SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 11 | November 2024 - Peer Reviewed Journal

MEDICINAL PURPOSE OF GARLIC (ALLIUM SATIVUM)

Mr. Aditya Mahadev Rathod [1], Miss.Rani Mhetre[2], Mr.Vijay Sable[3]
[1]Graduation in B Pharmacy Pursur Department of Pharmacy Lokmangal College of Pharmacy, Wadala .
[2]Vice Principal Lokmangal College of Pharmacy, Wadala.
[3]Principal Lokmangal College of Pharmacy, Wadala .

ABSTRACT
This review aims to update and evaluate garlic's medicinal properties, which include anti-inflammatory, antifungal, antibacterial, antioxidant, detoxifying, preventing platelet aggregation, lowering blood pressure, lowering cholesterol and triglycerides, preventing arteriosclerosis, antithrombotic, and anticancer effects. According to scientific studies, the sulfur compounds found in or extracted from garlic are responsible for the vast range of dietary and therapeutic benefits of garlic . Garlic's biological active component, allicin and its derivatives, are organic sulfur compounds that have powerful pharmacological effects. The most significant components of this plant, according to studies on its chemical makeup, are organosulfur compounds including allicin, diallyl disulphide, S-allylcysteine, and diallyl trisulfide, which are essential for its nutraceutical uses. One of the most significant bulb vegetables, garlic is used to flavor and spice cuisine. Numerous beneficial minerals, vitamins, and other compounds for human health can be found in garlic. In addition, it contains high levels of calcium, potassium, phosphorus, sulfur, iodine fiber, silica, sugar, protein, and fat.
KEYWORDS: *Allium Sativum, Antiviral,Antimicrobial,Antifungal, Antiviral,Anticancer, Antidiabetic, Antioxidant*

INTRODUCTION

For thousands of years, humans have utilized pure or unrefined natural compounds from plants, animals, and microorganisms to treat a wide range of illnesses. One of the herbs that has been extensively studied throughout the years and utilized for centuries to combat infectious infections is garlic (Allium sativum L.). For many years, there has been debate concerning the taxonomic status of garlic and allied taxa. The most recent classification scheme for garlic, which was based mostly on nuclear ribosomal DNA sequences, was class Liliopsida, subclass Liliidae, superorder Liliianae, order Amaryllidales, family Alliaceae, subfamily Allioideae, tribe Allieae, and genus Allium [3].

Garlic contains a lot of biologically active ingredients that help with its medicinal uses. Around the world, people have used garlic to treat a variety of illnesses, such as high blood pressure, infections, and snake bites. Some cultures have also employed it to fend off evil spirits. Garlic is also used to lower cholesterol and cardiovascular risk, as well as for its antibacterial and antineoplastic properties[2].Garlic was suggested by traditional Chinese and Indian medicine to treat leprosy and parasitic infestations, as well as to help with digestion and breathing.Garlic has significant epidemiologic evidence supporting its medicinal and preventative uses. Numerous clinical and experimental studies indicate that garlic and its compounds have numerous beneficial effects[4]. The complex sulfurcontaining molecules that are quickly absorbed, changed, and digested make up the active ingredients. Garlic reduces total cholesterol levels by about 10% and improves HDL/LDL ratios, according to pooled data from many randomized trials. Garlic is also a mild antihypertensive that decreases blood pressure by 5–7%, according to randomized research. Additionally, garlic increases fibrinolytic activity and suppresses platelet aggregation, which lessens clots on injured endothelium[5]. Hippocrates, the Father of Medicine, once stated, "Let food be thy medicine and let medicine be thy food. Hippocrates recommended garlic to treat a number of ailments, which lends credence to this claim. In many cultures, garlic was used to give workers vigor and improve their ability to perform their jobs. It was administered to the first Olympic competitors in Greece as possibly one of the first "performance enhancing" substances[6].

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 11 | November 2024 - Peer Reviewed Journal



Fig-1

According to reports, ginger is one of the most widely utilized herbs in traditional medicine across many nations. Ginger has long been used by the Chinese to treat conditions including rheumatism and bleeding, as well as to aid with digestion and relieve nausea. It has reportedly been used to cure respiratory disorders, toothaches, snakebite, and baldness. In Arabian medicine, ginger is used as an aphrodisiac.However, some Africans think that eating ginger on a daily basis may help keep mosquitoes away[7].

