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Review Article

Shatavari (*Asparagus Racemosus*) – The Best Female Reproductive Tonic

Shivani Kathar, Vaishnavi Jadhav, Dr. Gajanan Sanap

Late Bhagirathi Yashwantrao Pathrikar College of pharmacy, pathri Phulambri Chh.Sambajinagar 431111.

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ABSTRACT

The World Health Organization (WHO) advises that the majority of people on the planet rely on herbal medicine for their medical needs. One of the most important healing plants used by Ayurvedic Vaidyas from ancient times is shatavari, or asparagus racemosus. In Ayurvedic literature, this herbal plant is referred to as a Rasayan and possesses a broad range of biological functions. The component of Shatavari that Ayurvedic Vaidyas use the most is the root. One of the most widely used herbal plants in the world, it contains a variety of chemical constituents, including Immunoside, Asparanin A, Shatavarins, Racemoside A, B, and C, 27 α -dimethyl-1 β , 2 β ,3 β -trihydroxy-25-spirost-4-en-19 β -oic, and many more. It has lactogenic qualities and is referred to as a tonic. It is widely used to treat nervous disorders, acid reflux disorders, a number of infectious conditions, and as an immunomodulant. It is mostly utilized for female diseases, such as various menstruation issues and galactagogic issues. Asparagus racemosus's chemical components offer a wide range of pharmacological properties, including antimicrobial, antiviral, anti-inflammatory, wound-healing, antidepressant, anti-anxiety, antifertility, and many more. Over the past few years, a lot of scientific research has been done on Asparagus racemosus to examine its pharmacological and chemical characteristics. This review provides a brief explanation of Asparagus racemosus's general description, phytochemicals, pharmacological characteristics, ayurvedic characteristics, and traditional usage.

INTRODUCTION

Medicinal herbs are nature's gift to humanity, allowing us to live healthy, disease-free lives. One of the world's leading medico-cultural countries is India, where the division of medicinal herbs is a

part of a long-standing tradition that is still respected today. The use of restorative herbs needs to increase because of the global movement for an improved "quality of life"¹. Many beneficial types of plants with therapeutic value are widely

***Corresponding Author:** Shivani Kathar

Address: Late Bhagirathi Yashwantrao Pathrikar College of pharmacy, pathri Phulambri Chh Sambajinagar 431111.

Email : shivanikathar2002@gmail.com

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available in India ². The most often utilized plant in Ayurveda is shatavari. Traditional medical system including Ayurveda, Siddha, and Unani provide a general description of its therapeutic qualities.” Who acquires 100 husbands or sufficient to many” is what the word “shatavari” means. It is recommended as a female reproductive tonic as well as a general tonic. “100 spouses” is another way to represent Shatavari (Figure 1), indicating its ability to increase endurance and fertility. This amazing plant is known as the “Queen of Herbs” in Ayurveda because it promotes passion and love. It is the main Ayurveda medication used to revive women. The genus *Asparagus* contains around 250 species worldwide, with 22 of those species occurring in India. Because different portions of the plant

contain different phytochemicals, such as steroidal saponins and sapogenins, the *Asparagus* genus is thought to have therapeutic significance .The plant has many benefits, including promoting longevity, boosting immunity, improving mental clarity and strength, and giving the body more vigor. It is also used to treat mental illnesses, cancer, heartburn, irritability, neuropathy, and hepatopathy. According to studies, its root extracts contain anti-oxidant, anti-diarrheal, anti-ulcer, antidiabetic, and immunomodulatory qualities ³. The goal of this review is to examine all medical perspectives on shatavari plants, including folk, Ayurvedic, and modern. Table No. 1 and Table No. 2 display the taxonomical classification and colloquial names of *Asparagus racemosus*, respectively ³



Figure 1: *Asparagus Racemosus* (Shatavari)

