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THERAPEUTIC POTENTIAL OF GARLIC : A REVIEW

Vipin Chandra Pal*, Bhuwanendra Singh, Rohit Mohan*****

Department of Pharmacy, **, Department of Pharmacology*

Era's Lucknow Medical College & Hospital, Era University, Sarfarazganj Lucknow, U.P., India-226003*.

NKBR College of Pharmacy & Research Centre, Meerut, U.P., India - 245206**.

Goel Institute of Pharmacy & Sciences, Lucknow, U.P, India- 226028***.

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Address for correspondence

Dr. Vipin Chandra Pal
Department of Pharmacy
Era's Lucknow Medical College &
Hospital, Era University, Lucknow-226003.
Email: vipinpalrlt@gmail.com
Contact no: +91-9634555671

ABSTRACT

Garlic or Lashun is the member *Liliaceae* family, is use as spice in food cooking as well as medicine to treat various ailments. Garlic is also acting as a flavoring agent for the cooking, and however it has also been used as a drug from very ancient and modern times in all over the world, it is used to inhibit and cure the vast range of ailments and disorders. Allicin found in the garlic is the chemically active substance of fresh garlic extract, possess the capacity of readily permeable through phospholipid membranes which contributes to its possible pharmacological activity and also contain sulfur compounds, which are believed to bring some of the health benefits. Currently, garlic is broadly used for different diseases related with the systemic circulation and heart, which includes atherosclerosis, HDL, LDL & heart attack, coronary heart disease, and hypertension. Garlic is also reported to treat the lung cancer, and various other cancers such as colon cancer& skin diseases too, it also has hypolipidemic, immunomodulator, aphrodisiac, & Antifungal actions. This article reviews the importance of garlic (*Allium sativum*), and, their active constituents to show whether or not can be further used as potential natural sources for the development of any novel drug formulations.

KEYWORDS: Ailments, Allicin, Allium sativum, Allicin, Fibrinolysis.

INTRODUCTION

Allium sativum is close in resemblance to well-known vegetable called as onion, which is also famous by other names garlic , or Lashun, and sometimes onion of China. If we talk about the Garlic so it is important to describe the origin of this drug i.e., garlic originates in the middle of Asian region and northeastern province of Tehran since the human civilization have its own history and it reveals some proof that garlic has been the essential part of human diet and drugs. This is reported the ancient Egyptians have key interest regarding the use of garlic as a flavoring agent as well as medicinally active agent.

As a perennial bulb, it's a belief that it is primeval to middle of Asian region, and in the Western areas of the Indian Himalayan hills and it as growing from very beginning in the various parts of England since near the year of 1540. Thus, garlic as a drug as well as vegetable is regularly used to cultivate in the entire the world (1). If someone talk for common food & flavor, then garlic is the best choice. Garlic was also supreme medicine in the Egypt. It is very good choice to treat the various disorders for example, cardiovascular troubles, head pain, insect biting, and cancer (2-3). Lashaun (Fig.1) is a bulb containing eternal herbal drug, which is very close to the Allium cepa. If we talk about its plant then seen as long straight, flower bearing stem that attain the height in fit about 2-3. Regarding its flowers of the garlic plant then they seem to pink or purple in color and blooms in mid to late season of the summer. The bulb is used in the form of crude drug. According to the standards of the European garlic supplements should contain at least 0.45% amount of allicin (1).

TAXONOMY OF THE GARLIC

- Genus Allium,
- Species sativum, ophioscorodon.
- Family Amaryllidaceae/ Liliaceae/Alliaceae.
- Order Asparagales.
- Kingdom Plantae.

S. no.	Language	Common Names
1	English	Garlic
2	Hindi	Lahsun
3	Sanskrit	Lahsuna
4	China	Da suan
5	japan	Taisan
6	korea	Taesan
7	Nepalese	lobha
8	Germany	Knoblauch
9	Scientific name	Allium sativum

Table 1: Vernacular Description of Garlic (4)

Geographical Distribution Of Garlic

The geographical data intimates regarding distribution of garlic in the temperate region, as well as Garlic also found in the region of central Asia, southern Europe, united states and most frequently in the different places of north India (5).

