



## **Brief Review on Shatavari (*Asparagus racemosus*) and Its Medicinal Uses**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

Asparagus racemosus is another name for shatavari. It belongs to the family asparagaceae. It is an adaptable plant as well. The adaptation of human body to mental and physical stress is said to be achieved by the help of adaptogenic herbs like these.

Shatavari is an ayurvedic medicine staple that is made available in the form of analeptic for the wellbeing and vitality of person.

It is popular among all therapeutic plants due to various active biochemicals present in it such as steroidal glycosides, saponins (Shatavarins I, II, III, and IV), flavonoids, polyphenols, vitamins and alkaloids (racemosol). Shatavari extracts from its different parts like roots, flowers, leaves and stems are effective in treating female organs which are involved in reproduction.

For centuries, ayurvedic medicine has employed shatavari. However, there haven't been enough human trials to recommend it for any medical problem. It is, however, safe to consume it in modest doses, and doing so will allow you to benefit from its antioxidant and immune-boosting properties.

Except for being an indigenous medicinal plant which known to be important for its sapogenin content which is the precursor of many active pharmacological steroids, it also has many medicinal uses like antioxytoxic (shatavarin four), spasmodic to uterus, hypertensive as well as hypoglycemic activity, anticoagulant activity, antiviral activity, anticancer and antidysentric activity. In ayurvedic

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medicine asparagus racemosus is considered as tonic specific to females .Despite of being a herb which is rejuvenating it is used in infertility cases of females, increases libido , enhances ovulation as well as folliculogenesis, also increases lactation.

**Keywords:** *Shatavari; anti oxidant property; reproductive system issues; bioactive chemicals; immunity.*

## 1. INTRODUCTION

### 1.1 Scientific Classification

Kingdom – Plantae;  
 Division – Angiosperms;  
 Class – Monocots;  
 Order – Asparagales;  
 Family – Asparagaceae;  
 Genus- Asparagus;  
 Species- Asparagus racemosus.

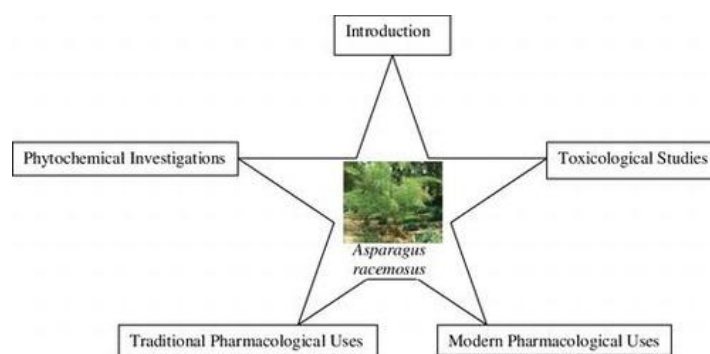
Asparagus racemosus (also known as satavar, shatavari, or shatamull, shatavari) is a widespread asparagus species in India and the Northern Australia and Himalayas. It grows to a height of 1–2 m (3 ft –6 ft) and loves to take root in gravelly and rocky soils which are located high in the piedmont plains seen at elevations of 1,300–1,400 m (4,300–4,600 ft). In 1799, it was botanically described. Shatavari possesses homogeneous, bright green phylloclades (photosynthetic branches) that look like little pine needles. It blooms in July with tiny white flowers on short, thorny stems, and it fruits in the ninth month of the year with globular berries which are blackish-purple along with a tuberous root system with tuberous roots that are about hundered centimeteres long and taper at the terminal sites.

Though is known to us that shatavari is one of the major health tonics and most popular rasayana drugs to treat reproductive ailments of women, but the underneath mechanism of action

of a. racemosus at the level of ovary is not undertood clearly till now to the researchers as well. Shatavari is recommended in numerous texts of Ayurveda for prevention as well as to treat the following conditions namely dyspepsia, gastric ulcer and also as a “galactogogue”. Asparagus racemosus has also been used successfully by some of the practioners of Ayurveda for the purpose inflammation,nervous disorders, liver diseases and certain infectious diseases.

The therapeutic application of this plant has been reported in the pharmacopoeias of Indian as well as british and traditional medicine course systems such as Siddha, unani and Ayurveda. Crude, semi-purified and purified extracts obtained from different parts of this plant have been used in therapeutic applications. Many biologically active phytochemicals, primarily saponins and flavonoids, have been isolated and identified from this plant, and are used in combination or alone for various pharmacological activities [1].

