

Morphology, Anatomy and Phytochemical Analysis in *Asparagus Racemosus* Wild. (1) (Asparagaceae)

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Abstract: *Asparagus racemosus* wild. (1) i. e. Shatawari This plant deals with the family Asparagaceae. Plant was collected from YogeshwariMahavidyalay medicinal garden campus, Ambajogai during November 2021 for study of its morphological, anatomical and phytochemical analysis. The biochemical test is positive in all three parts except tannin is absent in leaf. phytochemical comparative analysis in root, stem, leaf, i. e. highest amount of total alkaloids is in root 11%, magnesium 3.9%, Nitrogen 0.9%, Calcium 2.7%, Protein 3.2%, Potassium 20% and Total carbohydrate 4.7% in root compared to stem and leaves, but Sodium is highest in stem compared to root and leaves i. e. 2.3%. The detailed pharmacognostic studies of *A. racemosus* wild. (1). have not been reported so far. Therefore, an attempt has been made to phytochemical studies of the plant of *A. racemosus* wild. (1).

Keywords: Asparagus, anatomical, photochemistry

1. Introduction

Asparagus racemosus wild. (1) Belongs to family Asparagaceae, commonly known as 'Shatawari' 'perennial twining shrub, found throughout India in tropical areas. Traditionally it is recommended for the treatment of anemia, preventing Alzheimer's disease. Studies have shown that a diet rich nutritionally dense vegetables. The main active compounds in Asparagus medicinal properties are glutathione

Shatawari means "who possesses a hundred husbands or acceptable to many". It is considered both a general tonic and a female reproductive tonic. Shatawari may be translated as "100 spouses", implying its ability to increase fertility and vitality. In Ayurveda, this amazing herb is known as the "Queen of herbs", because it promotes love and devotion. Shatawari is the main Ayurvedic rejuvenative tonic for the female,

Importance of *Asparagus racemosus*

Asparagus racemosus (family Asparagaceae) also known by the name Shatawari is one of the well-known drugs in Ayurveda, effective in treating madhurasam, madhurvipakam, seet-veeryam, somrogam, chronic fever and internal heat. This herb is highly effective in problems related with female reproductive system. Charak Samhita written by Charak and AshtangHridayam written by Vagbhata, the two main texts on Ayurvedic medicines, list *Asparagus racemosus* (*A. racemosus*) as part of the formulas to treat women's health disorder. *A. racemosus* is a well-known Ayurvedic rasayana which prevent ageing, increase longevity, impart immunity, improve mental function, vigor and add vitality to the body and it is also used in nervous disorders, dyspepsia, tumors, inflammation, neuropathy, hepatopathy. Reports indicate that the pharmacological activities of *A. racemosus* root extract include antiulcer, antioxidant, and antidiarrhoeal, antidiabetic and immunomodulatory activities. A study of ancient classical Ayurvedic literature claimed several therapeutic attributes for the root of *A. racemosus* and has been specially recommended in cases of threatened abortion and as a

galactagogue. Root of *A. racemosus* has been referred as bitter-sweet, emollient, cooling, nervine tonic, constipating, galactagogue, and aphrodisiac, diuretic, rejuvenating, carminative, stomachic, antiseptic and as tonic. Beneficial effects of the root of *A. racemosus* are suggested in nervous disorders, dyspepsia, diarrhoea, dysentery, tumors, inflammations, hyper dipsia, neuropathy, hepatopathy, cough, bronchitis, hyperacidity and certain infectious diseases

Scientific Classification

Kingdom: Plantae
Division: Angiosperms
Class: Monocots
Order: Asparagales
Family: Asparagaceae
Genus: Asparagus
Species: *A. racemosus*

2. Materials and Methods

Collection and authentication of plant material:

The selected variety of *Asparagus racemosus* was collected from Medicinal Gardening, Yogeshwari Mahavidyalaya Campus, Ambajogai, Dist. Beed, in November 2021. The herbarium of the plant was made by following standard procedure of (Honda *et al*, 1991).

Macro and Microscopical studies:

The macroscopic study of the selected plant species was described with the help of flora provided by (Jain and Rao, 1977). The plant material was air dried for 4-5 days in hot air oven. The samples were stored in airtight container of about 25-27°C and grounded to form powder whenever required and filtered through sieves of 345 micron sized. Qualitative study was done by taking hand cut sections of the plant part in transverse planes, thin and best section were used for mounting after the staining and dehydration were completed. Quantitative study was done for stomatal number; stomatal index and palisade ratio were done by slide preparation after clearing with chloral hydrate solution. The complete observation and photographs of the parts was

done under the microscope Olympus CX3 and compatible software (Magnus Pro image analysis software). The powder studies were done by following the method (Kokate, 2006).

Estimation of total starch:

Presence of total amount of starch in the selected drug was calculated on the basis of Montgomery method Anonymous (2000) by the use of spectrophotometer (Thermoelectronic, Double Beam UVvis Spectrophotometer). 10% of the plants homogenate tissues in 80% ethanol prepared and centrifuged for 15 minutes. 4ml distilled water was added to the residue which heated on water bath and macerate with the help of glass rod. The percentage of starch was calculated by formula: % sugar = $\frac{\text{Con. At. UV X Ext value} \times 100}{1000}$.

3. Result and Discussion

Morphology

The *A. racemosus* is a climber growing to 1-2m throughout the India, especially in Northern India (Nadkarni, 1954). The plant has needle like leaves with small white flowers, highly branched, under shrub with fusiform tuberous root system, tuberous roots may be 30-100cm long with 0.7 to 1.5 cm diameter. Branches are modified into cladodes with spines. Flowers occur solitary or fascicled 2-2.5cm long racemes. Fruits are in form of seeds occurs in December to January.