Cultivational Information Of Garlic Crop

Garlic needs well irrigation facilities throughout the year to grow well. For obtaining the best yield of the crop mild climatic conditions are suitable for the garlic. If we talk about the soil condition then it needs clay loamy type of soil. Fields for the cultivation of garlic should be well ploughed and beds should be made generally for the cultivation of crop (6).

Infection In The Garlic Plans An D Bulbs As Well As In The Leaves

There is no evidence regarding infection occurs in the garlic crops. Garlic plants itself have the capacity to check the entry of rabbits & moles (3). But there are still certain organisms are found those are quite responsible for the infection in garlic such nematodes, fungus, bacteria, etc. and they also affect the soil.

Garlic have suspected to attacked by leek rot; or downy mildew the larvae of the leek moth which turns the crop of the garlic in pink root, this is a routinely non-fatal disease that stunts assault the garlic by excavate to their leaf and bulb (6).

Therapeutic Potentials Of Garlic

Power of healing associated with the Garlic is magical action of this drug to cure the too many ailments under the soft tissue infections. There are too Many traditional practices have been made with use of this drug to stop & as well as to kill the bacterial, fungal infections, caused by bacteria and fungi respectively. Literature has also reported use of garlic regarding the prevention of blood clotting in the humans, & bulbs of it acts as anticancer agent. This can be also used as immunity booster for obtaining the better health. Garlic has the capacity to eliminate the waste products from our body if taken in empty stomach. Hence it is a strong antioxidant to avoid the process of aging in the humans. Its very preventive to stop the certain types of strokes in the body and acts as blood thinner so most efficiently recommended for the treatment heart diseases by the researchers in all over the world (7).

Garlic As A Dietary Supliments

The worldwide use of the garlic for its pungent flavor is very remarkable. It is used in the many other dishes of foods to impart he flavors as well as blend the food with its pungency. The bulb of the crop is mostly used to fulfill the purpose, bulbus are divided into many others cloves of equal dimensions. The leaves are also sometimes taken for the food but they have mild flavoring properties in comparison to bulbs of the garlic (7).

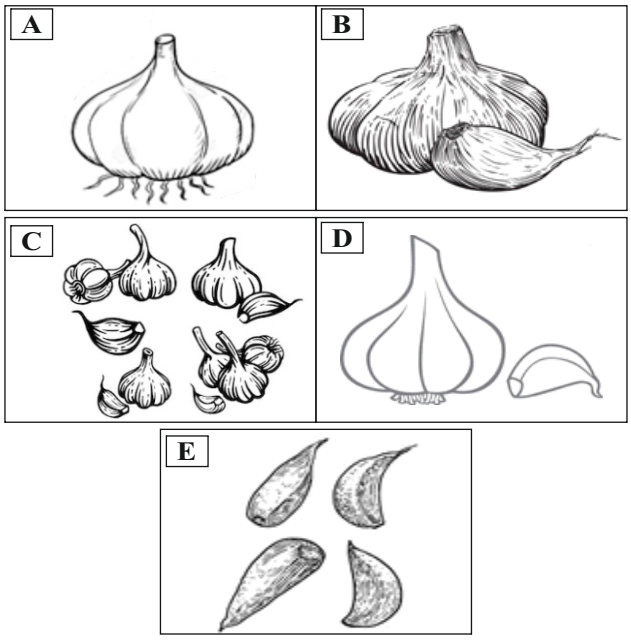

Fig. 1: Garlic and its Bulb

Reported Phytochemicals From The Garlic

A sulfur chemical compound is found that is known as Alliin which is derived from cysteine. On other hand if we crush it then it converted in to allicin and at last in the then in to Ajoene. Ajoene has active role in the thinning of blood hence, Ajoene prevents the blockage of blood vessels from clot.

