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Medicinal Importance of Allium Sativum

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Abstract
Nature is very good friend of humanity and the natural products are also so beneficial for human being without any harmful effects. There are different kinds of medicinal plants or herbs which are used as a medicine from centuries. So among these medicinal plants *Allium Sativum* is also included in the list of medicinal plants. *Allium Sativum* which is known as Garlic as common name all around the world and its leaves, flowers and cloves have been used as a traditional medicine for a long time. They are wide number of researches on the medicinal importance of *Allium Sativum* and from these researches the pharmacological effects of *Allium Sativum* have been proven and also about its organosulfur compounds specially Allicin. Mostly Garlic is used in different dishes to add flavor to it but Garlic has also have some inspiring health profits. The most significant and main medicinal compound found in *Allium Sativum* is Allicin, Which has many important medicinal properties (antibacterial, antiviral, antifungal and also antioxidant properties). *Allium sativum* is also rich in vitamins and nutrients. Among them some of the vitamins include vitamins B, C as well as selenium, copper and manganese. So, therefore *Allium Sativum* is included in the list of the most important medicinal plants.

Key words: Allium; Antibacterial; Antiviral; Antifungal; Antioxidant

Introduction

Allium Sativum which is known as Garlic is used for a centuries in our cultures to inhibit the actions of parasites and also against fungal, bacterial and viral infection (Ankri & Mirelman, 1999). It has been confirmed that Garlic is so beneficial as hypolipidemic, antimicrobial, antihypersentive, hepatoprotective and insecticidal representative in numerous human and also animal therapies (Sumiyoshi, 1997). Garic not only inhibit the microorganisms but also enhance the growth, immunity, excites hunger and also build up the control of bacterial and fungal pathogens. In most of the reports it has been recognized that *Allium Sativum* is so beneficial in removing major pathogenic bacteria. These effects in Garlic is due to the presence of the most important compounds which are known as organosulphur (allicin) (Augusti & Mathew, 1974). Garlic is

included in the list of those plants which were extremely observed for many years and which were cast-off for many periods to fight against infectious disorders (Daniell, 1985). Initially in Egypt the garlic is used for the treatment of diarrhea and after that it was used by the Greek surgeons Hippocrates and Galen for the treatment of intestinal and extra-intestinal disorders; earliest Japanese and Chinese used garlic for the treatment of headache, flu, fever and also for the treatment of sore throat (Gebreyohannes & Gebreyohannes, 2013). Garlic is also used in Europe and India for the treatment of common cold, asthma and also for the treatment of fever. In garlic there are many essential bioactive compounds and among those active compounds allicin is the most plentiful active compound and this compound is very operative in contradiction of the parasites (Papu, Jaivir, Sweta, & Singh, 2014). Garlic is actually initiated from the different countries of central asia and from there the cropping of *Allium Sativum* has blowout to Southwest Asia and also into the Mediterranean region. But today the cultivation of garlic is separated all around the world especially in the areas with temperate or subtropical climate. In different parts of the world *Allium Sativum* is used as a traditional food and as well as medicine for the treatment of various diseases. For example asthma, calming, for the growth of hair, for the treatment of stomachache and also for the treatment of respiratory disorders and urinary disorders and the most thing it is used for the treatment of cardiac disorders. Freshly, some other important medicinal values of *Allium Sativum* have been calculated and also assured some other ingredients of garlic. The natural comebacks of garlic include decline the factors for the risk of cardiovascular disorders and cancer, a motivation of immune function, detoxify the foreign compounds and also decline the resistance to numerous stresses (Amagase, Petesch, Matsuura, Kasuga, & Itakura, 2001). The other most important function performed by Garlic is to decreased the danger of cancer, the components of garlic are consequently successful for the blocking of tumors in diversity of locates calculating skin, breast, uterine cervix and colon (Ansari & Scheff, 2010). In garlic one of the most chief active compound is organosulfur, which repressed the propagation of cancerous cells and nearly of these compounds persuaded apoptosis in tumor cells of various tissue origin (Rahman, 2007). The use of garlic is so beneficial against different micro-organism. For instance antifungal, antiviral, antibacterial, anthelmintic, antiseptic and also have the properties of anti-inflammatory. In addition to these all garlic also have the ability to reveal the activity of both gram negative and gram positive bacteria. These main purpose of this article is to provide maximum information about the medicinal values of *Allium Sativum* and also about the bioactive compounds present in *Allium Sativum*.

