Pharmacological and therapeutic attributes of garlic (Allium sativum Linn.) with special reference to Unani medicine - A review

Abdul Nasir, Gazala Fatma, Naziya Neshat and M Aftab Ahmad

Abstract
Garlic, (Allium sativum) Linn. is a member of the family Liliaceae. It is known as Seer (Persian) and Saum (Arabic) in unani medicine, similarly in Sanskrit, garlic is commonly known as lahsuna or rasana. Garlic plays important role in daily diet and also helps in maintaining good health that’s why it is widely used as diet and medicine. The effects of garlic (Seer) have been largely attributed as Muhallil, Mulattif, Jali Musakkhin, Mufatteh uraoq, Mudirr-e- Baui (Duretiic), Muqatte-Akhlate ghaleeza, Muraaqiqe dam, anti-hyperlipidemic, antihypertensive, antibacterial, antifungal, antidiabetic, anticarcinogenic, hepatoprotective activities. Garlic has many health benefits and has been traditionally used worldwide. The wealth of scientific literature supports the significant effects in Humniyat kahna (Intermittent fevers), Nazla muzmin (chronic catarrhs), Shaheeqa (whooping coughs), Sara’a (epilepsy), Dama (asthma), Deafness, Retention of urine, Zaheer (amoebic dysentery), Haiza (cholera), Zaghtuddam Qawi (hypertension), Ziyabetus (diabetes), Warme Meda (gastritis), Dafa (asthma), Deafness, Retention of urine, Zaheer (amoebic dysentery), Haiza (cholera), Zaghtuddam Qawi (hypertension), Ziyabetus (diabetes), Warme Meda (gastritis), Dafa (asthma), Deafness, Retention of urine, Zaheer (amoebic dysentery), Haiza (cholera), Zaghtuddam Qawi (hypertension), Ziyabetus (diabetes), Warme Meda (gastritis) in treatment of arthritis, toothache, chronic cough, diarrhea, dysentery, hypertension, hysteria, constipation, parasitic infestation, snake and insect bites, gynecologic diseases, as well as in infectious diseases. This great bulb has a lot of benefits, because no other plant has been h

Introduction
Garlic (Allium sativum Linn.) has been used throughout different traditions as a prophylactic as well as therapeutic medicinal plant for the treatment of a wide variety of conditions. Garlic has played important dietary and medicinal roles throughout the history. Some of the earliest references to this medicinal plant were found in approximately 5000 years ago while Chinese have been using it for at least 3000 years. The Codex Ebers an Egyptian medical papyrus dating to about 1550BC mentions garlic as an effective in a variety of ailments [1-3]. Avesta, a collection of Zoroastrian holy writings that was probably compiled during the sixth century BC has also described the benefits of garlic [4]. Hippocrates, Aristotle and Pliny cited numerous therapeutic uses of garlic. In the medieval period, garlic was also played an important role in the treatment of different diseases [5]. In his well-known book, Al Qanoon-fil-Tib (The Canon of Medicine), recommended garlic as a useful compound in treatment of arthritis, toothache, chronic cough, diarrhea, dysentery, hypertension, hysteria, constipation, parasitic infestation, snake and insect bites, gynecologic diseases, as well as in infectious diseases. This great bulb has a lot of benefits, because no other plant has been held out for so long as a cure for so many human ailments. That’s why garlic has been considered as the “Wonder Drug”.

But it is fact that garlic have occupied special place for their medicinal value for centuries in the Middle East and Southeast Asia, Europe and America. There is an attempt has been made in this review to cover the nutritional value (table 1) and pharmacological and therapeutic uses of garlic mentioned in Unani system of medicine and reported by the recent studies for garlic.
Family- Liliaceae [6-7]
Latin name: *Allium sativum* Linn. [6-8]
Vernacular Names [9-13]
Eng. - Garlic.
Urdu- Lahsun
Arabic-Saum
Quraanic name: Fum
Persian-Seer
Greek - Aglidion, Skorodon
Hindi - Lahasuna.
Sanskrit Lashuna

**Botanical description**
Garlic is an important medicinal and dietary herb which is found commonly in Central Asia and cultivated all over India. It is grown in Uttar Pradesh, Bihar, Karnataka, Tamilnadu and Andhra Pradesh as an irrigated crop. It is cultivated in and Gujarat also on a large scale. It is a perennial herb, 60 cm in Height. The garlic bulb made up of individual cloves enclosed in a white sheath or skin (Fig 1).

