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PHARMACOLOGICAL PROFILE OF ASPARAGUS RACEMOSUS WILLD (SHATAVARI) WITH EVIDENCE

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ABSTRACT

The plant *Asparagus racemosusWilld*(*Shatavari*) is one of the major drug used extensively in *Ayurveda* and also in other traditional systems of medicine, like Unani, Siddha etc. It is indigenous to India, seen in Asia and Africa. It is a woody climbing plant; both the rhizome and whole plant are useful as medicine in a wide range of diseases. There are many more references about varieties, forms of preparation, doses, substitute and adulterants, side effect etc. in detail. It has been used in medicine for lack of milk in lactating mothers, bleeding through urethra, epilepsy, hoarseness of voice, night blindness, scanty urination, erysipelas and cough etc. It is rich in chemicals like steroidal saponin (Shatavarin-1 to 6), carboxylic acid, isoflavones, polycyclic hydrocarbons, furan compound, flavonoids, carbohydrates, a trace of minerals, sterols, kaempferol and some miscellaneous constituents. The main pharmacological activities observed in this study Galactogogue, antioxidant, aphrodisiacs, antidepressant, hepatoprotective, antiemesis, anticonvulsant, antiulcer and anti-anxiety activity etc. Further research and investigation requires for its bioactivity, mechanism of action, pharmacotherapeutics, toxicity, standardization and safe use of this vital drug of *Ayurveda*. The present review incorporated a detailed account of the plant highlighting its medicinal uses, pharmacological activity on the experimental, preclinical toxicological study along current research potentials.

Keywords: *Shatavari, Asparagus racemosus Willd,* Antioxidant, Aphrodisiac, Rejuvenate

INTRODUCTION

Plants have been used in the traditional system of medicine for thousands of years; based on experience and folk claimed observations in a wide range of clinical conditions from mild to severe[1]. In recent years focus on plant research and demand have increased all over the globe. Huge experiences have been gathered to highlight the immense potential of medicinal plant[2].The plant *Asparagus racemosusWilld* is an important medicinal plant belonging to the family Asparagaceae has more than 300 species of genus Asparagus widely distributed in Asia and Africa. It is a woody climbing plant found in temperate and tropical regions, contains phytochemicals like saponin (Shatavarin-1 to 6), carboxylic acid, isoflavones, polycyclic hydrocarbons, furan compound, flavonoids and carbohydrates etc. extensively used in *Ayurveda* and another system of traditional medicine because of its broad-spectrum pharmacological activities. This drug classically denoted with various Sanskrit names, like-In *Paraskara Guhya Sutra Shatavari* is mentioned in the context of *Mula Vidh*i(PGR. 2/24). It is also mentioned in *Atharva Parishishta*(5/1/5 and 7/1/5) and by *Panini* (4/1/123). In *Taitariya Aranyak* (10/1/7) described a herb named *Shatamoola* which is believed to be *Shatavari*. *Shyana* explained the meaning of *Shatavara* as either it has 100 roots/spines or which cures a countless number of health ailments. Various parts of *Shatavari* are extensively used in *Ayurveda, Unani, Siddha* and *Amchi* system of medicines. It is having *Madhura, Tikta Rasa* (Sweet & Bitter) *Guru* and *Snigdha* (Heavy to digest and Unctuous too), *Sheeta* (Cold potency) and *Madhura Vipaka* used in *Stanya Kshyaya, Artava Kshyaya, Raktapitta, Arsha, Atisara, Grahani* and *Kasa* etc. *Maharshi Charaka* denoted it as *Atirasa (Shatavari)* under *Vayasthapana Mahakashaya* (Anti-ageing Group) and *Maharshi Kashyapa* indicated this drug for infertility.

BOTANICAL CATEGORIZATION:

Kingdom: Plantae; *Clade*: Tracheophytes; *Clade*: Angiosperms; *Clade*: Monocots; Order: Asparagales; Family: Asparagaceae; Subfamily: Asparagoideae; Genus: *Asparagus* and Species: *A. racemosus*.