Microscopic characters:

The transverse section of root is circular with 5-6 layers of compactly arranged cells of periderm; phellem was tangentially elongated thin walled structure. The single layered phelloderm is followed by 6-7 layers of cortical cells. The vascular bundles are present in center forming circular ring. The epidermis contains numerous epidermal

hairs. Inner side to the endodermis single layered pericycle composing with parenchymatous cells formed.

Transverse section of young stem shows presence of ridges and furrows, large pith with irregularly arranged vascular bundles. Epidermis with thick outer layer of cuticle followed by cortical region. 3-4 layers of collenchymatous cells were seen to be differentiated in cortical region. Vascular bundles to be found Satterley arranged where larger placed at inner side while smaller at peripheral region. Centrally located pith was composed from larger sized cells.

Cladodes in its horizontal section showed triangular shaped with single layer of epidermis followed by 2-3 layers of palisade cells with centrally located vascular tissues with xylem and phloem to be seen.

Table 1. Shows biochemical test which is positive in all three parts except tannin is absent in leaf. In table no.2 shows phytochemical comparative analysis in root stem leaf, i.e. highest amount of total alkaloids is in roots 11%, magnesium 3.9%, Nitrogen 0.9%, Calcium 2.7%, Protein 3.2%, Potassium 20% and Total carbohydrate 4.7% in root compared to stem and leaves, but Sodium is highest in stem compared to root and leaves i.e. 2.3%.

Table 1: Biochemical analysis of metabolites in *Asperagusracemosus* plant parts

Sr. no	Test	Root	Stem	Leaf
1	Starch	+	+	+
2	Protein	+	+	+
3	Fat	+	+	+
4	Tannin	+	+	-
5	Saponin	+	+	+
6	Glycoside	+	+	+
7	Alkaloids	+	+	+

Table 2: Phytochemical analysis in *Asperagusracemosus* plant parts

Sr. no	Plant part	% of total alkaloids	Magnesium	Nitrogen	Calcium	Sodium	Protein	Potassium	Total carbohydrate
1	Root	11%	3.9%	0.9%	2.7%	1.5%	3.2%	20%	4.7%
2	Stem	6%	1.6%	0.5%	1.2%	2.3%	2.1%	2.1%	2.1%
3	Leaf	7.3%	0.7%	0.3%	1.5%	1.2%	2.1%	1.5%	0.7%

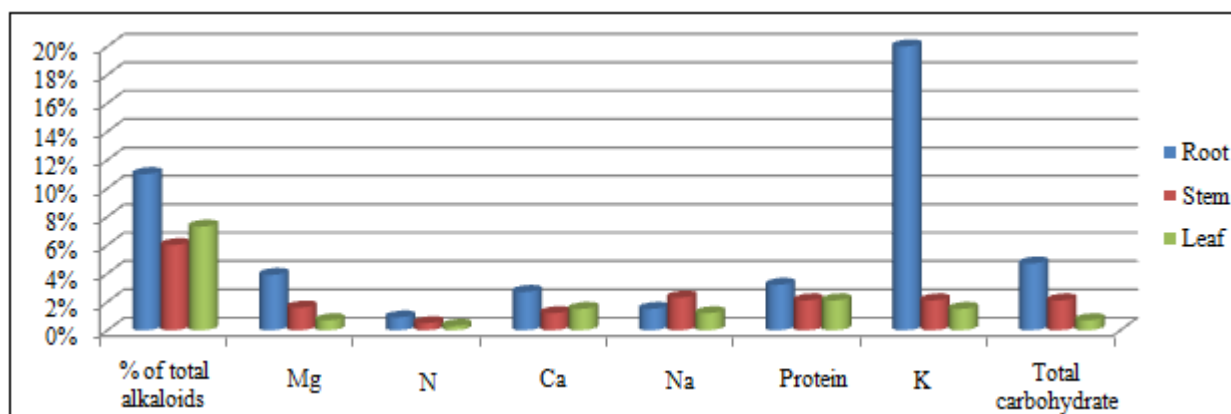


Figure: Graph of Phytochemical analysis in *Asperagusracemosus* plant parts

4. Discussion

Therapeutic importance of medicinal plants mainly depends on the quality and quantity of chemical components that start with wrong identification of plant material (Woisky

&Salatino, 1998). There are number of evidences which reveals this problem by pharmacognostic studies of medicinal plants in present time (Chanda, 2014). Anatomical method of medicinal plants is based on the study of

mounting of thin sections of them under compound microscopes.

Each and every plant has characteristic histology with respect to its part and the study of the tissue, cell walls, and cell contents observed when mounted in stains, reagents or any mounting media. The preliminary biochemical analysis shows presence of starch, protein, fats, tannin, saponins alkaloids in root, stem and leaves of *A. racemosus*. While further pharmacological investigations are required to study the therapeutic values in *A. racemosus*.

5. Conclusion

Each and every plant has peculiar morphological, anatomical, histological characteristics to its ecological conditions. The anatomical features of *A. racemosus* showed presence of structures like pericycle, vessels in root, stem and leaves with certain characters. The biochemical screening shows presence of different components like starch, protein, alkaloids, saponins etc. There are much more chances to increase the knowledge about *A. racemosus* for its anatomical and phytochemical screening with modern techniques.

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