**Chemical Constituents**
Garlic contains: volatile oil 0.1 to 0.36%, composed of sulfur containing compounds like allicin, dially disulfide, dially trisulfide and others. These volatile oil are thought to be responsible for most of garlic's pharmacological properties. When garlic is chopped or crushed, allinase enzyme is activated and produce allicin from alliin (present in intact garlic). Other important compounds present in garlic homogenate are 1-propenyl ally thiosulfonate, ally methy thiosulfonate, Minerals such as selenium, germanium as well as vitamins and enzymes (allinase, peroxidase and myrosinase) are present in garlic. Allicin is mainly responsible for the pungent odor of garlic and formed by the enzymatic action of allinase on allicin [2, 14-17].

**Table 1: Nutrition value of Garlic**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>One clove of garlic (3 grams)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbohydrates</td>
<td>1 gram</td>
</tr>
<tr>
<td>2.</td>
<td>Sodium</td>
<td>1 mg</td>
</tr>
<tr>
<td>3.</td>
<td>Potassium</td>
<td>12 mgs</td>
</tr>
<tr>
<td>4.</td>
<td>Calcium</td>
<td>5 mgs</td>
</tr>
<tr>
<td>5.</td>
<td>Calories</td>
<td>4</td>
</tr>
</tbody>
</table>

It is the bulb, either fresh or dehydrated is used as a spice or medicinal herb. Leaves long, flat, acute, sheathing the lower half of stem; scape slender, smooth, shining, spathes long, beaked, enclosing heads bearing solid bulbils. Flowers are small, white, prolonged into leafy points [14-16].

**Fig 1: Bulb and cloves of garlic (Allium sativum)**

**Table 2: Recommended daily doses in humans [18]**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Form of garlic</th>
<th>Doses (daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fresh garlic:</td>
<td>4g approx 1 clove (4–12 mg of alliin or 2–5 mg of Allicin)</td>
</tr>
<tr>
<td>2.</td>
<td>Dehydrated garlic powder</td>
<td>600–1200 mg in divided doses</td>
</tr>
<tr>
<td>3.</td>
<td>Fresh air-dried bulb</td>
<td>2–5 g</td>
</tr>
<tr>
<td>4.</td>
<td>Tincture</td>
<td>(1:5 in 45% alcohol); 2–4 ml three times daily</td>
</tr>
<tr>
<td>5.</td>
<td>Garlic oil</td>
<td>2–5 ml</td>
</tr>
<tr>
<td>6.</td>
<td>Dried bulb</td>
<td>2–4 g three times daily</td>
</tr>
</tbody>
</table>

**Unani description of garlic (Seer/Saum)**
Parts used
Bulb and oil [6, 7, 13, 19]

**Temperament (Mizaj)**
Haar (3º) Yabis (3º) [15, 20, 21, 22]

**Therapeutic dosage (Miqdar-e-Khurak)**
2-3 Masha (gram) [21-24]

**Pharmacological actions (Af’aal) [15, 19-24]**
- Muhallil (Resolvent)
- Jali (Detergent)
- Mulattif (Demulcent)
- Musakhkhin (Calorific)
- Mufatteh urooq
- Mudirr-e- Baul (Diuretic)
- Muqatte-Akhlate ghaleea (Morbid humour remover)
- Muraqqiqe dam (Fibrinolytic)

**Pharmacological activity on the basis of scientific report**

**Antihypertensive activity**
Garlic has demonstrated hypotensive action in both experiments and humans [16-20]. It has been shown to decrease the systolic pressure by by 20-30 mmHg and the diastolic by 10-10 mmHg in hypertensive [25, 26]. The mode of action of garlic as an antihypertensive appears to be related to its cholinomimetic and lipid lowering properties [27].

**Anti-inflammatory activity**
Garlic extract has demonstrated significant anti-inflammatory activity in experimental models of inflammation [1, 23].

**Antibacterial activity**
Studies have demonstrated that both garlic juice and allicin inhibited the growth of *Staphylococcus*, *Streptococcus*, *Bacillus, Brucella* at low concentrations [29, 30].

**Antiviral activity**
It’s antibacterial effects have been demonstrated *in vivo* by its protection of mice from infection with intranasally inoculated influenza virus and by its enhancement of neutralizing antibody production when given with influenza vaccine [28].

**Antifungal Activity**
Studies revealed that significant antifungal activity in many *in vitro* and *in vivo* studies [11, 34].