Botanical Description – Garlic is a perennial plant with fine leaves and a compound bulb made up of 10–50 tiny bulb-lets, or cloves, encased in a thin, pinkish or white sheath and with short, embedded roots. With the exception of those close to the center, the cloves are asymmetrical in shape. Garlic can reach a height of 1.2 m (4 ft) and has hermaphrodite blooms. The plant yields bulblets as well as seeds. Since ancient times, the health advantages of garlic and other Allium species have been recognized. The herb garlic, which is grown practically everywhere, seems to have come from central Asia and then moved to China, the Near East, and the Mediterranean region before heading west to Mexico, Central and Southern Europe, and Northern Africa (Egypt)[8].
The stem's lower half is heated by the long, flat, pointed leaves; the scape is slender, smooth, and shiny, with long, beaked spathes that enclose heads that contain firm bulbils. The tiny, white flowers extend into leafy tips[9].

Chemical Composition -The vacuolar enzyme alliinase quickly lyses the cytosolic cysteine sulfoxides (alliin) in garlic when it is crushed, sliced, chewed, dehydrated, ground up, or otherwise harmed by bacteria. Seventy to eighty percent of the thiosulfinates are allicin, a transiently produced chemical. Usually, alliinase transforms alliin into allicin. Diallyl sulfide (DAS), diallyl disulfide (DADS), ajoene, and dithiins are among the compounds that allicin rapidly decomposes into. Concurrently, g-glutamyl cysteine is transformed into S-allylcysteine (SAC) through a mechanism distinct from the alliin–allicin pathway .

1. There are at least 33 sulfur compounds in garlic, including: S-allylcysteine (SAC), vinyldithiins, allylpropyl disulfide, diallyl trisulfide (DATS), alliin, allicin, ajoene, and others.
2. A number of enzymes (superoxide dismutases, catalases, myrosinase, peroxidase, and allinase,catalases, myrosinase, arginases, lipases, peroxidase, and superoxide dismutases),
3. Amino Acids: Threonine, Methionine, Asparagic Acid, Glutamic Acid, and Arginine.
4. Glutamyl peptides, or proteins
5. B1, B2, B6, C, and E vitamins
6. Trace minerals such as Se, Ge, and Te 7. Prostaglandins, lipids, biotin, nicotinic acid, fructan, pectin, and adenosine[1].

Traditional Use -: According to Velisek et al. (1997), garlic is one of the most significant bulb vegetables and is used as a seasoning and spice in meals. Due to its strong flavor, it is frequently used as a seasoning or condiment all over the world. Additionally, Edwards et al. (1997) observed that garlic is employed in food preparation, especially in stews and in the production of preserved goods. The chemicals that give garlic its pungency, lachrymatory qualities, and spicy aroma include diallyldisulfid, allicin, and other organic sulfur compounds.Garlic enhances the flavor and facilitates digestion of food. It is a key component in many of the world's most popular

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 11 | November 2024 - Peer Reviewed Journal

cuisines. In the food sector, garlic is used as a spice in both fresh and dehydrated forms. According to Ahmad (1996), it is dehydrated into various products like flakes, slices, and powders. Garlic not only enhances food flavor but also contains a variety of beneficial minerals, vitamins, and other compounds that are beneficial to human health. In addition to vitamins, it's high in sugar, protein, fat, calcium, potassium, phosphorus, sulfur, iodine fiber, and silicon. It has a high nutritional content. Due to its strong flavor, it is mostly used as a spice, seasoning, and flavoring for foods that contain both green[2].

Medicinal Properties – Antiviral Effect –

Antiviral action against coxsackievirus species, herpes simplex virus types 1 and 2, influenza B, para-influenza virus type 3, vaccinia virus, vesicular stomatitis virus, human immunodeficiency virus type 1, and human rhinovirus type 2 has been confirmed by garlic and its sulfur compounds. Ajoene, allicin, allyl methyl thiosulfanate, and methyl allyl thiosulfanate were the chemicals in garlic that had the most virucidal activity; the polar fractions of alliin, deoxyalliin, diallyl disulfide, and diallyl trisulfide showed little activity. Garlic is an effective treatment for the influenza B virus and the herpes simplex virus, according to several scientific investigations[3].When administered with influenza vaccine, it increases the formation of neutralizing antibodies and protects mice from infection with the intranasally implanted influenza virus, demonstrating its antibacterial properties in vivo[8].