Allicin after the breakdown convert into number of compounds those are volatile in nature, &includes DAS and DADS. These both are the organosulfur compounds and result in sulfide of allyl methyl after metabolism, and these can be found in human respiratory tract after consumption of garlic (8-10).

Essential oil consists (0.06-0.1%) contains allyl propyl, disulphide & allicin.

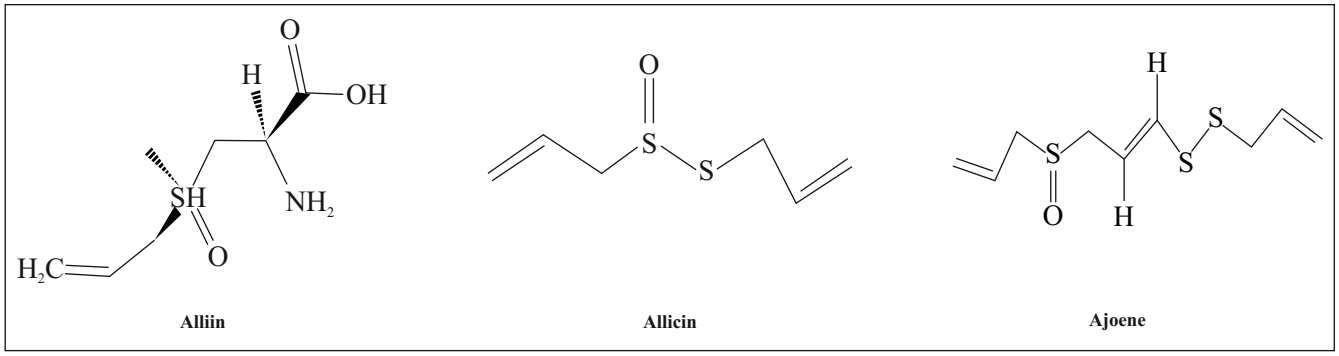

Fig. 2: Chemical Structures of Active Constituents from Garlic

S.No	Active component of garlic	Antibiotic Action	Anti-fungal Action	Hyperlipidemic Action	Anti-platelet Action	Anticancer Action	Pesticide Action
1	Alliin	P	P	NP	P	NP	NP
2	Allicin	P	P	P	P	P	P
3	Allixin	P	NP	P	NP	P	NP
4	Adenosine	NP	P	P	P	P	NP
5	Allyl1,5-hexadienyl trisulphide	NP	P	P	P	P	NP
6	Allyl methyl trisulphide	NP	P	P	P	P	NP
7	s-allyl2-pro pene thiosulphinate	NP	NP	P	NP	P	NP
8	Ajoene	P	P	P	P	P	P
9	Diallyl disulfide	P	P	P	P	P	P
10	1,5-hexa dianyltrisulfide	NP	NP	P	NP	NP	NP
11	s-allyl2-pro penethiosulphinate	NP	NP	P	NP	NP	NP
12	Ajoene	NP	NP	P	NP	NP	NP
13	Diallyl disulfide	NP	NP	P	NP	NP	NP
	1,5-hexa dianyltrisulfide	NP	N	P	NP	NP	NP

Table 2: Chemical Constituent of Garlic and their Pharmacological Actions (11)

Amounts Per Selected Serving	Calorie Information	Percentage DV
Calories	203(850 kJ)	10
From Carbohydrate	173(724 kJ)	-
From Fat	5.7(23.9 kJ)	-
Entire proteinoids	24.0(100 kJ)	-

Table 3: Nutritional Information of Garlic Amounts per 1 cup (136g) (12)

