



ASPARAGUS RACEMOSUS, A CLIMBING AYURVEDIC MEDICINAL PLANT: REVIEW ON ITS CULTIVATION, MORPHOLOGY AND MEDICINAL SIGNIFICANCE

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ABSTRACT:

Asparagus racemosus (A. racemosus) is a well-known medicinal plant due its various application in Ayurveda. It contains various type of secondary metabolite active natural products (or ingredients) such as steroids, alkaloids, flavonoids, furan derivatives and essential oils. In the present scenario due to growing catastrophic effect of diseases in human life, researchers are trying to stop synthetic drugs by replacing with herbal drugs. Herbal drug treatments are in general used to provide first-line and public health provider, both to persons abode in faraway areas the place it is the only on hand wellness service, and to people residing in bad areas the place it offers the one cheap relief. In this point of view A. racemosus can show a new path of herbal treatment.

KEYWORD: Asparagus racemosus, Shatavari, rasayana,

INTRODUCTION:

The genus Asparagus consisted of about 300 species around the world, out of which 11 species are recorded in India. A. racemosus is widely distributed across the globe and its distribution ranges from tropical Africa, Java, Australia, Sri Lanka, Southern parts of China and India, but it is mainly cultivated in India¹. A. racemosus is an important medicinal plant which is regarded as a 'rasayana' which means plant drugs promoting general well-being by increasing cellular vitality and resistance³. Use of A. racemosus is mentioned in the ancient literature of Ayurveda (Charaka samhita)⁴. Traditionally, A. racemosus is indicated in epilepsy, vata disorders⁵, brain tonic, helps in regulating cardiac disorders and hypertension⁶. It is extensively used in male genital dysfunctions, oligospermia, spermatogenic irregularities and other male disorders such as painful micturition^{7,8}. It is also explored in Ayurveda formulations for digestive discomfort, indigestion, amoebiasis, piles and debility^{9,10}. In females, prescribed by the doctors in habitual abortions, weakness of the uterus, excessive bleeding during menstruation¹¹. Recent reports and experiments disclosed Shatavari as antidiarrheal, ¹¹ antispasmodic, aphrodisiac⁹ antidyentery, demulcent, diuretic¹³ galactagogue, nutritive,

mucilaginous, refrigerant, stomachic properties and works as a tonic for human beings.¹⁴ It is also known to reinforce the immune system and protect vital organs like heart¹⁵ brain¹⁶ and other organs of the body.

Vernacular names¹

Sanskrit	Satavari
Hindi	Satavari, Shatawar or Satmuli
Bengali	Shatamuli
Marathi	Shatavari or Shatmuli
Gujarati	Satawari
Rajasthan	Norkanto or Satawar

Classification

Kingdom	Plantae
Order	Asparagales
Family	Asparagaceae
Sub family	Asparagoideae
Genus	Asparagus
Species	Asparagus racemosus L

1. CULTIVATION:

1.1 SOIL AND CLIMATE-

Plant usually grows in a variety of soils including medium black having pH 7-8, electrical conductivity 0.15, organic carbon 0.79% and phosphorus 7.3 kg/acre. It can be easily grown in sub-tropical & Sub-temperate agro-climatic regions up to 1400 m.

1.1 LAND PREPARATION-

The soil is given 10-30 cm deep ploughing followed by 1-3 harrowing after few days. Grasses and weeds are removed. The land is properly levelled and 40-45 cms broad ridges are prepared for plantation, leaving 15-10 cms furrow space as a channel for irrigation.

1.2 NURSERY RAISING AND PLANTING-

Seeds are sown in April in raised beds at 5 cms apart to facilitate decay of its hard seed coat by the time monsoon commenced. Germination start in 8 to 10 days after the first shower of monsoon in June. The seedlings were transplanted on ridges at 60 x 60 cms apart and provided bamboo stakes when the plants attained a height of 45 cms. Vegetative propagation is by division of rhizomatous disc present at the base of the aerial stem. The rhizomatous disc develops several vegetative buds around the aerial shoots. The disc is divided in such a way that each piece possessed at least two buds along with 1-3 tuberous roots. These pieces are planted conversing the buds with 1cm of soil followed by irrigation. The sprouting commenced in 8-10 days after plantation.

1.4 WEEDING -Two weeding's are carried out during the rainy months, thereafter one in next 1-3 months.

1.5 IRRIGATION-

Irrigation is given after the rain season is over, at the rate of two irrigations in winter season and one per month in summer season.

1.6 MANURES, FERTILISERS AND PESTICIDES-

The medicinal plants have to be grown without chemical fertilizers and use of pesticides. Organic manures like, Farmyard Manure (FYM), Vermi-Compost, and Green Manure etc. May be used as per requirement of the species. To prevent diseases, bio-pesticides could be prepared (either single or mixture) from Neem (kernel, seeds & leaves), Chitrakmool, Dhatura, Cow's urine etc.