Table 1: Taxonomy of *Asparagus racemosus*

Taxonomical Rank	Taxon
Kingdom	Plantae
Division	Angiosperms
Class	Monocots
Order	Asparagales
Family	Asparagaceae, Liliaceae
Genus	<i>Asparagus</i>
Species	<i>Racemosus</i>
Common Name	Shatavari

Table 2: Vernacular Names of *Asparagus racemosus*

English	Wild asparagus
Hindi	Shatavari, shatawar or satmuli
Sanskrit	Shatavari
Bengali	Shatmuli
Marathi	Shatavari or Shatmuli
Gujarati	Satawari
Telegu	Toala-gaddalu or pilli- gaddula
Tamil	Shimaishadavari
Malayalam	Chatavali
Kannada	Aheruballi
Madhya Pradesh	Atmooli
Rajasthan	Norkanto
Himachal Pradesh	Sanspayiin

Botanical Distribution of *Asparagus Racemosus* (Shatavari) :-

The plants can reach a height of three meters and are under shrub. There are many short root succulents in this spiny herb. The plant has long, tuberous, brownish roots with tapered tips on both sides. It can reach heights of 25 to 90 cm and thicknesses of 1-2 cm, giving it an internal or external silver white appearance. This woody climber plant is referred to as “Liana Bearing Brown” or turns from white to grey ^{4,5} and has protecting pin needles on top of its leaves. The blooms bloom in February and March and are uniformly modest. They have fragrant, hermaphrodite flowers that are mostly contaminated by bees ⁶. Fruits with eye-catching red boundaries. These barriers are spherical, tiny, and have turned crimson from green. The root's transverse portion is either elliptical or circular. Five to six layers of compact cells and thin-walled phellements that extend tangentially make up the periderm. One layer of phelloderm follows two to three peripheral layers of cork cells. 6-7 layers of cortical cells come after phelloderm. The vascular bundle forms a circular ring in the center. Metaxylem is outwardly oriented, whereas protoxyl is oriented toward the center⁷. Zones of secondary phloem are widespread. Secondary

phloems are followed by a secondary xylem broad zone, which includes ships, tracheid, and parenchyma xylem. There is a lot of epidermal hair in the epidermal layer ⁶.

Geographical Distribution of *Asparagus Racemosus*:-

The plant is found all across the world, primarily in the Himalayas, India, and Sri Lanka. It is located up to 1500 meters above sea level in tropical and subtropical regions of India.

Phytochemical constituents of *Asparagus Racemosus*:-

According to numerous scientific investigations, Plant Shatavari contains the active ingredients listed below (Figure 2):

1. *Asparagus racemosus* was used to extract steroidal saponins, also known as Shatvarins, Shatvarin I and VI, sarsapogenin, asparanin (A, B, C), and adcendin (A, B). Shatvarin I is an important glycoside that is attached to sarsapogenin by 3-glucose and rhamnose moieties ⁸. A glycoside of sarsapogenin with two molecules of asparagus rhamnose moieties connected to it is called Shatavarin IV. The asparagus species' roots, leaves, and fruits all contain these phytoconstituents. According to recent studies, the specific plant has also been shown to contain Curillins, Asparinins, Asparosides, and Shatavarin V. Figure 1 displays each species' primary biochemical characteristics ⁹
2. The compound oligospirostanoside is classified as immunoside
3. Aspargamine A, an enclosure-type pyrrolizidine alkaloid, is a polycyclic alkaloid
4. Isoflavones: 7-O-beta-D-glucopyranoside, 8-methoxy-5, 6-, 4-trihydroxy isoflavone ¹⁰
5. Acemosol, a cyclic hydrocarbon, such as dihydrophenantherene.
6. Racemofuran, a Furan compound
7. Adhesive polysaccharides and starches



8. Flavanoids: Quercetin, rutin, and hyperoside glycosides can be found in natural goods and flowers
9. Sterols: In addition, roots contain undecanyl cetanoate, 4,6-dihydroxy-2-O(- 2-hydroxy isobutyl) benzaldehyde, and sitosterol .¹¹
10. In addition to calcium, magnesium, potassium, zinc, and selenium, minor elements discovered in roots include zinc (53.15), manganese (19.98), copper (5.29), and cobalt (22.00 microgram per gram) .¹²
11. It is possible to isolate Kaepfrol and Sarsapogenin from the woody portions of tuberous roots . Essential unsaturated fats at random Vitamin A, quercetin 3-glucourbnides, diosgenin, and gamma linolenic acids.