Active Compounds of Garlic

Garlic is so rich in chemical compounds, among these garlic consist of minimum 33 sulfur compounds, numerous enzymes and also garlic is also rich in various minerals, for example germanium, calcium, copper, iron, potassium, magnesium, selenium and zinc. Other than these minerals *Allium Sativum* consist of 17 kinds of amino acids which are as follow: lysine, histidine, arginine, aspartic acid threonine, swine, glutamine, praline, glycine, alanine, cysteine, valine, methionine, isoleucine, leucine, tryptophan and phenylalanine. In garlic the quantity of sulfur is much more than the other species of Allium and the presence of sulfur compound is responsible for the strong adour of garlic and as well as this compound is responsible for the various medicinal values. One of the most active compound found in garlic is allicin which is also known as diallyl thiosulfinate or diallyldisulfide. The supreme component of sulfur found in garlic is alliin which is also known as Sallylcysteine sulfoxide and this compound is found in fresh and as well as in dry garlic, correspondingly. When garlic is cut down, grind it or devastate it then the S-allyl cysteine sulfoxide disrupts and bare it to the allinase enzymes and then these allinase enzymes rapidly

transformed it to diallyl thiosulfinate, which is responsible for the fragrance of *Allium Sativum*. When the heat is given to garlic or the pH of garlic become below 3.5 then diallyl thiosulfinate become deactivate (Gebreyohannes & Gebreyohannes, 2013)**.** Overall allicin is supposed as the chief antioxidant and hunting compound but the modern research on *Allium Sativum* proved that there are also some other compounds in garlic which play very essential roles; such as polar compounds of phenolic and steroidal origin, which deal with numerous medicinal properties without any aroma and these are also heat stable.

Pharmacological Activities

Due to the presence of bioactive compounds in garlic (allicin) it is widely used as a medicine for the treatment of different diseases, in which heart related diseases are on the top of list. *Allium Sativum* is very beneficial for the treatment of several types of cancer in which lung cancer, stomach cancer, colon cancer, bladder cancer, breast cancer, rectal cancer and prostate cancer. Garlic is also used for the treatment of cold and flu. Garlic is not only used for the treatment of various diseases but it also enhance our immune system by preventing from bacterial and fungal infections. Beside these all garlic is also beneficial for the treatment of asthma, fever, cough, bronchitis, low blood pressure, and low blood sugar and used to fight against snakebites. Garlic also good to decrease stress and fatigue and as well as sustain the functions of liver (Tesfaye & Mengesha, 2015). In other research it has been testified that garlic is also very effective against sciatica, lumbago, backache, chronic fever, tuberculosis, malaria, indigestion, colic pain, urinary diseases, anemia, kidney stone, jaundice, piles, fistula, fracture of bones, epilepsy and as well as night blindness. Garlic play essential role in the field of medication and used for dealing with cardiovascular disorders.