Inspite of a long history of use in Ayurvedic medicine, there is little research demonstrating the effects in our health of the herb asparagus racemosus. Studies on its effects on lactation have shown mixed results. Its safety has not been thoroughly studied, however small trials have found no adverse effects in mothers or their babies. The main pharmacological components of shatavari a.k.a a.racemosus are alkaloids, saponins, steroids and mucilages.



**Fig. 1. Different aspect of *Asparagus racemosus***

The above diagram basically gives us a brief and a Simple idea that shatavari (asparagus racemosus) Can be studied under the five headings. But the part which deals with the phytochemical investigations is not touched by me in this review article besides this the modern pharmacological uses and its benefits are the main highlights of this article.

Apart from all the topics mentioned above it is very well known to us that research is a never ending process one thing leads to another, a constant hope for knowing many functions, data collection, data analytics putting all these things in an organised manner paves a way for further research [1].

## 1.2 Objective

To study the pharmacological and therapeutic uses of Shatavari.

## 1.3 Empirical Review

Apart from what all is mentioned under the headings of abstract, objective, uses and conclusion there are many other facts which can be placed as a part of general discussion to. Shatavari means “acceptable to many or the one who has one hundred husbands” which also indirectly implies one of its ability that is to treat various problems related to female reproductive system.

In todays day and age the modern practices of Ayurveda the roots of the plant a.racemosus are considered to be an effective appetizer, astringent, laxative, used in cases of diarrhea, kidney issues as a diuretic or for the removal of canaliculi.

## 2. MAIN APPROACH

### 2.1 Uses

**It has Anti-Oxidant Properties:** The free radical cell damage prevented by the use of Anti-oxidant. Asparagus racemosus is rich in saponins which are the compounds with antioxidant activity.

Based on a study in the year 2004 found a new antioxidant called Triangular Plan in Shutter Bali roots. And antioxidants which were already known they are namely.

1. Asparagarmin and

2. Racemosol were also found.

These anti-oxidants mentioned above are also said to have strong ability in treating depression , therefore there is no harm in using them as anti-depressents. This is another use of shatavari which is dicussed as a separate point below.

**It has Anti-Inflammatory Properties:** A molecule named Racemofuran which is found in a.racemosus has got a significant property namely anti-inflammatory. According to the book Cook Medicine: How You Can Benefit From Natural Medicine, racemofuran works similarly in our body to anti-inflammatory drugs which act as COX2 inhibitors. All these drugs are expected to redusce inflammation present at any site of the body without any kind of serious digestive side effects.

**It May Help Boost Your Immune System:** Asparagus racemosus is used as an agent which boosts our immunity in ayurvedic medicine. Based on a study which took place in the year 2004 in which a.racemosus root extract was being used upon animals showed an increase in antibodies against a strain of pertussis compared with the animals which were left untreated. The animals which were treated with the root extract of shatavari had a faster recovery in contrast with those which were left untreated. This indicates an improved immune response.

**It May Provide Relief from Cough:** Based on a study on a rat in 2000, root juice of shatavari is a natural remedy for cough in the state of West Bengal in India. Researchers evaluated its ability to cough in coughing mice.It was found that a.racemosus root extract suppressed coughs. Many more research works are required to determine how shatavari works to relieve cough [2,3].

**It has an Anti-Diarrheal Activity:** Asparagus racemosus is utilized as a traditional medicine in case of diarrhea. It that is diarrhea leads to loss of electrolytes and a state of dehydration.

The tuberous roots and leaves of plant Asparagus racemosus are therapeutic use of which anti -diarrheal property is one. This due to the fact that the phytochemical extract of the roots of shatavari consists of many active biomolecules like phenolic compounds, carbohydrates, steroidal glycosides, tanins in aqueous extract as well as ethanolic extract whereas steroids, terpenes and saponins in ethanolic extract etc.

The roots of *A.racemosus* contain saponins (shatavarin I-IV) which are the defence systems which acts as an anti-microbial in nature. The most common microbes causing diarrhea and dysentery are shigella, *Escherichia coli*, non-typhoidal salmonellae and *Vibrio cholerae* [4,5].