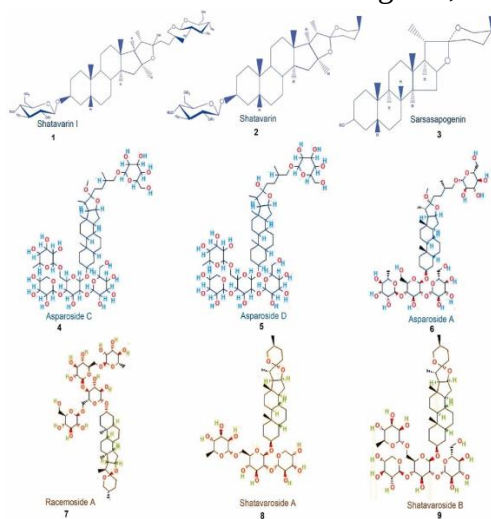


Figure 2: Chemical Structures of some major phytochemicals of Asparagus racemosus

Reported Therapeutic Studies of Asparagus racemosus:-

This plant has been the subject of numerous studies to determine its medicinal and pharmacological use. To demonstrate the clinical effectiveness of this herb, particularly in the treatment of cancer, immunomodulatory disorders, and skin conditions, more clinical research is still required.

1. Effect on Reproduction: It is used to treat female reproductive issues such as irregular menstruation, endometriosis, dysmenorrhea, uterine bleeding, amenorrhea, sexual weakness, menopause, and pelvic inflammatory diseases such sexual dysfunction. It has been used for centuries as a uterine tonic for PMS; as a result, it produces uterine prolapse and strengthens, nourishes, and cleanses the uterus. In addition to helping Shifali Thakur et al. Shatavari (asparagus racemosus), the greatest female

reproductive tonic, it eradicates infertility and prepares the uterine wall for contraction during fetal development, preventing miscarriage.

2. International Journal of Research and Review 78, Vol. 8, Issue 5, May 2021 (ijrrjournal.com) to raise lactation through hormonal balance. It improves folliculogenes, makes ovaries heavier, and the root extract helps stimulate serum FSH ^{13, 14}. Saponins found in A. racemosus prevent the oxytocic action on the uterine musculature, maintaining unrestricted uterine motility and confirming its use in dysmenorrhea, which involves painful periods without significant pelvic pathology. Because of Shatavarin 1, the well-known shatavari formulation Shatavri Sidh Girit is recommended in cases of threatened abortion ¹⁵.
3. Anti-carcinogen Activity: An extract of steroidal saponins from the shatavari plant is

employed to induce apoptosis in research . In the case of memory cell cancer, the root extract seemed to have a protective effect. It was hypothesized that steroidal segments of *A. racemosus* could cause tumor cell death based on research on their apoptotic activity. Significant anti-cancer activities are possessed by Shatavarin IV .^{16,17}

