



# AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: <http://www.ajptr.com/>

## Asparagus: The Queen of Herbs

Shaikh Imtiyaz<sup>1\*</sup>, Fauziya Naaz,<sup>2</sup> Musta Ali,<sup>1</sup> Shahid S Chaudhary<sup>3</sup>, Mohd Tariq<sup>3</sup>

1. Department of Moalajat (Medicine), National Institute of Unani Medicine, Bangalore, Karnataka, India.

2. Department of *Ilmul qabalat wa Amraze niswan* (Obstetrics and Gynaecology), National Institute of Unani Medicine, Bangalore, Karnataka, India.

3. Department of *Ilmul Saidla* (Pharmacy), National Institute of Unani Medicine, Bangalore, Karnataka, India.

### ABSTRACT

*Satavar* is an important drug which has been used in Unani and Ayurveda systems of medicine since long as an effective aphrodisiac and galactogogue drug. It is widely distributed throughout tropical and sub-tropical parts of India up to an altitude of 1500 m. It is also known as the queen of herbs. It is cultivated in gardens as an ornamental plant. Chemically it is comprised of saponins, alkaloids, steroids, carbohydrates, mucilage and essential nutrients like mineral and vitamins by virtue of which it possesses therapeutic actions such as aphrodisiac, galactogogue, immunomodulator, demulcent and anti-inflammatory etc. Modern scientific researches have also proved its novel therapeutic activities like antioxidant, antibacterial, hypoglycemic, antidepressant etc. In this article an attempt has been made to summarize the immense classical Unani literature and modern researches on *Satavar*.

**Key words:** *Satavar*, *Asparagus racemosus*, galactogogue, Unani, Ayurveda

\*Corresponding Author Email: [dribshaikh@gmail.com](mailto:dribshaikh@gmail.com)

Received 13 March 2013, Accepted 21 March 2013

Please cite this article in press as: Imtiyaz S *et al.*, Asparagus: The Queen of Herbs. American Journal of PharmTech Research 2013.

## INTRODUCTION

*Satavar* (*Asparagus racemosus* Willd) is a well known drug of plant origin which belongs to the family Liliaceae.<sup>1</sup> It is a native of Europe and has been in cultivation for over 2000 years. It is a favorite spring vegetable of the Greeks and Romans. It is found throughout tropical and subtropical parts of India up to an altitude of 1500 m<sup>2,3,4</sup> and also distributed in Bangladesh, Africa, Jawa, Australia and Pakistan.<sup>5</sup> It is a perennial shrub which appears in October,<sup>6</sup> while its roots and young shoots are used for medicinal purposes, its young spears are consumed as vegetable or salad and are considered as a balanced health food with many essential nutrients.<sup>7</sup> Black, well drained and fertile soil is good for its cultivation, but can also be cultivated in loose and medium black soil.<sup>3</sup> It is cultivated in gardens as a potted plant for its graceful feathery leaves and flowers.<sup>8</sup> The roots contain long needle shaped structure known as pith which is meant for the conduction of water.<sup>9</sup> It is mainly known for its phytoestrogenic properties.<sup>2,10</sup> Chemical analysis of *Satavar* reveals that it contains alkaloids, steroids, saponins, carbohydrates and mucilages. It has been used in Indian traditional systems of medicine mainly in Ayurveda and Unani Tibb since centuries ago as a potent aphrodisiac and galactagogue drug. Recent scientific researchers also support its traditional claims.

### Vernaculars

**Unani:** Satavar;<sup>11</sup> **Urdu:** Satavar;<sup>5</sup> **Hindi:** Satavare,<sup>12</sup> Satawar,<sup>5,13,14</sup> Bojhidan, Sadabori;<sup>13</sup> **English:** Asparagus;<sup>15</sup> **Sanskrit:** Shatavari,<sup>12</sup> Shatamoolee,<sup>5,12,14</sup> Satamuli;<sup>15</sup> **Bengali:** Satmuli,<sup>12</sup> Satamuli;<sup>13</sup> **Tamil:** Paniyanaku,<sup>12</sup> Kilavari;<sup>15</sup> **Sindhi:** Satwari;<sup>5,14</sup> **Gujrati:** Shatawari;<sup>5,14</sup> **Arabic:** Shaqaqul;<sup>13,15</sup> **Telugu:** Pillitega;<sup>15</sup> **Malayalam:** Chatavali, Satavali, Satavari;<sup>13</sup> **Marathi:** Asvel, Satavarimul;<sup>13</sup> **Punjabi:** Bozandan, Bozidun.<sup>13</sup>



