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PHYSICOCHEMICAL ANALYSIS OF SHALPARNI [DESMODIUM GANGETICUM. DC] WHOLE PLANT

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ABSTRACT

Introduction: *Shalparni* is one of the most powerful herbs used in the traditional system of *Ayurveda* that fosters indispensable medicinal and therapeutic benefits. Family Fabaceae is commonly found throughout most parts of India and Himalayas. The plant is also used in preparation of various indigenous medicine. *Shalparni* is endowed with variety of diseases like *Shoth, Jwar, Vatrog, Vamam, Shawas, Atisar, Vish, Kshaykas*. **Objective**: To investigate macroscopic, microscopic, qualitative physiochemical parameter of *Shalparni* (*Desmodium gangeticum* Linn *DC)* whole plant. **Material and Method:** An establishment of pharmacogenetic standard on identification, purity, quality and classification of herbal plant is required. Microscopic characteristics were observed under a light microscope. Physicochemical properties including total Ash value, acid insoluble ash, water soluble and alcohol soluble extractive were determined. **Result:** These findings will be useful towards establishing pharmacogenetic standards on identification, purity, quality and classification of the plant drug research. **Discussion:** The species *Desmodium gangeticum* is plant that has beenconfused with other species due to their relative similarities, therefore many a times some other materials are mixed or adulterated during the preparation of medicines. As standardization of a crude drug is an integral part of establishing its correct identity for its inclusion in herbal pharmacopoeia. For which pharmacogenetic parameters and standards must be established. **Conclusions:** Physicochemical study of whole plant is helpful in sample identification and to ensure quality and purity standards of *(Desmodium gangeticum* Linn *DC).*

KEYWORDS: Desmodium gangeticum Linn DC, Physicochemical investigation, Pharmacogenetic standardization.

INTRODUCTION

Desmodium gangeticum Linn DC, Fabaceae family known as *Shalparni* in *Marathi*. It is one of most important herbs in ayurveda. The root of this plant is one of the herbs in *Dashsmool* which has numerous properties. It is a nearly erect undershrub, 0.6 to 2 meter high, growing will almost throughout India in the plains and western ghat, and up to 1500 meter in the north up to Sikkim.[1]

Shalparni possesses *Titkta, Madhur rasa, Guru, Snighdha Guna, Ushna virya* and *Madhur vipak* as a therapeutic property.[2] It is used in diseases like *jwar, prameh, arsh, shodha, atisar* and *kshaya* etc.[3] *Shalparni* is loaded with wealth of bioactive compounds which deliver umpteen health benefiting properties.

In *Vedic* quoted it is *Tridoshshamak, kaphanissarak, vrishya, mutral, balya, bhruhan, hrudya, shodhahara, deepan, snehan, jwaraghn, shonitshapan* etc.[4] The established pharmacological activities of *Shalparni* include anti-inflammatory, analgesic, antibacterial, antidiabetic, antiulcer, anticholinesterase, smooth muscle relaxant, antipyretic, CNS stimulant and depressor, and bronchial muscle relaxant.[5,6]

Botanical name- *Desmodium gangeticum Linn DC.*

Family- Fabaceae.

Vernacular names

- ***Hindi***- *Sarivan, Salpan*
- ***Marathi***- *Saalvan, Sarvan*
- ***Bengali*** – *Shalpaani*
- ***Gujarati***- *Saalvan, Sameravo*
- ***Kannada***- *Murelchonne, Kolakannaru*
- ***Telugu***- *Kolakuponna, Kolaponna*

Synonyms - *Sthira, Triparna, Vidarigandha, Amsumati.*

Classical categorization

It is included in following *Gana* and *Varga*

Sr. no.	*GRANTHA*	*VARGA / GANA*
1	*Charaka Samhita*	*Shothahara dashemani, Balya dashemani, Snehopagadashemani, Angamardaprashmanadashemani, Madhuraskandhas*
2	*Sushruta Samhita*	*Vidarigandhadi gana, Laghupanchmool.*
3	*Ashtanga samgraha*	*Vayasthapan gana,*
4	*Dhanvatari Nighantu*	*Guduchyadi varga*
5	*Sodhala Nighantu*	*Guduchyadi varga*
6	*Madhava Dravyaguna*	*Vividhaushadhi varga*
7	*Hridayadipaka Nighantu*	*Chatushpada varga*
8	*Madanpal Nighantu*	*Abhayadi varga*
9	*Kaidev Nighantu*	*Aushadhi varga*
10	*Bhavaprakasha Nighantu*	*Guduchyadi varga*
11	*Shaligrama Nighantu*	*Guduchyadi varga*
12	*Priya Nighantu*	*Haritakyadi varga*

MATERIALS AND METHODS

Plant material collection

Sample of *Desmodium gangeticum Linn DC* were collected from departmental medicinal plant garden of shri ayurvedic Mahavidyalaya, Nagpur of Maharashtra. Plant material that is whole plant were dried in shed and ground to a coarse powder.

Macroscopic analysis[7]

The whole plant was studied macroscopically for important identification points, i.e. odour, taste and texture and for microscopic studies. It is a technique of qualitative evaluation based on the study of morphological and sensory profile of whole drug. *Shalparni* plant is undershrub, 0.6-2 meter tall.

Stem: Irregularly angled, appressed with white hairs.

Leaves: Unifoliate or trifoliate, Alternate, with ovate along to lanceolate in shape measuring 3-3.5 x 2-2.5 cm in size. the margins somewhat wavy, glabrous, green above.

Inflorescence: Terminal and axillary, 15-30 cm long racemes, of few flowered fascicles on somewhat angular rachis.