**Antihelminthics effects**
It’s extracts have antihelminthics effects against common intestinal parasites like roundworm and hookworm [28, 35].
Antithrombotic activity
Garlic produces both antithrombotic (therapeutic) and antithromogenic (preventive) effects on atherosclerosis. It inhibits proliferation of atherosclerotic cells and other cell types as well as collagen synthesis and accumulation in the aorta thus, all the major manifestations of atherosclerosis (lipidosis, proliferation, and fibrosis) show a tendency toward a decrease and normalization under the action of garlic, which may account for the direct antithrombotic effect [36-39].

Antihyperglycemic activity
Garlic also has the ability to inhibit enzymes involved in lipid synthesis, prevent lipid peroxidation of oxidized erythrocytes and LDL, increase antioxidative status, and inhibit the angiotension-converting enzyme. Garlic extract reduced cholesterol synthesis by up to 75% without evidence of cellular toxicity and inhibition is likely mediated at sterol 4- alpha-methyl oxidase [40].

Fibrinolytic activity
Fibrinolytic activity have found that garlic increased fibrinolytic activity in healthy individuals as well as in acute myocardial infarction patients [41].

Antitumor effect
Studies have suggested in many in vitro and in vivo, garlic has been found to contain a large number of potent bioactive compounds (largely allylsulfide derivatives) with anticancer properties [42].

Antidiabetic activity
The presence of allicin, garlic has significant hypoglycemic action and this effect is thought due to increased hepatic metabolism and/or increased release of insulin and insulin sparing effect [43]. Garlic was effective in reduction of blood glucose in streptozotocin- as well as alloxan-induced diabetes mellitus in rats and mice [44, 45].

Hepatoprotective activity
Several studies showed that garlic can protect the liver cells from some toxic agents. Dietary inclusion of garlic powder protects rats against gentamycin-induced hepatotoxicity, improves antioxidant status, and modulates oxidative stress [46].

Other effects
Diuretic, diaphoretic, emmenagogue, carminative, antispasmodic, digestant [2, 28, 47].

Therapeutic uses
Hummiyat kuhna (Intermittent fevers), Flatulence, Nazla muznin (chronic catarrhs), Dropsy, Shaheeqa (whooping coughs), Sara’a (epilepsy), Dama (asthma), Infantile convulsions, Nervous affections, Deafness, Retention of urine, Zaheer (amoebic dysentery), Haiza (cholera), Rheumatism, Zaghtuddam Qawi (hypertension), Ziyabetus (diabetes), Qoolanj (colitis), Warme Meda (gastritis), Dafa-e-Ta’affun (anti-infective), Falij (paralysis), Hysteria, Asthma, Niqras (gout), Iruqnnisa (sciatica), Jarab (scabies),Bars (Leucoderma) and very effective in scorpion bite [11, 12, 16, 21, 22, 48].

Muzir asraat (adverse effects)
On Vision, Pregnancy, People with Haar Mizaj [21, 22, 49].

Musleh (corrective)
Gulgand, Katira, Kishnneez, Sikanjabeen, Rogan badam [21, 22, 49].

Badal (substitute)
Onion, Jadwar shirin, Lehsun jangali [22, 50].

Murakkabat (formulations)
Majoon Seer, Majoon Seer Ali Khan, Roghane Seer, Arqe Hazoom nu Nushka Kalan [21, 22, 49].

Contraindications and side effects [6]
- Contraindicated in hyperthyroidism
- It may potentiate the effect of antihypertensive and anticoagulant drugs.
- More than 5 cloves a day may induce gas and heartburn.
- Avoid concomitant use with NSAIDs, anticoagulants and drug that inhibits liver metabolism
- Topical application of garlic or garlic oil may cause local irritating effects.

Conclusion
The use of herbal drugs is increasing day by day. Garlic/Seer/ Saum (Allium sativum Linn) is one of them which is widely used in diet and for medicinal purposes. During this review we have found that a number of studies have been carried out on efficacy of garlic as antihyperlipidemic, antihypertensive, antibacterial, antifungal, antiatherosclerotic, anticancer, hepatoprotective activities. In unani medicine garlic (Seer) in a single form as well as compound formulations such as Majoon Seer, Majoon Seer, Alvi Khan, Roghane Seer are used in the treatment of Zaghtuddam Qawi (hypertension), Falij (paralysis), Hysteria, Asthma, Niqras (gout), Iruqnnisa (sciatica) etc. So, this paper may be helpful to know the pharmacological actions and uses of garlic (Allium sativum) which is mentioned in Unani system of medicine. With above fact still there is scientiﬁc study needed to explore further activities of garlic/seer.

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Conflict of Interest
There is no conﬂict of interest

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