**It can Act as a Diuretic:** Diuretics act by releasing out the excess fluid in our body specifically sodium ion along with water. Used in patients with congestive cardiac failure, glaucoma, cerebral edema lowering the intracranial tension. It would be easier to understand when we support it with an evidence as mentioned below.

Based on a study conducted on a rat in 2010. It says that an aqueous extract of the roots of *asparagus racemosus* after 3 doses of 800mg/kg, 1600mg/kg and 3200mg/kilogram its activity as a diuretic compared to mainstream drugs like furosemide shows no signs of acute toxicity or any kind of side effects. Many more trials on humans are a must so that it would facilitate an easy way into the mainstream market.

**Can help in Renal Stone Treatment:** Kidney stones are hard deposits that form in your kidneys. As they pass through your urinary tract, they can cause severe pain known as colicky pain as they traverse through the ureters.

Most kidney stones are made up of oxalates. Oxalates are compounds found in certain food items, such as beets, spinach as well as potato chips.

A study of year 2005, root extract of *asparagus racemosus* had prevented formation of oxalate crystals. It also increases the concentration of magnesium in the urine. It is believed that the proper amount of magnesium in the body helps prevent the presence of crystals in the urine.

**Anti-Aging:** Shatavari is perhaps one of nature's best kept anti-aging secrets. According to a 2015 study, the saponins in shatavari root help to reduce damage due to free radical that leads to wrinkles. Shatavari also helps prevent the degradation of collagen. Collagen helps maintain the elasticity of the skin.

More research is needed before shatavari topical products are marketed.

**It can be Helpful in Treating Depression:** According to the Anxiety and Depression

Association of America, a depressive disorder (major) affects more than 16.1 million American adults per year. However, many people are unable to take prescription antidepressants due to the negative side effects.

In Ayurveda *asparagus racemosus* is made available to treat depression. In 2009, a rodent study found that the antioxidants in shatavari have potent antidepressant effects. They also affect neurotransmitters in the brain. Neurotransmitters carry information throughout our brain. Some have been linked to depression.

**\*\*Impact of Stress on Disorders of Women's Reproductive Health: Possible Effects of Shatavari (*Asparagus racemosus*).**

Stress runs deep in the society, the female gender is oftenly exposed to physical, psychological and physiological stress. Mental stress damages the reproductive health by generating reactive oxygen species (ROS) and therefore oxidative stress (OS). An increase in oxidative stress can alter the physiology of the ovaries, the quality of the oocytes and lead to problems associated with female reproductive health. As a medication to reproductive health disorders in women in which the etiology is mainly stress *Asparagus racemosus* is often recommended in the Ayurveda. As a known fact *asparagus racemosus* is a main analeptic and a well known rasayana for treating female reproductive problems, the lying pathway by which shatavari acts at the level of ovary is still unknown. According to present and recent studies, it is suggested that shatavari might treat complications related to women's reproductive health, including imbalance in hormones, polycystic ovary syndrome (PCOS), growth and development. Follicles, oocyte quality, and impotency are possible by decreasing the SG levels and raising antioxidant levels in the human body. More research is needed to demonstrate the pathway of action of *asparagus racemosus* in ovaries as well as oocytes present in it, which has a direct impact on the reproductive health of women [6].

**As a Cardiac Tonic:** It increases the rate as well as force of contraction in the isolated heart of frog which is at a moderate rate.

**As a Immunomodulator:** It enhances the immune system by replenishing the neutrophils and leucocytes that is causing neutrophilia and leucocytosis.

**As an Anti-Tussive:** The methanol extract of shatavari root elicits an antitussive activity on a mice in which cough is induced by sulphur dioxide.

**As a Digestive:** The roots of shatavari and the aerial parts both of them possess lipase as well as amylase activity. And hence have a function of digestive.

**As an Anti-Oxytocic:** In experimental subjects crude extract of shatavari increases uterine weight in estrogen primed group. The fraction of saponin present in the extract is responsible for blocking the contractions induced by Pitocin.

**Side Effects and Possible Risks:** According to a 2003 study, Ayurveda itself declares asparagus racemosus as harmless for longer period of usage. However, there hasn't been a lot of scientific research on the side effects of shatavari supplements. Pregnant or breastfeeding women should not use it until more research is done and it is proven to be safe.