Anti-Microbial Effect

Since Pasteur originally reported garlic's antibacterial qualities in 1958, other studies have shown how efficient and broad-spectrum its antimicrobial activity is against a variety of bacteria, viruses, parasites, protozoa, and fungi (Jaber and AlMossawi, 2007). Commercial antibiotics are used as an alternate treatment for a variety of diseases because garlic is more effective and has fewer side effects[3].Due to its extensive use as a topical and systemic antibacterial agent, garlic is known as Russian penicillin [10].

Anti-Fungal Effect

Against a variety of fungus, such as Candida, Torulopsis, Trichophyton, Cryptococcus, Aspergillus, Trichosporon, and Rhodotorula species, garlic extracts shown a broad spectrum fungicidal action. Garlic extract has recently been shown to prevent Rhodotorula mucilaginosa and Meyerozyma guilliermondii from germinating and growing[11].Pure allicin was found to have antifungal properties. The antifungal activity was reduced when the allicin was extracted from the process using a solvent.Schmidt and Marquardt initially demonstrated antifingal action in 1936 while dealing with epidermophyte cultures[3].

Antioxidant Effect

Both whole garlic and aged garlic extract have direct antioxidant properties and raise the levels of the antioxidant enzymes glutathione peroxidase and catalase in the blood. Allicin, an extract from garlic, effectively scavenges exogenously produced hydroxyl radicals in a dose-dependent manner; however, heating to 100°C for 20 minutes decreased their efficacy by around 10%[3].Both the 10% homogenate of garlic in physiological saline solution and its supernatant were effective in lowering the levels of free radicals in cigarette smoke. Additionally, smashed garlic produces allicin, another substance that is plentiful in dried garlic. Recent research indicates that allicin breaks down into the powerful antioxidant sulfenic acid[6].

Antidiabetic Activity

Garlic contains allicin, which has a strong hypoglycemic impact. This effect is believed to be caused by enhanced hepatic metabolism, increased insulin release, and an insulinsparing effect[9].In diabetic mice, but not in normal mice, oral administration of garlic extract resulted in a significant drop in serum glucose, total cholesterol, triglycerides, urea, uric acid, aspartate amino transferase, and alanine amino transferase levels, as well as a rise in serum insulin. An investigation comparing the effects of glibenclamide and garlic extract revealed that the latter had a less potent antidiabetic impact than the former[8].

Cardiovascular Effect

It was found through statistical analysis that people with lower blood pressure are more likely to eat more garlic. Numerous epidemiologic studies have shown a negative relationship between the development of cardiovascular disease and garlic use. The authors believe that whereas d-penicillamine is ineffective in treating mean systolic blood pressure[12].Garlic's involvement in coronary heart disease was studied in rabbits, and it was discovered that regular garlic consumption could really erase pre-existing atherosclerotic plaques and lesions[3].

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 11 | November 2024 - Peer Reviewed Journal

Anti-Cancer Effect

Garlic plays an important role in preventing cancer, particularly tumors of the digestive system, according to numerous epidemiological, clinical, and laboratory research investigations. A cohort study conducted in the Netherlands discovered that eating garlic significantly reduced the risk of developing stomach cancer. In a human population research, regular garlic consumption decreased the incidence of stomach, colon, and esophageal cancer[7].The strongest radical scavenging action was exhibited by Sallylcysteine and S-allylmercapto-L-cysteine, the two main compounds found in old garlic. Furthermore, in a number of animal models, it has been discovered that some organosulfur compounds obtained from garlic, such as S-allylcysteine, slow the growth of chemically produced and transplantable cancers. Garlic consumption may therefore offer some protection against the development of cancer.[5]

CONCLUSION

Since ancient times, garlic (Allium sativum L.) has been linked to a variety of biological functions. The biologically active components found in the plant play a crucial part in its nutraceutical use. It is widely used as a spice or condiment in continental cuisine and is known to contain important minerals, vitamins, and protein. In addition, the plant may have a number of pharmacological properties.Many pharmacological qualities, including antioxidant, anti-inflammatory, rheumatologic, blood circulation booster, anti-cramp, antiulcer, anticholinergic, analgesic, antimicrobial, anti-stress, anti-cancer, immune system booster, and anti-diabetic, have been documented for them.