SYNONYMS:

Shatapadi & Bahusuta Numerous succulent roots), Peevari (Tuberous root having succulent), Vari (Best medicine), Satavirya (Have multiple pharmacological efficacies), Suksmapatra (Cladodes of Shatavari is very thin), Atirasa (Rich in water element), Adhakantaka (Recurved spine) and Narayani (Auspicious, divine).

VERNACULAR NAMES:

Hindi - *Satavar*; English– Buttermilk root, Tamil – *ShimaiShadavari,* Marathi / Gujarati - *Satavari*, Kannada - *Aheruballi*, Odia- *Vari*.

CLASSICAL CATEGORIZATION:

In *CharakaSamhita: Balya* (Strength and immunity promoting herbs), *Vayasthapana* (Anti-ageing group of herbs) and *Madhura Skandha* (Sweet tasting group of herbs); in *Sushruta Samhita*: *Vidarigandhadi, Pitta Shamaka* (Pitta balancing group of herbs) and *Kantaka Panchamula*; in *Vagbhata- Vidarigandhadi Gana*and in *BhojanaKutuhalam* mention-its sprouts are aphrodisiac and alleviates three *Dosha*.

MORPHOLOGICAL CHARACTERISTICS:

Shatavari is a scandent, much-branched, spinous under-shrub with tuberous roots. The roots are fleshy, spindle-shaped, light ash-coloured externally and white internally, more or less smooth when fresh, but on drying, develop longitudinal wrinkles and lack any well-marked odour. Branches are modified into cladodes with long basal decurved spines.

Floral characteristics

Flowers are white, fragrant, and minute, about 3 mm long and occur in solitary or fascicled, 2.5–5 cm long, racemes. Fruit is a three-lobed, red coloured berry, up to 6 mm in diameter, with mottled seeds and oily endosperm. Flowering and fruiting occur in December–January.

GEOGRAPHICAL DISTRIBUTION:

Shatavari is common throughout the tropical and subtropical regions, particularly central India. It is

also found up to an altitude of 1500 m in the subtropical Himalayas. By nature, the plant is xerophytic and prefers the semi-arid to subtropical, cool environment[3, 4].

PROPAGATION, PLANTING AND HARVESTING:

Both seeds and crown rhizomes can be used for propagation. However, seeds are preferable on account of high production that makes up for low germination percentage in cultivation. Seeds may be collected from March to May when their colour changes from red to black.

VARIETIES:

In *Nighantus* (Lexicons) two varieties of *Shatavari* i.e., *Shatavari* and *MahaShatavari* have been described. Some people consider *Shatavari* as *Shati Veerya* and *Maha Shatavari* as *Sahasra Veerya*. Botanical sources have suggested them as *Asparagus racemosus Willd* and *Asparagus sarmentosus Linn* respectively. In comparison *Asparagus sermentosa* Linn is a larger climber and have tuberous root. Some people identified *Asparagus adscendens* as *Maha Shatavari*; but it is originally considered as Sweta *Mushali*. Another species *Asparagus filicinus Ham*, which is thorn less plant distributed in the Himalayan region is identified as *Shatavari*. Some other species of genus asparagus also refer in context of *Shatavari*; Particularly Nepalis Asparaus, i.e., *A.Curillus Buch Ham ex Roxb*. and *Asparagusgonoclados Baker, A. Sprengeri Regal*.

PARTS USE: Root, Sprouts &Leaves.

CHEMICAL CONSTITUENTS:

It possesses a wide range of phytochemical constituents like-

Steroidal saponins, known as Shatvarins. Shatvarins-I to VI are present. Shatvarins I is the major glycoside with 3-glucose and rhamnose moieties attached to sarsapogenin; Oligospirostanoside referred to as Immunoside; Polycyclic alkaloid-Aspargamine A, a cage-type pyrrolizidine alkaloid; Isoflavones-8-methoxy-5, 6, 4-trihydroxy isoflavone-7-0-beta-D-glucopyranoside;Cyclic hydrocarbon-Racemosol, Dihydrophenantherene; Furan compound-Racemofuran; Carbohydrates-Polysacharides, mucilage; **Flavonoids**-Glycosides of quercitin, rutin and hyperoside are present in flower and fruits; **Sterols**-Roots also contain sitosterol, 4, 6-hydroxy-2-O (-2-hydroxy isobutyl) benzaldehyde and un-decanylcetanoate; Trace minerals are found in roots-zinc (53.15), manganese (19.98 mg/g), copper (5.29 mg/g), cobalt (22.00 mg/g) along with calcium, magnesium, potassium zinc and selenium; Kaempferol along with Sarsapogen in isolated from woody portions of tuberous roots and Miscellaneous chemical contents are essential fatty acids-Gamma linoleinic acids, vitamin A, B1,B2,C,E,Folic acid, Diosgenin, quercetin 3-glucourbnides, Arginine, Tyrosine,. Tannin, Resin, [5-7].

PHARMACODYNAMICS (RASA PANCHAKA):

Rasa - Madhura, Tikta; Guna – Guru, Snigdha; Vipaka- Madhura; Veerya – Sheeta and widely use to correct vitiation of all Doshas.

INDICATIONS:

Vrushya (Aphrodisiac); *Kshayajit* (Useful in chronic respiratory disorders, tuberculosis); *Asrajit* (Useful in blood disorders), *Ayushya, Vaya Sthapani, Rasayana Vara*(A very good anti-ageing medicine), *Shukrala* (Improves sperm and semen quantity and quality), *Stanyada* (Improves breast milk production), *Medhya (*Improves intelligence), *Pushtida* (Nutritious, improves nourishment), *Chakshushya* (Improves vision, good for eyes, useful in eye disorders), *Pitta Saraka (*Useful in bleeding disorders such as Nasal bleeding, Menorrhagia, Rectal bleeding etc), *GulmaJeet* (Useful in abdominal tumors), *AtisaraJeet* (Relieves diarrhea), *Shophajeet (*Reduces swelling, anti-inflammatory), *Retas Doshahara (*Improves sperm quality), *Garbhaprada* (Relieves infertility) and *Kshataksheenahara* (Relieves chest injury, injury with bleeding).

USES:

Sr No	Formulation	Route of Drug administration	Indication	Reference
1	*Shatavari* along with *Gokshura (Tribulus terrestris*) are both of equal quantity boiled with milk.	Orally	Bleeding through urethra and burning pain.	*Charaka Samhita Chikitsa Sthana* 4th Chapter
2	*Shatavari Choorna* with milk	Orally	*Raktatisara* (Stop bleeding with loose motion)	*Charaka Samhita Chikitsa Sthana* 10th Chapter
3	*Shatavar*i grinded with *Shatad-houtaGhrita*	Locally	*Visarpa* (Erysipelas)	*Charaka Samhita Chikitsa Sthana* 11th Chapter
4	3-5gms *Shatavari Choorna* with milk	Orally	*Apasmara* (Epilepsy)	*Charaka Samhita Chikitsa Sthana* 16th Chapter
5	*Shatavari Choorna* along with *Go-mutra*	Orally	*Swarabheda* (Hoarseness of voice)	*Sushruta Uttara Tantra* 53rd Chapter
6	Leaves fried with Ghee	Orally	*Naktandhya* (Night blindness)	*Ashtanga Samgraha Uttara Sthana* 13th Chapter
7	*Shatavari Choorna* with cold water	Orally	*MutraKrichra* (Scanty urination)	*Harita Samhita*
8	Root juice of *Shatavari* with milk	Orally at early morning	Pain and burning sensation in *Pittashoola* (Stomachache)	*Chakradutta*
9	The root boiled with milk	Orally	Raktapitta (Bleeding disorder	*Bhava Prakasha Nighantu*
10	Paste taken orally with milk followed by milk associated food	Orally	*Atisara* (Loose motion)	*Vaidya Manoram*
11	*Ghrita* formulation of *Shatavari* and *Nagabala (Grewia hirsuta Vahl)*	Orally	*Kasa* (Cough)	*SushrutaUttaraTantra*52nd Chapter
12	*Shatavari* roots grinded with milk	Orally	*StanyaKshyaya* (Inadequate breast milk)	*Yogaratnakara*

***Shatavari Ankura* (Sprouts) qualities:**

The sprouts of *Asparagus racemosus (Shatavari-Ankura*) is *Kapha Pittahara* (Balances *Kapha* and *Pitta*), *Arshohara* (Useful in hemorrhoids) and *KshayaPaha* (Useful to improve depleted body tissues, chronic respiratory conditions, tuberculosis).