**Figure 1: Dried root tubers**

### Plant Morphology

It is about 1-2 m long woody,<sup>3</sup> scandent, much-branched, spinous under-shrub with cylindrical, tuberous and fleshy roots<sup>12</sup> and sweet scented white flowers which are unisexual in nature.<sup>6</sup>

Spines are sharp and bent.<sup>5</sup> The leaves are 2-6 inches long,<sup>5</sup> reduced to small scales or needle-like spines called cladodes.<sup>7</sup> They are linear,<sup>12</sup> small<sup>3</sup> and arranged in a tuft. Fruits appear in winter which is shiny and red in color. Fruits are small, gram sized,<sup>5</sup> globular or obscurely 3 lobed, pulpy berries which are purplish black when they are ripened, seeds are hard and brittle. The roots are 30-100 cm in length and 1-2 cm in thickness<sup>5</sup> and found in clusters.<sup>3</sup> These finger like roots are soft and pliable. They are silvery white or ash colored externally and white internally. They are mucilaginous and somewhat sweet in taste.

### Parts Used

Root tubers and leaves<sup>8</sup>

**Dosage:** 7-10 gm;<sup>5, 14</sup> 12-15 gm;<sup>16</sup> 5-7 gm.<sup>17</sup> (powder of roots)

### Action mentioned in Unani system of Medicine

In classical Unani literature following important therapeutic actions of *Asparagus recemosus* are mentioned.

*Muqawwie bah* (aphrodisiac),<sup>5,14,16,17</sup> *Mughallize mani*,<sup>5,14,16,17</sup> *Mudire labn*(galactagogue),<sup>5,14,16</sup> *Musakhhine meda*,<sup>16</sup> *Qatae balgham*,<sup>16</sup> *Musakkin* (Analgesic),<sup>17</sup> *Mugharri* (Demulscant),<sup>17</sup> *Muqawwie rehm* (Uterine tonic),<sup>17</sup> *Mohallile warm* (Anti-inflammatory),<sup>18</sup> *Muallide mani* (Semenagogue),<sup>18</sup> and *Muqawwie qalb* (Cardiac tonic).<sup>18</sup>

### Medicinal Uses

The important therapeutic uses of *Satavar* described in classic Unani texts are given below.

- It is useful in *bawaseer* (hemorrhoids),<sup>18</sup> *amraze chashm* (Eye disorders),<sup>18</sup> *sozishe bol*(Burning micturition),<sup>18</sup> *jiryam* (Spermatorrhoea),<sup>5,14,16,17,18</sup> *riqqate mani*,<sup>14</sup> *fasaade khoon*,<sup>18</sup> *waja ul mafasil*(Arthritis),<sup>18</sup> *juzam* (Leprosy),<sup>18</sup> *Diq* (tuberculosis),<sup>15</sup> *Suaal* (cough),<sup>11</sup> *Zoafe aam* (debility),<sup>11</sup> *isahal*(Diarrhoea ),<sup>17</sup> and *pechish* (Dysentery).<sup>17</sup>
- Juice of root with honey is effective in *sailane rehm* (leucorrhoea).<sup>17,18</sup>
- Powder of root with milk is used to improve breast milk production.<sup>17,18</sup>
- Juice of fresh roots is useful for the patients of *Suzak* (Gonorrhoea).<sup>5</sup>
- Decoction or powder of its Root acts as a general tonic and also indicated in sexual debility.<sup>11</sup>
- The boiled cladodes are applied externally for suppression of boils and tumours.

### Ethnobotanical Actions

Ethnobotanical review of literature of *Asperagus recemosus* reveals that it possesses following important actions.