Antibacterial Activity

As many studies on *Allium sativum* specify the antibacterial activity of it. In several informations. It has been reported that the extract of garlic has comprehensive range as an antimicrobial against various bacteria. The critical oils present in garlic repressed the growth of bacteria. As the different discussions proved the antibacterial, antiviral and antifungal activities of garlic and these all the properties are belonging to the presence of allicin compound, and this compound is free when the garlic is cut down. Allicin is that compound which provides the special smell and for the antibiotic property of garlic you have use it freshly (Witkowska & Smolewski, 2013).The presence of allicin compound inhibit the effect of bacteria in which 13 gram-positive and 6 gram-negative types of bacteria are listed. The quantity of allicin compound found in 57.1% (w/v) is 220 µg/ml and this amount of garlic extract will responsible to inhibit the growth of most of the bacteria. There are various functional activities in bacteria which are disturbed due to the presence of allicin compound in garlic. The functions which were disturbed are synthesis of lipids, RNA synthesis, lowering of lipids, and as well as aggregation of platelets. Allicin also depressed the action of acetyl-CoA synthetases from various mammals, yeast and as well as plants. In bacteria acetyl-CoA creating an arrangement which is made up of acetate kinase and phosphotransacetylase was depressed. Allicin responds very quickly with able thiol groups, through thiol-disulphide conversation, hence it is believed that the chief process of antibacterial activity is due to interaction of thiol containing enzyme in which cysteine proteases and alcohol dehydrogenases are included. So there for the presence of allicin compound is very effective against various actions of bacteria, which were effect the immune system of various living organisms, especially human being.

Antiviral Activity

As you known that garlic consist of sulfur compound and this compound show antiviral action in contradiction of coxsackie virus species, vascular stomatitis virus, human immune deficiency virus and as well as human rhinovirus. Many of the research illustrate that *Allium Sativum* is an efficient cure for the treatment of influenza B virus as well as herpes simplex virus. Newly it has been proven by researchers that *Allium Sativum* reveals substantial defense against common cold virus. *Allium sativum* much more effective in the production of deactivating antibodies if vaccinated with the influenza vaccine. In studying the antiviral activity of garlic it has been investigated that it has much more potentials against particular viruses, in which , parainfluenza virus, vaccine virus, vesicular stomatitis virus and as well as human rhinovirus are also included and the compounds which have potential against the included viruses are ajoene, allicin, allyl methyl thiosulfinate and methyl allyl thiosulfinate. It has been also studied that the garlic which containing allicin is effective in the prevention of infections which cause due to common cold virus (Elaridi, Bassil, Kharma, Daou, & Hassan, 2017).

Antifungal Activity

In the list of active compounds of garlic one of the active compound is listed, which is ajoene. This active compound shows a vital role as an antifungal representative. The use of garlic is also very effective in inhibiting the separation of various fungal diseases. When on the various species of fungi the garlic is use then it has been proven that it is very effective to inhibit the action of fungi. In China some of the researchers do work on garlic and explain the potentials of it as an antifungal, they have proved that garlic is very effective for the treatment of infections of brain called Cryptococcus meningitis which were caused by fungi. For the treatment of this infection the Chinese researchers compare the use of garlic with an antibiotic known as Amphotericin B. At final the research exposed that the use of garlic was extra active than the antibiotic. The oil of garlic is also used to treat external infections which caused due to ringworm, skin parasites and warts. In a research it has been proven that that ajoene is much more active than allicin as an antifungal agent. The aqueous excerpt of dry garlic constrains the development of dimorphic fungus Coccidioides immitis and stop the spore germination of vitro fungal. The extract of *Allium sativum* decline the development of Candida albicans and this is due to the inhibition of nucleic acids, proteins, and lipid productions (Singh & Singh, 2008).

Antiparasitic Activity

All around the world garlic is also used as an ant parasitic and the use of garlic is recommend by number of herbalists for the treatment of abdominal parasites. In many of the nations, the children having the disorder of helminthes are cured with the help of garlic. In Chinese nation garlic is used as a traditional medicine for the treatment of colonic diseases. The compound which is responsible for anti-parasitic activity is allicin, which show anti parasitic activity in contradiction of main human intestinal parasites**.** Entamoeba histolytica is a parasites which is found in the intestine of human being and this parasite is very thoughtful to allicin. A very small amount of allicin is responsible to repress the growth of Entamoeba histolytica. Beside these all researchers have discover that a very minor amount of allicin is helpful in the inhibition of the growth of various parasites. The crucial oil present in *Allium Sativum* are very against the various parasites, for instance the vital oils present in *Allium Sativum* are effective against F.gigantica. These vital oils decline the muscular activities of the different parasites. The existence of ajoene in *Allium Sativum*

is very important as an anti-parasite for the reason that it effect the different enzymatic activities of various parasites (Gallwitz et al., 1999).

