

Asparagus racemosus (Shatavari): An Overview

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ABSTRACT

Asparagus racemosus is an indigenous medicinal plant of the family Liliaceae 1956; is important for its sapogenin content the precursor of many pharmacologically active steroids. It has antioxidant activity, anti-abortion activity (Shatvarin 1), Antioxytoxic (shatavarin4), spasmodic to uterus, hypoglycemic, hypertensive activity, anticoagulant activity, antiviral activity, anticancer. Antidysenteric activity. This species occurs widely throughout the tropical and subtropical regions. The racemosides saponin content of *Asparagus racemosus* roots revised the structures of the two major saponins of this plant. Shatavarins I, 10 and 1V, 7 further confirmation was provided by the isolation of a new minar steroidal saponin from the *Asparagus racemosus* roots *shatavarin V*, 6 and the demonstration that this saponin in fact possessed the structure previously incorrectly assigned to shatavarin 1V isolation and structure elucidation of the steroidal saponins isolated from the root of this plant.

Keywords: *Asparagus racemosus*, Liliaceae, Antioxytoxic activity.

INTRODUCTION

Asparagus racemosus is an indigenous medicinal plant of the family Liliaceae (Chopra *et al.*, 1956; Anonymous, 1976) is important for its sapogenin content (Rao, 1952; Subramanian and Nair, 1968), the precursor of many pharmacologically active steroids. This species occurs widely throughout the tropical and subtropical regions. Several authors (Trease and Evans, 1978; Jha and Sen, 1983) have shown that the species from different localities often differ in their chemical constituents and contents. In *Asparagus racemosus* during summer, rhizomes and tuberous roots are inconspicuous and aerial portion dies which is the dormant phase. The present investigation was thus under taken to analyse the sapogenin content of the plant from different areas as well as at different growth phases vis-à-vis different seasons.

VERNACULAR NAME (Anonymous, 2003).

English	Willd asparagus
Hindi	Satavar
Bengal	Shatamuli
Gujrati	Ekalkanto, Satavari.,
Kannad	Callagadda
Tamil	Satavali
M.P.	Narbodh, Satmooli
Rajasthan	Satawar
Oriya	Chhotaru, Mohajolo
Telugu	Satavari, Callagad

SCIENTIFIC CLASSIFICATION

Kingdom	Plantae
Division	Angiosperms
Class	Monocots
Order	Asparagales
Family	Asparagaceae
Genus	<i>Asparagus</i>
Species	<i>Asparagus racemosus</i>

SYNONYMS

- *Asparagus rigidulus* Nakai
- *Protasparagus racemosus* (willd)

PLANT PART USED

Tuberous Roots, Leaves, flowers and fruits

**HABITAT**

This climber growing in low jungles is found all over India; especially in Northern India. (Nadkarni, 1954). The plant is a climber growing to 1-2m in length found all over India (Jarald & Jarald, 2007).

DESCRIPTION

Asparagus racemosus is plant with a woody stem that sends runners out, has needle like leaves with small white flowers, (Aviva Romm, 2010), scandant, much branched spinous under shrub with tuberous, short root, stock bearing numerous fusiform tuberous roots 30-100cm thick leaves reduced to minute chaffy scales & spines. Cladodes acicular 2-6 mm, falcate finely acuminate flower white, berries 7mm in diameter, globose, 1-seeded, red (Sharma *et al.*, 2000).

DISTRIBUTION

Throughout India, Tropical and subtropical parts including Andamans and ascending in

the Himalayas up to an altitude of 1500m (Sharma *et al.*, 2000).

PROPAGATION AND CULTIVATION

The plants can be successfully grown in variety of soil, but it prefers sandy well drained soil. They can be propagated by seeds and divisions of rhizomatous disc. Seedling should be planted preferably on ridges, 60 cm to 60 cm apart. Application of 12 tons per hectare increases the yield of roots considerably. Harvesting is recommended 40 months after plantation. Shatavari can also be propagated by shoot tip culture on MS medium supplemented with BAP (0.5mg/l). Shoot tip proliferates into a number of offshoots supplemented with NAA (1.0 mg/l) + kn (0.5 mg/l) (Sharma *et al.*, 2000).