Demulcent,<sup>12,19,20</sup> Diuretic,<sup>8,12,20</sup> Aphrodisiac,<sup>12,19,20</sup> Galactagogue,<sup>8,19,20,21</sup> Refrigerant,<sup>12</sup> Anti spasmotic,<sup>12,19</sup> Alterative tonic,<sup>8,12,19</sup> Amebicide,<sup>19</sup> Anticancer,<sup>19</sup> Anti-inflammatory,<sup>19</sup> Antipyretic,<sup>19</sup> Styptic,<sup>21</sup> and Immunomodulator.<sup>21</sup>

### Ethnobotanical Uses

- It is employed in diarrhoea as well as in cases of colic and dysentery.<sup>12</sup>
- The root is boiled in milk and it is administered to relieve bilious dyspepsia and diarrhoea and to promote appetite.<sup>12</sup>
- The tubers are candied and taken as a sweetmeat.<sup>12</sup>
- The fresh root juice is given with honey as a demulcent.<sup>12</sup>
- The boiled leaves smeared with ghee are applied to boils, small pox etc.<sup>12</sup>
- The roots along with the leaves of *Gymnema sylvestre* are given in diabetes.<sup>20</sup>
- Oil of the root is recommended in the treatment of rheumatism and nerve disorders.<sup>8</sup>

### Important Polyherbal Unani Formulations

- *Majoone bhangra* 5grams twice a day
- *Halwae supari pak* 6 grams twice a day
- *Safoofe sailanur rehm*<sup>5,17</sup> 5 grams twice a day with milk
- *Safoofe salab*<sup>5,17</sup> 5 grams twice a day
- *Safoofe shahi khas*<sup>5</sup> 3 grams twice a day

### Phytochemistry

The asparagus roots contain alkaloids, tri-terpenoids, steroids, saponins,<sup>9</sup> carbohydrates,<sup>9</sup> lactones,<sup>22</sup> flavonides (kaempferol, quercetin, and rutin),<sup>3</sup> glycosides<sup>9,23</sup> and mucilages.<sup>9</sup> The mineral constituents of the root are: calcium 0.172; copper 0.033; sodium 14.60; potassium 8.32; magnesium 0.169; manganese 0.0074; nickel 0.105 and zinc 0.072 mg/g<sup>20</sup> and traces of phosphorus and iron.<sup>3</sup> The glycosides present in the root are shatavarins I-V,<sup>20,24</sup> n-butyl-beta-D-fructopyranoside, glycoside-AR-4,<sup>24</sup> tridecaacetyl shatavarin I, tetradeca-O-methylshatavarin I, sarsasapogenin,<sup>20,24</sup> immunoside.<sup>24</sup> The ethanolic extract of roots of the plant is reported to yield a polycyclic alkaloid, asparagine.<sup>20,24</sup> Its leaves contain diosgenin and quercetin-3 glucuronide while flowers and fruits contain quercetin, rutin and hyperoside.<sup>8,25</sup> This plant also contains vitamin A, B1, B2, C, E, and folic acid.<sup>3</sup> Other chemical constituents of asparagus are essential oils, asparagines, arginine, tyrosine, resin, and tannin.<sup>3</sup>

### MODERN SCIENTIFIC REPORTS

#### Wound healing activity:

Prabhath et al conducted a study on albino rats to prove wound healing effect of *satavar*. They administered aqueous extract of the root of *Asparagus racemosus* in a dose of 200mg/kg and 400mg/kg orally for 10 to 22 days in 12 week old healthy male Wistar rats weighing 150-250 g. It increased the level of IL-1 and TNF resulting in stimulation of fibroblast and collagenase activity, thus helping in wound healing as well as wound remodeling.<sup>26</sup>

#### **Hepatoprotective activity:**

A study was conducted on male albino rats of Wistar strain proved its hepatoprotective activity. Rats with body weight of 160-180 g were treated with *A. racemosus* extract (50mg/kg) for 21 days. It has been observed that *A. racemosus* extract prevented isoniazid-induced hepatotoxicity by inhibiting the production of free radicals via inhibition of hepatic CYP2E1 activity and increasing the removal of free radicals through the induction of antioxidant enzymes.<sup>25</sup>

#### **Memory enhancing activity:**

Memory deficit (amnesia) was induced in Swiss albino male mice by administration of scopolamine and sodium nitrite intraperitoneally. Methanolic roots extract of *Asparagus racemosus* prevented experimental amnesia and it may be a great potential in memory deficit.<sup>1</sup>

#### **Antibacterial activity:**

K. Ravishankar et al in their study confirmed that ethanolic extract of root of *Asparagus racemosus* has antibacterial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *Staphylococcus wernerii*, *Pseudomonas putida*, *Pseudomonas aeruginosa*, *Proteus mirabilis* etc, which may be attributed to presence of different phyto-constituents like alkaloids, phenolic compounds, saponins and flavonoids etc.<sup>27</sup>