REFERENCE

1. *Medicinal Properties of Garlic – A Concise review. (2014). Current Research in Pharmaceutical Sciences, 04(04), 92–98.*
2. *Tesfaye, A., Mengesha, W., Biodiversity research Center, Arba Minh University, Ethiopia, & Departement of plant Science, Aksum University, Ethiopia. (2015). Traditional Uses, Phytochemistry and Pharmacological Properties of Garlic (Allium Sativum) and its Biological Active Compounds. In International Journal of Scientific Research in Science, Engineering and Technology (Vol. 1, Issue 5, pp. 142–148).*
3. *Gebreyohannes, G., 1, & Gebreyohannes, M., 2. (2013). Medicinal values of garlic: A review. In Academic Journals, International Journal of Medicine and Medical Sciences (Vols. 5–9, pp. 401–408). https://doi.org/10.5897/IJMMS2013.0960*
4. *Garlic: areview of potential therapeutic effects – Avicenna journal phytomedicine https://ajp.mums.ac.ir/article_1741_94f68e960d35c89d5233c5de51e6db3d.pdf.*
5. *Londhe, V. P., Jr., Gavasane, A. T., Nipate, S. S., Bandawane, D. D., & Chaudhari, P. D. (2011). ROLE OF GARLIC (ALLIUM SATIVUM) IN VARIOUS DISEASES: AN OVERVIEW. In Progressive Education Society's Modern College of Pharmacy, Journal of Pharmaceutical Research and Opinion (Vol. 1, Issue 4, pp. 129–134) [Journal-article]. JPRO. https://mmencapsulation.com/wp-content/uploads/2022/11/65-178-1-PB.pdf.*
6. *Chidinma, O., Ofili, C. T., Salawu, S., Elimian, I., Shehu, H., & Department of Biochemistry, Federal university of technology minna, Nigeria. (2019). Therapeutic Effects of Garlic: A Review. In Scientific Journal of Biology & Life Sciences (Vols. 1–1) [Journal-article].*
7. *Imo, C. (2019). Medicinal Properties of Ginger and Garlic: A Review. Current Trends in Biomedical Engineering & Biosciences, 18(2). https://doi.org/10.19080/ctbeb.2019.18.555985*
8. *Singh, R., & Singh, K. (2019). Garlic: A spice with wide medicinal actions. In Journal of Pharmacognosy and Phytochemistry (Vols. 8–8, Issue 1, pp. 1349–1355).*
9. *Nasir, A., Fatma, G., Neshat, N., Ahmad, M. A., & Nasir, A. (2020). Pharmacological and therapeutic attributes of garlic (Allium sativum Linn.) with sp Singh, R., & Singh, K. (2019). Garlic: A spice with wide medicinal actions. In Journal of Pharmacognosy and Phytochemistry (Vols. 8–8, Issue 1, pp. 1349–1355).ecial reference to Unani medicine-A review. In JMPS, Journal of Medicinal Plants Studies (Vol. 8, Issue 3, pp. 06–09) [Journalarticle]. http://www.plantsjournal.com (Original work published 2020)*
10. *Rana, S. V., Pal, R., Vaiphei, K., Sharma, S. K., & Ola, R. P. (2011). Garlic in health and disease. Nutrition Research Reviews, 24(1), 60–71. https://doi.org/10.1017/s0954422410000338.*
11. *Batiha, G. E., Beshbishy, A. M., Wasef, L. G., Elewa, Y. H. A., Al-Sagan, A. A., El-Hack, M. E. A., Taha, A. E., Abd-Elhakim, Y. M., & Devkota, H. P. (2020b). Chemical Constituents and Pharmacological Activities of Garlic (Allium sativum L.): A Review. Nutrients, 12(3), 872. https://doi.org/10.3390/nu12030872*
12. *Mikaili, P., Maadirad, S., Moloudizargari, M., Aghajanshakeri, S., & Sarahroodi, S. (2013). Therapeutic Uses and Pharmacological Properties of Garlic, Shallot, and Their Biologically Active Compounds. Iranian Journal of Basic Medical Sciences, 1031–1048.*
13. *Reference -https://wall.alphacoders.com/big.php?i=413326.*