MORPHOLOGY**Macroscopy**

The air dried roots are brown in color, tuberous, elongated, and tapering at both the ends, up to 30-100 cm long. The fresh roots are fleshy and white in color; while on drying it becomes shrunk, longitudinal ridges appeared and the color turned light brown. Outer surface of the fresh root is soft and contains epidermal hairs. Taste is mucilaginous, fracture brittle. The powder drug swells on moistening with water. Roots are cylindrical, fleshy tuberous straight or slightly curved, tapering towards the base & swollen in the middle; white buff colour, 5-15cm in length 1-2 cm diameter (Jarald & Jarald, 2007).

Microscopy

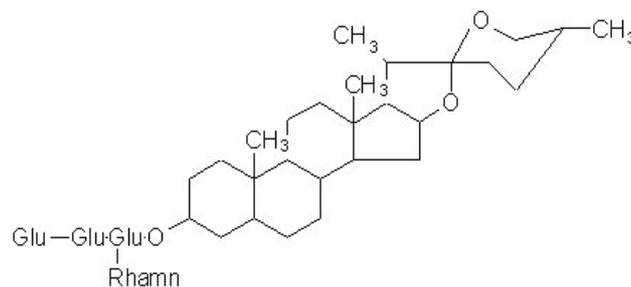
Transverse section of the root is circular or elliptical, periderm is composed of 5-6 layers of compact cells, tangentially elongated thin walled phellem. About 2-3 peripheral layers of cork cells followed by a single layer of phelloderm. The phelloderm is followed by 6-7 layers of cortical cells. Vascular bundles are arranged in the center forming a circular ring. Protoxylems are arranged toward the center; while the metaxylem toward the outer side. There is a wide zone of secondary phloem composed

of sieve tubes, companion cells and phloem parenchyma. A wide zone of secondary xylem, which is composed of vessels, tracheids and xylem parenchyma, follows secondary phloem. The epidermal layers contain numerous epidermal hairs (Anonymous, 2003).

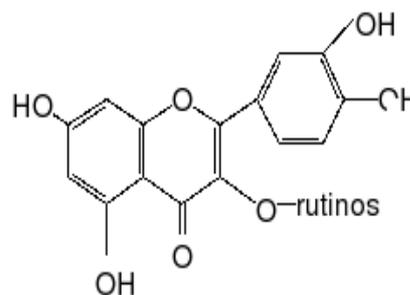
Reported Phytoconstituents

Recently, the racemosides (Mandal *et al.*, 2006) the saponin content of *Asparagus racemosus* roots revised the structures of the two major saponins of this plant. Shatavarins I,10 and 1V,7(Hayes *et al.*, 2006a). further confirmation was provided by the isolation of a new minar steroidal saponin from the *Asparagus racemosus* roots (Hayes *et al.*, 2006b) *shatavarin V*, 6 and the demonstration that this saponin in fact possessed the structure previously incorrectly assigned to shatavarin 1V (Jadhav and Bhutani, 2006; Ravikumar *et al.*,1987) isolation and structure elucidation of the steroidal saponins isolated from the root of this plant. A limited number of steroidal saponins have been reported previously from the roots of this plant, with the major one being shatavarins 1 and 4 (Ravikumar *et al.*, 1987; Joshi and Sukh, 1988; Jadhav and bhutani, 2006) shatavarin V (Hayes *et al.*, 2006b) and Immunoside (Handa *et al.*, 2003). From the herbs of *Asparagus racemosus* (roots) sarsapogenin, saponins A4-A7, Glycosides of quercetin, rutin, hyperoside and diosgenin, quercetin 3-glucuronide, sitosterol and stigmasterol alongwith their glucosides, two spirostanolic and furostanolic saponins and sapogenin, 4 saponins, viz., shatavarin 1 to 4, polycyclic alkaloid, asparagamine A and disaccharide in roots are reported (Lopez *et al.*, 1996).