#### **Nutritional effects:**

Kumari et al investigated the nutritional effects of herbal preparation of *Asparagus racemosus* in 50 day old broiler chicks. The results were encouraging in relation to total body weight and feed conversion efficiency. The researchers found that it can also be used potentially before mass vaccination of the chicks for its property of immune-modulation like levamisole.<sup>28</sup>

#### **Anti hyperglycemic activity:**

The ethanolic extracts of roots of *Asparagus racemosus* stimulates insulin secretion and contributes to anti hyperglycemic action.<sup>29</sup>

#### **Lipid lowering and antioxidant property:**

It has been reported that *Asparagus racemosus* root powder administration decreases plasma lipids and oxidative stress in hyperlipidemic conditions which were produced by administration of cholesterol and bile salt in diet in male albino rats.<sup>30</sup>

**Galactogogue activity:**

A clinical trial was conducted in 60 lactating mothers showed that *Asparagus racemosus* has significant galactogogue activity in comparison with the placebo control group without any significant acute toxic effects.<sup>24</sup>

**Aphrodisiac activity:**

A study was carried out on adult albino rats suggested that the systemic use of extracts of *Satavar* has sexual behavior enhancing effect in male rats. A single dose of 3000mg/kg was administered that was found to stimulate the mounting behavior of male rat and also increase their mating performance. No general short term toxicity was noticed.<sup>31</sup>

**Anti-depressant activity:**

Dhingra and Kumar in their study concluded that methanolic extract of *Asparagus racemosus* showed significant antidepressant activity probably by inhibiting MAO-A and MAO-B; and through interaction with adrenergic, dopaminergic, serotonergic and GABAergic systems.<sup>32</sup>

**Teratogenic effect:**

One of the studies showed teratogenic effect of *Asparagus racemosus* in Charles-Foster strain albino rats. They were administered 1000mg/kg of methanolic extract of *Asparagus racemosus* orally before and during pregnancy. Teratogenic effects in the form of increased resorption of fetuses, gross malformation and intra uterine growth retardation during pregnancy and decrease in body weight and length and delay of various developmental parameters after birth were observed.<sup>23</sup>

**CONCLUSION**

From the detailed literature survey it can be concluded that *Satavar* is an outstanding galactogogue herb which has been used in Unani system of medicine to treat the condition of oligogalactia since millennia. Scientific studies also support the classical Unani claim regarding its actions. Further researches should be carried out to explore other hidden beneficial chemical constituents and therapeutic activities of *Satavar*.

**REFERENCES**

1. Dhawaj AV, Singh R. Reversal Effect of *Asparagus racemosus* Wild (liliaceae) Root Extract on Memory Deficits of Mice. Int J Drug Develop Res 2011; 3(2):314-323.
2. Vijay N, Sairkar P, Silawat N, Garg RK, Mehrotra NN. Genetic Variability in *Asparagus racemosus* (Willd.) from Madhya Pradesh, India by Random Amplified Polymorphic DNA. African J Biotechnology 2009; 8(14):3135-3140.