Flowers: Complete, regular, small pink to purple in colour, arranged in terminal or axillary raceme which after fertilization form pods, having 5-8 seeds with curved beak like ends. The

flower is complete with five hairy sepals (2 mm in size), triangular in shape; five petals (4 mm), violet or white in colour, arranged papilionaceously. Androecium present around single carpel. Flowering occurs from October to December.

Fruit: Pod, sub falcate, 1.2-1.8 cm by 0.2 cm deeply intended on the lower edge, slightly indented on the upper edge; joints 6-8, longer than broad, indehiscent. Sparsely clothed with minute, hooked hairs, the lower edge rounded and upper straight**.**

Taxonomic Position

Kingdom	Plantae
Division	Magnoliophyte
Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Genus	Desmodium
Species	Gangenticum

Microscopic Study

A transverse section was prepared and stained. Microscopy of power was investigated according to method of Kokate (2010). this method allows more detailed examination of the drug and it can be used to identify the organized drug by their known histological characters. It is mostly used for qualitative evaluation of organised crude drug in entire and powdered form.

Stem: Stem appears angular in shape when young but after attaining maturity it becomes irregularly cylindrical. The presence of trichomes was observed at the angular ends of the stem. The single layered epidermis consists of thick walled, transversely elongated cells covered with a thick layer of cuticle. In the cortical region 5-6 layered, thick walled, parenchymatous cells are present below the epidermis while angular parts of the stem showed the presence of some sclerenchymatous cells. The vascular bundles are deltoid in shape in the cortical region, fused with one another to form a continuous cylinder over the large pith. The central pith consists of parenchymatous cells that are circular to polygonal in shape with an increase in their size from the periphery towards the center.

Leaf: Occurrences of short and curved unicellular trichomes are observed on the midrib and veins of leaf lamina. Both, the upper and lower epidermis layers are composed of single layer of small cells which are thick walled, circular to elliptical in shape followed by 4-5 layered

parenchymatous cells in the cortex of the midrib region. In the central region, 3-5 vascular bundles are arranged in triangular shape with the xylem tissues place towards the upper side and phloem on the lower side. In the blade part, spongy mesophyll tissue is divided into two layers of palisade tissue. The vascular bundles are conjoint collateral and open type besides; both the upper and lower epidermis possesses paracytic type of stomata.

Root: A thick layer of dead tissues which are hard and dry called periderm are found present at the peripheral position of root. The presence of lenticels is also observed where the bark was broken down as it protects the inner tissues viz. epidermis which is parenchymatous in nature and cork which are lignified. Inside the cork region compressed and thin-walled cells of the cortex are present. Secondary phloem tissue is found to be present in patches or elements which are separated from very thick layer of secondary xylem by the cambium. Also, the one or two cell layered radially elongated bands called medullary rays is found to differentiate the secondary xylem of the root and it extend from the primary xylem up to secondary phloem. However, in the centre, primary xylem bundle is accumulated.

Powder study of root: The powder of the root appeared cream brown in colour, without any aroma and taste. Under the microscopes large numbers of vessel elements possessing simple pits were observed. The presence of starch grains was also observed in the powder.

Physicochemical Study[9]

The physicochemical parameters are necessary for confirmation of the identity and determination of quality and purity of crude drugs. Quality of the drug can be assessed with this analysis and thus biochemical variations, adulterations, substitutions, effect of storage/treatment occurring in it can be tested. Physicochemical studies such d. The moisture content / loss on drying, ash value, acid insoluble ash, water soluble ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive and pH of the powdered sample were determined by the method as described in WHO guidelines.[10] Results are tabulated in table no.

Evaluation of the dried powder *Desmodium gangeticum Linn DC* whole plant. Table no 1.

Evaluation parameter	Whole plant value (%w/w)
Loss on drying	1.4 %
Total ash value	6.50 %
Acid insoluble ash	1.06 %
Alcohol soluble extractive	8.65 %
Water soluble extractive	12.05 %

RESULT AND DISCUSSION

microscopic Linn characteristics show the single layered epidermis composed with rectangular cells, vascular. the bundles consisted few elements of xylem and phloem, unicellular covering trichomes, pith composed of parenchymatous cells, round to oval starch grains. These findings will be useful towards establishing pharmacogenetic standards on identification, purity, quality and classification of the plant drug research.

The total ash content was around 6.50%, with 1.06% acid insoluble ash and 12.05% water soluble extractive.

Desmodium gangeticum is one of the important herbs in Ayurveda. The species *D. gangeticum* is a plant that has been confused with other species due to their relative similarities, therefore many a times some other materials are mixed or adulterated during the preparation of medicines. As standardization of a crude drug is an integral part of establishing its correct identity for its inclusion in herbal pharmacopoeia. For which pharmacogenetic parameters and standards must be established.

CONCLUSION

Plant morphology: it is a nearly erect undershrub, 0.6 to 2 meter high, growing will almost throughout India in the plains and western ghat, and up to 1500 meter in the north up to Sikkim in almost all traditional system of medicine, the quality control aspect has been covered by careful observation of skilful persons. However, in modern concept, it requires necessary changes in their approach by way of quality control in terms of development of modern methodologies. Thus, today quality assurance is a thrust area for the evaluation of traditionally used medicinal plants and herbal formulations. It is necessary to explore the parameters related to standardization to be carried out in different batches to set the limit for the reference standards for the quality control and quality assurance of Herbal drugs. The micro and macro

standards obtained here can be identifying parameters to substantiate and authenticate the drug. The total ash value, extractive values will be helpful in identification and authentication of the plant material along with the microscopic method, which is the cheapest method to establish the correct identification. So physicochemical analysis of herbal drugs is an important issue of quality control aspects of natural products.

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