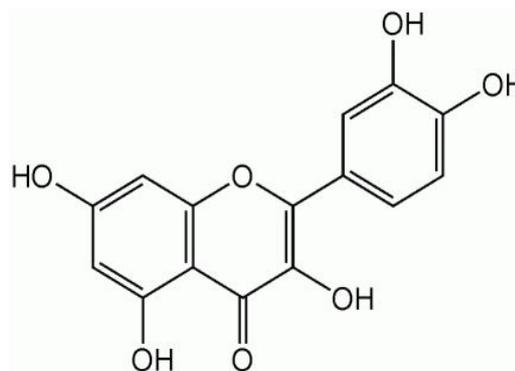
Structures of some reported of phytoconstituents *Asparaguracemosus*



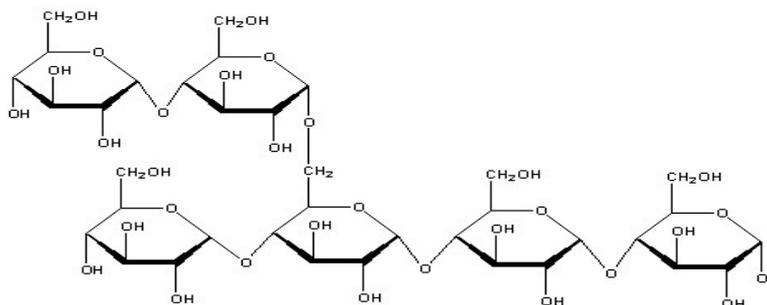
Shatavarin



Rutin



Quercetin



Polysaccharides

SUBSTITUTES AND ADULTERANTS

It is reported that in Indian markets apart from *Asparagus racemosus*, the roots of *Asparagus sarmentosus* Linn., *Asparagus curillus* Ham., *Asparagus filicinus* Ham. And *Asparagus sprengeri* Regel are also being probably sold in the name of Shatavari (Sharma *et al.*, 2000).

PHARMACOLOGICAL ACTIVITIES

Anticancer activity, antidysenteric activity, antifungal activity, antibacterial activity, anti-inflammatory activities, antiulcer activity, antioxidant activity, anti-abortifacient activity (Shatvarin 1), Antioxytoxic (shatavarin4), spasmotic to uterus Hypoglycemic, hypertensive activity, anticoagulant activity (Sharma *et al.*, 2000).

FORMULATIONS AND PREPARATIONS

Shatavari kalpa, Eranda paka, Puga khanda, Bhrihatchagaladya ghrita, Phalaghrita, Narayana taila, Shatavaryadi ghrita, Garbhachintamani rasa, Vishnu taila Shatavari modaka, Shatamoolyadi lauha, Shatavari panaka, Brihatashwagandha ghrita (Sharma *et al.*, 2000).

MEDICINAL USES

Plants for a future can not take any responsibility for any adverse effects from the use of plants. Always seek advice from a professional before using a plant medicinally. Alterative; Antispasmodic; Aphrodisiac; Demulcent; Digestive; Diuretic; Galactogogue; Infertility; Women's

complaints. Root is employed in Diarrhea as well as in cases of chronic colic and dysentery. "Root boiled with some bland oil, is used in various skin diseases 'root is boiled in milk and the milk is administered to Shatavari (this is an Indian word meaning a woman who has a hundred husbands) is the most important herb in ayurvedic medicine for dealing with problems connected women's fertility. It is taken internally in the treatment of infertility, loss of libido, threatened miscarriage, menopausal problems, hyperacidity, stomach ulcer and bronchial infection. Externally it is used to treat stiffness in the joints (Bown, 1995). The root is used fresh in the treatment of dysentery. It is harvested in the autumn and dried for use in treating other complaints. The whole plant is used in the treatment of diarrhea, rheumatism, diabetes and brain complaints. It is also Used in Management of behavioral disorder and minimal brain dysfunction (Sheth *et al.*, 1991). The rhizome is a soothing tonic that acts mainly on the circulatory, digestive, respiratory and female reproductive organs. The root is alterative, antispasmodic, aphrodisiac, demulcent, diuretic, galactogogue and refrigerants (Chopra *et al.*, 1986).

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