Amounts Per Selected Serving	Carbohydrate Information	Percentage DV
Entire Carbohydrates	45.0g	15
Nutritional Fibers	2.9 g	11
Starch	-	-
Sugar	1.4g	-
glucose	-	-
Sucrose	-	-
fructose	-	-
Amounts Per Selected Serving	**Fat & Fatty acids Information**	**Percentage DV**
Total Fat	0.7 g	01
Saturated fat	0.1g	01
Monosaturated fat	-	-
Polysaturated fat	0.3g	-
Total trans fatty acid	-	-
Total Omega-3 fatty acids	27.3mg	-
Total Omega- 6 fatty acids	311mg	-
Amounts Per Selected Serving	**Vitamins Information**	**Percentage DV**
Vitamin A	12.2 IU	0
Vitamin c	42.4 mg	71
Vitamin d	-	0
Vitamin E	01mg	1
Vitamin K	2.3 mcg	3
Thiamin	0.3mg	18
Riboflavin	0.1mg	9
Niacin	1.0mg	5
Vitamin B6	1.7mg	84
Folate	4.1mcg	1
Vitamin B12	0.0 mg	0
Pantothenic Acid	0.1mg	8
Choline	31.6mg	-
Amounts Per Selected Serving	**Minerals Information**	**Percentage DV**
Calcium	246mg	25
Iron	2.3mg	13
Magnesium	34.0mg	8
Phosphorus	208mg	21
Potassium	545mg	16
Sodium	23.1mg	01
Zinc	1.6mg	11
Copper	04mg	20
Manganese	2.3mg	114
Selenium	19.3mcg	28

Cont. Table 3: Nutritional Information of Garlic Amounts per 1 cup (136g) (12)

Pharmacological Potentials Of Garlic

Garlic acts as a very potential antioxidant & antibiotic, a book was written by Avicenna (1998) revealed the facts that garlic is most frequently used in various disorders such, toothache, Arthritis, constipation cough, insect bites and parasitic invasion. Gynecologic disorders.

Several evidences are found which shows potential effects of garlic against different diseases such as, downfall in the factors causes the heart diseases as well as cancer also. Thus, the garlic is very powerful compound to reduce the hepatic and microbial infections (13-14). Garlic is potentially very active against lead induced toxicity, it's a compound known as allicin is very active against oxidative stress produced by the chelation of lead ions (Pb^{+2}). garlic also shows effect to stop the lead burden from the soft tissues in the humans (15). Thus, role garlic has also reported in the lowering level of serum cholesterol, triglyceric acids, and also inhibit the clumping of platelets, atherosclerosis as well as it also induces the fibrinolysis (16).

Result of the *in vivo* experiments shows reduction of systolic and diastolic pressures when the extract of garlic was given to the animals(17), while on giving the orally the high blood pressure become to normal again (18) So if we talk about the mechanism of reduction in the high blood pressure then it is related to prostaglandin similar effect that is reduction in peripheral vascular resistance (19) literature has also reported the other actions of garlic such as it shows anti-hypercholesterolemic affect in the rats, so when garlic is administered in the rats researchers have noticed significant reduction in the serum cholesterol, triglycerides, & LDL, although no effect found in the HDL (20).

Anti-tumour action of garlic has also reported in too many *in vivo* & *in vitro* researches, some evidences shows that the compound found in the garlic names as allylsulfide has potential action to prevent the cancer in the humans by molecular mechanism in the way to adduct the DNA, or by scavenging of the free radicals in the human body, or by the proliferation and differentiation of the cells, garlic shows the blockage action on growing speed of cancers cells in the G2/M phase (21).

Garlic has also very effective in the diabetes mellitus, hence reduces he blood glucose in the animals when studies was done in the streptozotocin & alloxan induce rat models in the rat and mice (22-23). Now if we reveal the action and uses of garlic on the liver then it is found that so many research has been completed with significant reports an some them are discussed here in this review, such as garlic has potent action against the toxicity caused by the overdose of acetaminophen, by using the garlic powder continuously by modulating the oxidative stress [(24)]. Notably garlic has been reported to check out the infection caused by the various microbes & has proven most potent against *Gram -ve, Gram +ve* & acid-fast bacteria, which included *salmonella and E. coli* (25).

CONCLUSION

It is concluded that too much research has done on the garlic and its effects on the human beings, but still the drug has so many future prospective to explore the biological potentials that will be more beneficial for the mankind, as we saw the amount of chemicals present in the garlic is too much high, thus it reveals that it can also be used as natural pesticide although there is no evidences found but it can be taken as a research topic for the future.

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