despite cultural variations, there is a unit some shared characteristics of healthy dietary patterns. Perceiving plant foods as a helpful diet is suggested by the lore of the many cultures over centuries. Natural merchandise of animals, plants and microorganism sources are utilized by man for thousands of years either within the pure forms or crude extracts to treat several diseases [1]. Garlic (*Allium sativum* L.) is one amongst those plants that were seriously investigated over many years and used for hundreds of years to fight infectious diseases [2].

Garlic (*Allium sativum* L.) has inherent a reputation in many traditions as a prophylactic still as a therapeutic healthful plant. Garlic has important dietary and healthful roles throughout the history. The primary Egyptians used garlic to treat symptom and its medical power was delineate on the walls of ancient temples and on papyrus dating to 1500 B.C. [3]. It had been used by Greek physicians health care provider and Galen to treat internal organ and extra-intestinal diseases; ancient Japanese and Chinese used it to treat headache, flu, inflammatory disease and fever. In Africa, considerably in the African nation, it's used to treat abdominal discomfort, diarrhoea, rubor and tract infections [4]. In Europe and Asian country, it had been used to treat common colds, coryza and respiratory disorder. Garlic is nicknamed as Russian antibacterial drug for its widespread use as a topical associated general associated microbial agent; it's ordinarily utilized in many cultures as excitement and name of healing power [5]. There's some proof that within the earliest athletics in European nation, garlic was fed to the athletes for increasing stamina [6] and in his well-known book, foreign FTO Fil Tib (The Canon of Medicine), urged garlic as a useful compound in the treatment of disease, toothache, chronic cough, constipation, parasitic infestation, snake and bug bites, gynaecological diseases, still as in infectious diseases (as an antibiotic).

Garlic can be a bulbous plant; grows up to 1- two m tall, simple to grow and may be huge in delicate climates. Garlic contains a minimum of thirty 3 sulfur compounds, several enzymes and conjointly the minerals semiconductor, calcium, copper, iron, potassium, magnesium, part and zinc; vitamins A, B1 and

C, fibre and water. It together contains seventeen aminoalkanoic acids to be found in garlic: essential amino acid, histidine, arginine, aminoalkanoic acid essential aminoalkanoic acid, swine, glutamine, proline, glycine, alanine, cysteine, valine, methionine, isoleucine, leucine, essential aminoalkanoic acid and essential aminoalkanoic acid [7]. it is a higher concentration of sulfur compounds than the opposite lilled genus species that unit responsible every for garlic's pungent odor and many of its healthful effects one of the foremost biologically active compounds in garlic is allicin (diallyl thiosulfinate or diallyldisulfide). The foremost torrential sulfur compound in garlic is alliin (S-allylcysteine sulfoxide), that's gift at 10 and thirty mg/g in up to date and dry garlic, severally [8]. Typical garlic food preparation like chopping, dainty and crushing disturbs S-allyl amino acid sulfoxide and exposed it to the allinase enzymes, then quickly regenerate it to diallyl thiosulfinate, that provide off garlic's characteristic aroma. Another wide studied garlic preparation is aged garlic extract. Sliced draw garlic detains one 5-20% plant material for quite one.5 year is refereed to aged garlic extract. This whole technique is supposed to cause sizable loss of allicin and exaggerated activity of certain newer compounds, like S-allylcysteine, sallylmercaptocysteine, allixin, N-O -(Ideoxy- D-fructos- one -yl)-Larginine, and the part that unit stable and significantly substance. MedicFinally used, garlic oil is typically prepared by steamdistillation technique. Steam-distilled garlic oil consists of the diallyl, allylmethyl, and dimethyl mono to hexa sulfides [6].

### **ROLE OF GARLIC IN HEALTH**

Garlic will truly be known as one in all nature's tremendous plants with healing power. It will inhibit and kill microorganism, fungi, lower (blood pressure, blood cholesterin and blood sugar), stop coagulation, and contains anti-tumor properties. It also can boost the system to fight potential sickness and maintain health [9]. It's the flexibility to stimulate the systema lymphaticum that expedites the removal of waste product from the body. it's conjointly thought-about an efficient inhibitor to safeguard cells against radical injury. It will facilitate to forestall some sorts of cancer, cardiovascular disease, strokes and microorganism infections. Garlic alone will offer US with over 200 uncommon chemicals that have the potential of protective the body from a good kind of diseases. The sulfur containing compounds found in garlic afford the body with protection by stimulating the assembly of sure helpful enzymes[10].