Anticancerious Activity

A research has declared that there are more than 75 plants which have a specific compound known as phytoalexins and garlic also consist of this compound. The researchers submitted that the plant which consist of these compounds having the potential against cancer. Diallayl sulfide, diallayl disulfide and diallayl trisulfide imitative from garlic and these have the potential to control the anticancer activity. The appearance of diallyl disulfide in *Allium Sativum* is strongly effective on various human tumors cells in which colon, lung, skin, and breast and liver tumors are also concluded. In one of the study it has been testified that intaking of *Allium Sativum* and the attendance of sulfur in it is beneficial for the inhibition of mammary cancer, colon cancer, lung cancer, hepatic cancer, skin cancer and as well as stomach cancer. In garlic there are variety of compounds are found and amid these active compounds the attendance of two main compounds, which are allyl sulfur compounds, which is lipid soluble and the second one is γ-glutamyl S-allylcysteine and this one is water soluble. Garlic is very effective for the prevention of cancer and there are a number of processes which were control by garlic to inhibit the cancerous cell and the mechanisms which were control by garlic are consist of inhibition of mutagenesis, enzymatic activities, DNA adduct formation and inhibit the growth of tumors. In some of the analyses it has been exposed that the presence of S-allyl mercaptocysteine obstruct the development of breast cancer cells. And also obstruct the development of colon cancer cells. The presence of S-allyl mercaptocysteine is effective in the prevention of colon cancer because it interrupt during the cell division by disturbing the formation of microtubules, which form cytoskeleton and mitotic spindle in cell.S-allyl mercaptocysteine also persuade the process of apoptosis in the colon cancer cells and overall this work is done by stimulating the signals in the way of enzymatic activity of apoptosis. So, the use of garlic is common all around the world for the treatment of cancer (Goncagul & Ayaz, 2010).

Cardio Protective Activity

All around the world it has been recorded that the main cause of death are cardiovascular diseases. In 2011 in one of the record of WHO it has been recorded that, in the year of 2008 17.8 million human being died due to cardiovascular diseases. It is assessed that in the future (2030), the world 23.6 population will die due to CVD. There are number of 191 disorders of CVD which are related to heart and vascular system in which coronary heart diseases, congestive heart failure, myocardial infraction and 193 high blood pressure disorders are also listed. In the present days the use of natural herbs are discovered by researches for the treatment CVD and the use of these herbs has less or no side effect and also the treatment by using of herbs is not expensive as well. In more than 199 records the use of *Allium Sativum* is recorded as an effective herbal medicine for the treatment of cardiovascular disorders due to the presence of its sulfur and also the more than 200 non sulfur bioactive compounds. *Allium Sativum* is used worldwide as a medicine to prevent and treat cardiovascular diseases, the use of garlic decrease the blood pressure and also low the cholesterol level. The linkage of cardiovascular diseases is with compound of reasons for example spate serum total cholesterol, spate in platelet aggregation, hypertension and also smoking is responsible for CVD. Different records from various researches it is prove that garlic is decrease the cholesterol absorptions and prevent the cardiovascular diseases (Berthold, Sudhop, & von Bergmann, 1998).

Adverse Effects

The adverse actions of garlic is due to its strong smell, mainly when it use without cook it. In adverse effects nausea and vomiting are mainly faced by the people due to take the large amount of the garlic. The extreme use of *Allium Sativum* especially in 87 years old man will caused spinal or epidural hematoma and this disorder is connected with platelet dysfunction (Miller, 1998).

Conclusion

Allium Sativum is use worldwide as a medicine for the treatment of different diseases. Due to the presence of the active compounds this is beneficial in the field of medicines. Garlic become one of the most important medicinal plant and this is grown approximately all around the world. In the present days garlic become the most important part of cooking and is widely used in cooking to give a pleasant taste to various dishes. At last this review will provide maximum beneficial features of this medicinal plant and also about its active compounds which are effective against various diseases.

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