4. Anti-proliferative Activity: Shatavarin IV exhibits the most capability to reduce cell viability and death rate among the different experiments¹⁸
5. Anti-ulcer Activity: The plant exhibits adaptogen properties, which increase the body's ability to adapt to changes as suggested by the climate. As previously mentioned, it is a rasayana spice that increases cell resistance¹⁹ . The ingredients in *A. racemosus* prevent ulcers. Analysis was done on the compatible perish in terms of acidity, number of ulcer patches, free causticity, and gastric secretion¹⁹ . Powdered *A. racemosus* root has a strong effect on chronic peptic ulcers. The thickness of the gastrointestinal body fluid, its emission, and the life expectancy of the gastric mucosal epithelial cells all increased.²⁰
6. Cardioprotective Activity: By reducing the (cholesterol) LDL and VLDL by more than 40%, the supplementation of root powder is used to lower the total lipid concentration and peroxidation²¹
7. Antibacterial Activity: *Shigella flexneri*, *Escherichia coli*, *Salmonella typhi*, *Salmonella typhimurium*, *Shigella sonnei*, *Pseudomonas putida*, *Shigella dysenteriae*, *Shibrio cholerae*, and *Bacillus subtilis* have all been shown to be susceptible to the antibacterial properties of the methanol extract derived from *A. racemosus* roots
8. Anti-fungal: Shatvari root extract offers strong defense against fungal diseases such *M.globosa*, *Malassezia furfur*, and *candida*²².
9. Antioxidant: Shatavari's methanolic extract has antioxidative qualities. While lipid peroxidation declines, there is a notable rise in enzymes such as catalase, superoxidase demutase, and ascorbic acid. Flavanols such as racemofuran, asparagamine A, and racemosol are also responsible for the antioxidant properties. Aqueous extract, both crude and refined, offers defense against radiation-induced protein thiol loss. Asparagamine A and racemofuran shown antioxidant efficacy against DPPH. The observed antioxidant property was anticipated given the phenolic mixes' redox characteristics found in the ethanolic root extracts¹⁷.
10. Anti-depressant: The strong anti-depressant effects of the methanolic extracts are directly linked to the Hepatoprotective: In rodents with CC14-induced liver damage, the alcoholic extracts of Shatavri roots are known to offer protection against elevated levels of alanine transaminase, aspartate transaminase, and soluble phosphatase. When ethanolic Shifali Thakur et al. prescribe Shatavari (*asparagus racemosus*), the best female reproductive tonic, SGOT, SGPT, serum bilirubin, and serum antacid phosphatase levels in rats with paracetamol-induced liver damage increase. Roots extract and invert in their levels demonstrating the hepatoprotective function in the International Journal of Research and Review (ijrrjournal.com) 79, Volume 8, Issue 5, May 2021¹⁸
11. Anti-diarrheal: After consuming charcoal meal, PGE2 induced enter pooling, and the ethanolic and aqueous concentrates appeared to have an inhibitory effect on gastrointestinal

tract motility, using loperamide as a sort of prospective therapy.²³

12. Immunomodulant Activity: The polysaccharide portion of *A. racemosus* is employed to provide immunomodulatory activity²⁴. Through T cells, it increases resistance, and it caused a significant rise in immunization titers with a clear humoral response. Shatavri contains important auxiliary metabolites called steroidal sapogenins and steroidal saponins (shatavaroside A and shatavaroside B), which may have immunomodulatory effects²⁵
13. Neural Disorders Activity: The potential of *A. racemosus* extract against striatal neuronal damage caused by Kainic Acid (KA) and generated hippocampal damage was investigated²⁶
14. Antiplasmodial Activity: An antiplasmodia activity test was conducted on the ethyl acetate extract of *A. racemosus* roots²⁷
15. Anti-inflammatory effects: 200 mg/kg of *racemosus* root powder can lower tissue weight, the generation of inflammatory cytokines, and the action of neutrophil-mediated myeloperoxidase, indicating that it has anti-inflammatory properties²⁸

CONCLUSION: -

Shatavari is the common name for *Asparagus racemosus* in the Indian traditional system (Ayurveda). In Ayurveda, this herb is well-known. It is cultivated in the Himalayan, Sri Lankan, and Indian tropical regions. The herb is typically used as a tonic for a number of illnesses. It is also regarded as a tonic for female reproduction. The plant's phytochemicals have numerous medicinal qualities and are extensively dispersed. The plant Shatavri is primarily used therapeutically to support women's reproductive systems and to enhance memory and learning. Recognition: There is no conflict of interest.

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