#### **Treat cardiovascular disease**

Disorders of the guts and also the cardiovascular system claim a lot of lives than the other diseases. It's the obstruction or preventive of the coronary arteries that causes a lot of deaths than the other factors. The arteries, that provide the guts with blood and chemical element, become more narrower as plaque builds up over time. Once blood provide becomes restricted, a particular portion of the guts is bereft of chemical element and ends up in the attack. The 2 greatest means that of cardiovascular disease is high {blood pressure and high bodily fluid sterol levels; that is directly wedged by the therapeutic action of garlic. The relevant role of garlic in coronary cardiovascular disease was done on rabbits and located that even pre-existing athero-sclerotic deposits and lesions might truly be reversed if garlic was systematically consumed [11]. From a study conducted in Asian nation, 432 artery patients were willy-nilly sorted into 2 teams and 1/2 them were equipped garlic juice in milk, whereas the opposite cluster patients weren't equipped garlic juice. The result showed that among the 3 years of the study time, nearly double as several patients had died within the cluster not equipped garlic juice [12]. In another study, two hundred mg of garlic powder was given 3 times daily, additionally to hydrochlorothiazide-triamterene baseline medical aid, made a mean reduction of heartbeat pressure level by 10-11 mmHg and of heartbeat pressure level by 6-8 mmHg versus placebo [13]. Aged garlic extract was superior to placebo in lowering heartbeat pressure level in patients full of uncontrolled high blood pressure. A indefinite quantity of 240-960 mg of aged garlic extract containing zero.6- 2.4 of S-allylcysteine considerably lowered pressure level by regarding twelve mmHg over twelve weeks [14].

#### **Reduces high blood pressure/hypertension**

Garlic has in all probability been most popularized as a com-plementary medical aid for pressure level management [15]. A recent in vitro study has confirmed that, the vasoactive ability of garlic sulfur compounds whereby red blood cells convert garlic organic polysulfides into sulphide, a celebrated endogenous cardio-protective tube cell signal molecule [16]. Victimization 2400 mg garlic pill containing thirty one. 2mg allicin has high dose reduced blood pressure by sixteen mmHg once 5h of administration [17]. A meta-analysis created on pooled knowledge from 415 patients showed additionally reduction of seven.7 mmHg blood pressure [18].

#### **As natural blood thinner**

Platelets and protein play nice role in curdling and better quantity of protein in blood will cause attack. Garlic constituents will scale back protein formation and additionally facilitate scale back the protein existing within the blood even higher than painkiller [19]. Ajoene, a sulfur compound found in garlic looks

to be chargeable for its anti-clotting effect; however ajoene is just viable at temperature or higher than, it's not gift in raw or freeze-dried garlic. it's believed that the addition of garlic to a diet will facilitate to extend the breakdown of protein from twenty four to half-hour in folks [20].

#### **Prevents polygenic disease**

A number of animal studies support the effectiveness of garlic in reducing glucose in streptozotocin-induced in addition as alloxan-induced DM in mice. Most of the studies showed that garlic will scale back glucose level in diabetic mice and rabbits [21]. A study was conducted to oral administration of garlic extract for fourteen days on the extent of body fluid aldohexose, total cholesterol, triglycerides, organic compound and acid, in traditional and streptozotocin-induced diabetic mice. The results of the study showed vital decrease.

#### **Reduces stress**

Among the numerous uses of garlic, it seems to own the lucky capability for safeguarding against the negative effects of stress that affects the involuntary nervous and system system. Rats that were trained with endurance exercises to physical fatigue enjoyed improv-ed parameters of aerobic aldohexose metabolism, attenuated aerophilous stress, and vasodilations, once given garlic at a indefinite quantity of two.86 g/kg for thirty min before exercise [22]. In rats exposed to psychologically trying things, aged garlic extracts considerably prevented the decreases in spleen weight seen up to the mark animals. in addition, the garlic considerably prevented the reduc-tion of lysis plaque forming cells in spleen cells furthermore, garlic was ready to block the lipopolysaccharide induced immune protein and plasma glucocorticoid and internal secretion changes following cold water immersion stress [23].

#### **Anticancer**

Of the numerous favorable actions of garlic, inhibition of the expansion of cancer is maybe the foremost distinguished. It's many synergistic effects that either stop or probably could fight cancer. The action of garlic has been attributed to stimulate immune effectors cells as well as T-cell and natural killer cells. Various medicine, clinical and laboratory studies have incontestable that, garlic features a nice role in cancer bar particularly in respect to alimentary canal cancers. Human population studies have shown that, regular intake of garlic reduces the chance of passage, abdomen and carcinoma. This was thought to flow from to the inhibitor impact of allicin in reducing the formation of malignant neoplastic disease compounds within the gastro-intestinal tract [24].

Dutch analysis within the Netherlands cohort study found a big decrease within the development of abdomen cancer in those intense garlic shut relatives of onions [25]. Garlic reduces the chance of patients with glandular cancer, particularly those with localized unwellness. Men within the higher of 2 intake classes of total genus *Allium* vegetables (>10.0 g/day) had a statistically vital lower risk of glandular cancer than those within the lowest class.

### **DERMATOLOGIC APPLICATIONS**

#### **Anti-microbial effect of garlic**

Garlic has been used for hundreds of years in numerous societies to combat communicable disease. Traditionally, it's believed that chemist delineate the medication result of garlic in 1858 for the primary time, though no reference is on the market. a lot of recently, garlic has been well-tried to be effective against a superfluity of gram-positive, gram-negative, and imperviable microorganism. These embrace enteric bacteria, *Escherichia coli* [26]. The medication activity of garlic is wide attributed to allicin. It's identified that allicin has sulfhydryl modifying activity [27] and is capable of inhibiting sulfhydryl enzymes. aminoalkanoic acid and glutathione counteract the thiolation activity of allicin.