Allergic reactions have been reported in some users of shatavari. If you are allergic to asparagus, avoid this supplement. See a doctor if you experience worsening asthma symptoms or allergic reactions.

This includes:

- rash
- heart palpitations
- itchy eyes
- itchy skin
- shortness of breath
- dizziness

Shatavari may have a diuretic effect. You should not take it with other herbs or diuretics such as furosemide (Lasix).

Shatavari may lower your blood sugar. You should not take it with any other medicine or herb that lowers blood sugar.

The research is still going on as its bioactive molecule combinations give rise to multiple actions in lab findings and clinical trials are one of the means to find the best out of best benefits for humans in the near future.

### 3. MISCELLANEOUS

**Reducing the Toxicity of Phthalates:** Phthalate toxicity mainly affects ovary and more specifically

the granulosa cells of the ovary which play a role in the synthesis/release of estrogen. But unfortunately the action of phthalate directly targets and block the receptors present on granulosa cells of mammals i.e human beings in this context this reduces/ inhibits estradiol production which further leads to oxidative stress increase and somatic cell apoptosis. This largely hampers the production of ova, most importantly the process folliculogenesis. If left untreated there will be no late in calling the person infertile. And the oxidative stress is increased by a rise in Reactive oxygen species [ROS].

Shatavari is here considered as a therapeutic agent as it contains active biochemicals like cytoestrol, glycosides, diosgenins as well as stigmaestend. Majorly steroidal saponins as well as sarsapogenin presence indicated in the leaves, roots, and fruits of *A. racemosus* plant, all these things qualities make this herb a good therapeutic agent to be used as against the reproductive toxicity induced by phthalates.

MOA of *a.racemosus* remains clarity less and few experimental studies suggest that root extract of shatavari increases the release i.e secretion of estrogen hormone and henceforth antrum formation and folliculogenesis is induced. And its also known and an inscribed fact that *a.racmosus* decreases the quantity of the ROS production and establishes intracellular connections between the cells.

Thus the hypoestrogenic situation is established in the absence of estrogen and further leads to impaired oocyte maturation and apoptosis is triggered [7-14].

**Gastrointestinal Effect of Shatavari Ghrita:** According to the classical text described in the ayurvedic medicine it is known that shatavari a.k.a *a.racemosus* is used to treat gastrointestinal disorders.

Ghrita in the Sneha dravya mentioned in the ayurvedic medicine is of par excellence because its powerful ability to assimilate all the properties of the substances. Shatavari Ghrita as a herbal medicine containing root of *a.racemosus*, ghee as well as milk.

Based on ayurvedic medicine GI disorders are majorly caused due to rise in pitta and imbalance of agni. Henceforth pitta alleviation treatment is necessary in these conditions.

**Shatavari Ghrita Properties:** Shatavari ghrita is composed of these 3 components they are Kalka of shatavari (fine paste of root of *a.racemosus*), cow's ghee as well as cow's milk in the proportion as 1: 4: 16.

Shatavari ghrita acts as a Daha nashana, Vranaropaka, Agni deepana, Shoolaprashmaka, pitta and Vata dosha. So, by all this mentioned above we come to know that this drug has the ability to treat gastro- intestinal disorders [15-18].

Generally shatavari has been recommended in the Ayurveda for the prophylaxis as well as treatment of Dyspepsia, gastric ulcers and as a galactologue.

Furthermore research also shows that shatavari ghrita acts as a cytoprotective agent to protect the gastro- duodenal mucosa. And also enhances the prostaglandins activity which prevents mucosal disruption [19-21].

#### 4. CONCLUSION

Till now we have seen that being an ayurvedic herb *Asparagus racemosus* has been used widely in various areas where there is scope of treatment. We have an idea that the ayurvedic medications are cheap and easily accessible to us. But still in the world where allopathy dominates, ayurvedic medicine has not lost its importance because economically useful plants like *a.racemosus* have not lost their worth. Shatavari has various uses namely anti oxidant, anti- inflammatory, diuretic, anti- diarrhoeal, as an anti – depressant, renal stone treatment.

#### NOTE

The study highlights the efficacy of "Ayurved" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

#### DISCLAIMER

The products used for this research are commonly and predominantly used products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by

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#### CONSENT

It is not applicable.

#### ETHICAL APPROVAL

It is not applicable.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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