1.7 HARVESTING/ POST HARVESTING-

The plant are harvested after 40 months in winter. The roots are dugout collected and cleared. The roots are peeled off with the help of sharp knife immediately after harvesting. It is observed that in case the roots are not peeled off within a few days, it is a bit difficult to remove the skin as such. In such a condition the roots are kept in boiling water for about 10 minutes, followed by cold-water treatment to facilitate peeling. After removing the skin, it is cut transversely into small pieces and dried in shade.

1.8 YIELD –

The average yield is reported to about 1607 Gms fresh weight per plant after 40 months age. Estimate yield of 5-7 tons/hectare dry roots is reported Precaution may be taken for rodents and rats which occasionally eat tender shoots.

2. MORPHOLOGY

Shatavari is a highly branched, consisting of thorn under shrubs. It is a woody climber plant which is 1-1 m in distance and readily grows up a documentation or over other plant. The leaves of the Shatavari looks like pine needles, uniform and small in size. The roots of the plant have a finger like structure and are clustered in nature. It has a tiny white colored flower while the plant itself is bittersweet in taste.



Figure 1. Pictures of *A. Racemosus* Showing Flowers, Leaves, Fruits, Tuberos Roots

3. PHYTOCHEMICAL CONSTITUENTS:

The root extract of *A. racemosus* was screened for phytochemical constituents to determine the presence of alkaloids, flavonoids, tannins, phytosterols, and glycosides. The ethanolic root extract of *A. racemosus* revealed the presence of alkaloids^{17, 18} flavonoids, tannins, phytosterols, glycosides, carbohydrates, proteins and fats.

3.1 Antibacterial activity

Antibacterial activity is the efficacy of the plant extract to inhibit the growth of bacterial pathogens. Plant extract with antibacterial property depends on its phytochemical constituents. Plant extracts with antibacterial property can be used as a medicinal plant and replace synthetic antibiotics. Methanolic and ethanolic root extract shows antibacterial activity against *Escherichia coli*, *Shigella dysenteriae*, *Vibrio cholerae*, *Bacillus subtilis*, *Staphylococcus aureus*, *Shigella sonnei*, *Shigella flexneri*¹⁹. Owing to its antibacterial property *Shatavari* can be utilized in place of synthetic antibacterial drugs.

3.1 Hypoglycemic activity

Ethanolic root extracts of *A. racemosus* exhibited a significant hypoglycemic activity. Studies with animal models prove a significant increase in the levels of insulin release. The release of insulin further increased with a subsequent increase in the concentration of glucose in blood. When compared to methanol and aqueous extracts, ethanolic extracts showed a significant hypoglycemic activity. In vitro antidiabetic studies also proved the efficacy of asparagus in decreasing the serum glucose levels¹⁰⁻¹¹. Further studies can help in the preparation of antidiabetic drug from *Shatavari* extract which can replace synthetic drugs available in market.

3.3 Immunostimulant activity:

Intra-abdominal sepsis is key causes of mortality following trauma and bowel surgery. Immunomodulating property of *A. racemosus* has been revealed to defend the rat and mice against experimental induced abdominal sepsis (Thatte, Chhabria, Karandikar, & Dayanara, 1987). Oral administration of decoction of powdered root of *A. racemosus* been reported to produce leucocytosis and predominant neutrophilia along with greater phagocytic activity of the macrophages and polymorphs.

3.4 Diuretic activity:

Critical toxicity study revealed no fatality even with the highest dose, and the diuretic study revealed significant diuretic activity in dose of 300 mg/kg (Kumar et al., 2010).

3.5 Antitussive effect

A. racemosus has been commonly used in the treatment of cough and in minor upper respiratory tract infection, exhibiting the antitussive properties. In the experimental setup by Akansha Singh and Sinha (2014) the methanol extract of the roots showed activity against sulphur induced cough in mice which was likened to the codeine phosphate, a drug obtained from opium.

3.6 Antioxidant action

Antioxidants are the moieties which are involved in the prevention of cell damage, common pathway for many diseases. As given by Aarati K the Methanolic extract of the root possess significant anti-oxidant properties when administered through the oral method.

3.7 Problems associated with menstruation

The constituents of *Asparagus racemosus* make it useful in menstrual disorders such as dysmenorrhea, premenstrual syndrome, irregular bleeding during peri-menopausal period and also in situations after menopause. *Asparagus racemosus* contain saponins which hinder the oxytocic activity on uterine musculature, thereby maintain the spontaneous uterine motility, confirming its utility in dysmenorrhea which comprises of painful menstruation without significant pelvic pathology.

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