Garlic extract and allicin are shown to exert organic process effects on some vancomycin-resistant enterococci. Associate in nursing repressing synergism was ascertained once utilized in combination with antibiotic [28]. The medication result of various concentrations of garlic extract against human plaque microbiota has been shown in *in vitro* study [29].

#### **Antifungal properties**

Antifungal activity was initial established in 1936 by statesman and Marquardt while operating with epidermophyte cultures [30]. A sample of pure allicin was shown to be antifungal. Removal of the allicin from the reaction by solvent extraction decreased the antifungal activity [31]. It's been according that garlic exhibited antifungal effects on 2 species, the mobile infectious agent *Botrytis cinerea* and *Trichoderma harzianum* [32]. larger satisfaction with the utilization of garlic instead of antimycotic was according by the patients with dental plate rubor.

#### **Antibacterial**

Garlic extract inhibits the expansion of Gram positive and Gram negative microorganism, like staphylococci, streptococci, bacteria genus, *Enterobacter*, enterics, *Klebsiella*, true bacteria, genus *Pseudomonas*, *Shigella*, *Salmonella*, *Proteus*, and *Helicobacter pylori* [33]. Its medication activity is

principally because of the presence of allicin made by the catalyst activity of allinase on alliin. Allicin is taken into account to be the foremost potent medication agent in crushed garlic extracts, however it is unstable, breaking down among sixteen h at 23°C [30]. However, the utilization of a water-based extract of allicin stabilizes the allicin molecule because of the atomic number 1 bonding of water to the reactive atomic number 8 atom in allicin or there could also be water soluble elements in crushed garlic that destabilize the molecule [8]. The disadvantage of this approach is that allicin will react with water to make diallyl disulphide, that doesn't exhibit an equivalent level of medication activity of allicin [32].

### Antiviral

Garlic and its sulfur constituents verified antiviral activity against Coxsackie virus species, herpes simplex virus sorts one and a couple of, contagious disease B, para-influenza virus kind three, vaccinia virus, stomatitis virus, human immunological disorder virus kind one and human picornavirus kind two. The order of compounds found in garlic for agent activity was, ajoene > allicin > chemical group methyl radical thiosulfanate > methyl radical chemical group thiosulfanate; no activity was found for the polar fractions, alliin, deoxyalliin, diallyl disulfide, or diallyl trisulfide. many laboratory tests have shown that garlic is Associate in Nursing effectual treatment for each the contagious disease B virus and herpes simplex virus. 2 freelance researchers in Japan and Balkan state have found that garlic is in a position to safeguard living organisms from the contagious disease virus [34]. Last, a test placebo con-trolled study has shown important protection from the respiratory disorder virus. As conducted by The Garlic Centre, revealed in Advances in medical aid, this can be the primary serious work to indicate hindrance, treatment and reduction of re-infection advantages from taking Allimax Powder capsules once daily [35].

### Antimicrobial

The antimicrobial properties of garlic were initial delineate by chemist (1958), and since then, several researches had incontestable its effectiveness and broad spectrum antimicrobial activity against several species of microorganism, viruses, parasites, protozoan and fungi [36]. Garlic is more practical with least aspect effects as compared to business antibiotics; as a result, they're used as another remedy for treatment of varied infections [35]. Garlic oil is wont to treat ring-worm, skin parasites and warts if it's applied outwardly. Lesions that were caused by skin fungi in rabbits and guinea pigs were treated with external applications of garlic extract and started to heal once seven days [37].

### Antioxidant

Whole garlic and aged garlic extract exhibit direct inhibitor effects and enhance the bodily fluid levels of 2 inhibitor enzymes, enzyme and antioxidant. Garlic extract, allicin is expeditiously scavenged exogenously generated hydroxyl group radicals in an exceedingly dose dependent fashion, however their effectiveness was reduced regarding 100 percent by heating to 100°C for twenty min. different garlic constituents, like S-allyl aminoalkanoic acid, additionally confirmed important inhibitor effects. The sulfur compounds found in recent garlic seem to be nearly one thousand times stiffer as antioxidants than crude, aged garlic extract. Garlic (both the stuff of 100 percent in physiological isosmotic solution and its supernatant) was ready to scale back the radical's gift in roll of tobacco smoke [38].

### CONCLUSION

A recent increase within the quality of other medication and natural product has revived interest in garlic and their derivatives as potential natural remedies. This review paper incontestable a number of the advantages of garlic for its potential uses in preventing and solidification completely different diseases, and acting as inhibitor for several radicals. Contemporary and powdery garlic square measure in style for food flavor and will still be used. Today, with the ever-growing resistant organisms, taking of garlic extract remains a robust antimicrobial agent. Clearly a lot of studies square measure required to refine the utilization and improvement of the effectively of this necessary healthful plant.

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