FORMULATION:

Shatavari Ghrita, Shatavari Taila, Shatavari Mandura, Shatavari Modaka, Shatavaryadi Kwatha, Mahanarayana Taila, Shatavaryadi Choorna, ShatavariGuda and Narasimha Churna etc.

DOSAGE:

Fresh juice 10-20 ml; Decoction (*Kashaya)* – 50-100 ml and Powder 3-6 gms.

SIDE EFFECTS:

For women having high estrogen, *Shatavari* mimics estrogen and cause symptoms like breast tenderness. In a few patients, *Shatavari* helps to improve breast size, and few have reported allergic reactions to it.

CONTROVERSY, SUBSTITUTES AND ADULTERANTS:

There are different species from which those tuberous roots may be collected. *Asparagus racemosus Willd, Asparagus adscendens Roxb.* are generally used in trade. Chlorophytum tuberosum, *C. borivilianum* (*Safed Musali*) are also used as a source of *Shatavari* sometimes. Other species like *Asparagus filicinus Buch Ham, A. sermentosaLinn, A. sprengeri R, A. curillus Buch Ham ex Roxb*. and *A. gonocladus Baker* also used as a substitute and pilled root of *Asparagus*

adscendens Roxb is used as adulterants. Also, dried tubers of *A. gonocladus Baker* are employed as an adulterant or substitute for Indian Atees (Aconitum *heterophyllum*. In classics, *Shatavari* is used as a substitute for *Ashtavarga -Meda (Polygonatum verticillatum L.) Mahameda (Polygonatum cirrhifolium (Wall) Royle*)[8-10].

PHARMACOLOGICAL ACTIVITY:

Galactogogue[11], Antioxidant[12], Aphrodisiac[13], effect on uterus[14], Anti depressant[15]Analgesic and Antidiarrhoeal activity, Cerebroprotective activity Antiparasitic activity, Hepatoprotective[16], Adoptagenic[17], Antiamnesic[18], Anticonvulsant[18], Antianxiety[20], Antisecretory[21] and Anti-ulcer activity , Anti neoplastic activity[22], Neuroprotective[23], Immuno adjuvant[24], Nephroprotective[25], Immunmomodulatory[26] , Analgesic and Antidiarrhoeal activity, Cerebroprotective activity Antiparasitic activity,Anti inflammatory[27], Antibacterial[28], Analgesic[29], Antipyeretic[30], Antitussive[31], Hypolipidemic[32], Antifungal[33], Antiurolithiatic[34], Analgesic and Antidiarrhoeal activity, Cerebroprotective activity Antiparasitic activity, Antiepileptic, Gastrointestinal sedative activity, effect on benign prostatic hypertrophy[35], Anti diabetic[36], Wound healing[37], effect on cardiovascular system[38], Molluscidal activity, Anti oxytocic, Antidysenteric, Antiabortificiant, Hypotensive, Anticoaglent, Enzymetic, Antidiarrhoeal effect[39], Teratogenic effect[40], Anti anaemic[41] and Anti thrombocytopenic effect[42], Antistress[43],Versatile female tonic[44], Cytotoxic[45]anti amoebic, Antiviral, Anti-cancer, Phagocytic and Miscellaneous activities[46].

CONCLUSION

Asparagus racemosus is one of the most vital rejuvenate plants in traditional medicine, having a wide range of pharmacological & medicinal activities. Hence extensive research is required to explore its therapeutic uses to fight against various other diseases. More study is needed for the identification of bioactive compounds, their mechanism of action, pharmacotherapeutics, standardization for safe clinical practice.

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