3. Chawla A, Chawla P, Mangalesh, Roy RC. *Asparagus racemosus* (willd): Biological Activities and its Active Principles. Indo-Global J Pharma Sci 2011; 1(2):113-120.
4. Bopana N, Saxena S. *Asparagus racemosus*—Ethnopharmacological Evaluation and Conservation Needs. J Ethnopharmacology 2007; 1-15.
5. Tarique NA. Tajul mufredat. New Delhi: Idarae Kitabul Shifa; Jan 2010:420.
6. Venkatesan N, Thiyagarajan V, Narayanan S, Arul A, Raja S, Kumar SGV et all. Anti - diarrhoeal potential of *Asparagus racemosus* wild root extracts in laboratory animals. J Pharm Pharma Sci 2005; 8(1):39-45.
7. Pant KK, Joshi SD. *In vitro* Multiplication of Wild Nepalese *Asparagus racemosus* Through Shoots and Shoot Induced Callus Cultures. Botany Res Int 2009; 2(2):88-93.
8. Kokate CK, Purohi Apt, Gokhale SB. Pharmacognosy. 43<sup>rd</sup> ed. Pune: Nirali Prakashan; 2009:8.56-8.57.
9. Wani JA, Achur RN, Nema RK. Phytochemical Screening and Aphrodisiac Activity of *Asparagus racemosus*. Int J Pharma Sci Drug Res 2011; 3(2): 112-115.
10. Saravanan P, Kumar SS, Charles A, Prabha RQ. Exploring the Ethno Medicinal Plant for Bio Remediation. Int J Computational Engineering Res 2013; 3(1):1-3.
11. Anonymous. Medicinal Plants of Gwalior Forest Division. CCRUM 1984; 15.
12. Nadkarni KM. Indian Plants and Drugs. New Delhi: Shrishti Book Distributers; 2005:45-46.
13. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2<sup>nd</sup> ed. Vol 4. Dehradun: International Book Distributers; 2007: 2499-2500.
14. Kabeeruddin M. Makhzanul Mufradat.. New Delhi: Ejaz Publishing House; YNM: 332-333.
15. Medicinal Plants of Andhra Pradesh Part 1. CCRUM 1999; 18.
16. Abdul Hakeem HM. Bustanul Mufradat. New Delhi: Idarae Kitabul Shifa; June 2002:330.
17. Safiuddin Ali HS. Unani Advia Mufrada. 10<sup>th</sup> ed. New Delhi: Lahoti Print Adds; 2004: 182.
18. Ghani MN. Khazainul Advia. New Delhi: Idarae Kitabul Shifa; YNM: 788-789.
19. Duke JA. Handbook of Medicinal Herbs. 2<sup>nd</sup> ed. London: CRC Press; 2002: 665-666.
20. Anonymous. The Wealth of India. Vol 1. National Institute of Science Communication and Information 2000; 101-102.
21. Khare CP. Indian Medicinal Plants. Delhi: Rajkamal Electric Press; 2007; 68-69.

22. Nagamani, Suresh J, Ahuja J, Reddy V. Comparative Phytochemical Screening of Vatashunga, Shatavari and Shatapushpa Claimed for *Prajasthapana* Activity. Scholars Research Library 2012; 3 (3):1294-1304.
23. Goel RK, Kumar MM, Dorababu M. Teratogenicity of *Asparagus racemosus* Willd. Root, A Herbal Medicine. Indian J Experimental Biology 2006; 44:570-573.
24. Gupta M, Shaw B. A Double-Blind Randomized Clinical Trial for Evaluation of Galactagogue Activity of *Asparagus racemosus* Wild. Iranian J Pharma Res 2011; 10 (1): 167-172.
25. Palanisamy N, Manian S. Protective Effects of *Asparagus racemosus* on Oxidative Damage in Isoniazid-Induced Hepatotoxic Rats: an in Vivo Study. Toxicology and Industrial Health 2013; 28(3):238–244.
26. Kodancha PG, Satish Kumar MC, Rajput R, Patil V, Udupa AL, Gupta S et al. Wound Healing Profile of *Asparagus racemosus (Liliaceae) Wild*. Current Pharma Res 2011; 1(2): 111-114.
27. Ravishankar K, Kiranmayi GVN, Lalitha TM, Priyanka T, Ranjith T, Someswarao SBV et al. Preliminary Phytochemical Screening and in-Vitro Antibacterial Activity on *Asparagus racemosus* Root Extract. Int J Pharma Chemical and Biological Sci 2012; 2(1): 117-123.
28. Kumara R, Tiwari BK, Prasad A, Ganguly S. *Asparagus racemosus* Willd. Root Extract as Herbal Nutritional Supplement for Poultry. Global Journal of Research on Medicinal Plants & Indigenous Medicine 2012; 1(5): 160-163.
29. Hannan JMA, Marenah L, Ali L, Rokeya B, Flatt PR, Abdel-Wahab YH. Insulin Secretory Actions of Extracts of *Asparagus racemosus* Root in Perfused Pancreas, Isolated Islets and Clonal Pancreatic *b*-Cells. J Endocrinology 2007; 192:159-168.
30. Bhosale RR, Jaju JB, Padwal SL, Jadhav RR, Deshmukh VS. Lipid Lowering and Antioxidant Potential of *Asparagus racemosus* in Hyperlipidemic Rats. Int J Basic and Clinical Pharmacol 2012; 1(3): 168-173.
31. Kumar MV, Saima S, Vineet A, Nitin C. Effects of *Asparagus racemosus* (Shatavari) on Mounting Behaviour of Male Rats. Int J Pharma Life Sci 2010; 1(1): 30-34.
32. Dhingra D, Kumar V. Pharmacological Evaluation for Antidepressant-like Activity of *Asparagus racemosus* Willd. In mice. Pharmacologyonline 2007; 3: 133-152.