International Research Journal of Ayurveda & Yoga
Vol. 5 (9),28-35, September,2022
ISSN: 2581-785X;https://irjay.com/
DOI: **10.47223/IRJAY.2022.5905**

Pharmacognostic Evaluation of *Prishniparni-Desmodium Gangeticum* (Linn.) DC.

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Article Info

Article history:
Received on: 26-07- 2022
Accepted on: 19-09-2022
Available online: 30-09-2022

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ABSTRACT:

Prishniparni –Desmodium gangeticum (Linn.) DC. is a well-known drug extensively discussed in the Ayurvedic classics. The plant and the therapeutical potential of its root is highly emphasized in the literature. Pharmacognosy is the study of crude drugs of plant and animal origin based on macroscopic and microscopic examination for the authentication and quality control. In present study, macroscopic and microscopic evaluation of root, was performed. Powder macroscopy as well as microscopy of powder of the drug was conducted. Assessment of colour, texture, odour and taste of powder were done in powder macroscopy. The macroscopic features of root, such as size, shape, external characters, type of fracture, colour, odour and taste were analysed. In microscopic evaluation of root, the different types of cells, their arrangement and cell contents were observed. The presence of cell constituents like prismatic calcium oxalate crystals, starch grain, stone cells, cork cells and fibres etc in the powder was observed using powder microscopy.

Keywords- *Prishniparni*, *Desmodium gangeticum* (Linn.) DC., root powder, macroscopy, microscopy

INTRODUCTION

Prishniparni –Desmodium gangeticum (Linn.) DC. is a well-known drug extensively discussed in the Ayurvedic classics. The illustration and description of the drug commences from the *Vedic* period itself. It is one among the *Parnidwaya* and is an ingredient of the group of *Dashamoola*.[1,2] It is described as best among the *sangrahika*, *vatahara*, *deepaneeya and vrishya* drugs by *Acharya Charaka*.[3] *Acharya Susrutha* has enumerated it in the *rodradhi basthi* [4] which is used in treating *hridroga*. In *Ashtanga hridaya*, *Acharya Vagbhata* included *Prishniparni* under *Vidaryadi gana* having *hridya karma*.[5] *Sthirasidha payas* is mentioned in *vatavyadhi chikitsa* advocated to be given in *hridayagata vata*.[6,7] The plant and the therapeutical potential of its root is highly emphasized in the literature. It is a slender undershrub with poorly developed tap root and deep growing prominent lateral

roots. It is found in the plains, in dry forests up to 900m elevations grows as an undergrowth in semi-deciduous forests at low elevations. The plant is subjected to controversy on account of the regional variation hence the through pharmacognostical evaluation is vital in confirming its identity. The pharmacognostical evaluation was conducted in the Department of Dravyaguna Vijnanam, Government Ayurveda College, Tripunithura.

MATERIALS AND METHODS

I. Macroscopic evaluation

A. Materials

Magnifying lens and digital camera were used for this study.

B. Procedure

The fresh root of *Prishniparni –Desmodium gangeticum* (Linn.) DC. was collected and washed thoroughly under running water, dried and then subjected to identification with naked eyes and other sensory perceptions. The macroscopic features of the root of collected fresh plants were studied. The photographs of the drug were also taken using digital camera.

II. Microscopic evaluation

A. Materials

Razor or safety razor blade, dissecting needles, watch glasses, petri dishes, glass slides, cover slips ¾ circles (No. 2 thickness), camel hair brush (medium size), dropper, safranine stain, glycerine, compound microscope, digital camera.

B. Procedure

Fine handmade transverse section of fresh root of *Prishniparni –Desmodium gangeticum* (Linn.) DC. was made with the help of razor blade. The cut sections were then suspended in water in a petri dish. After that a few drops of safranine stain was added to the watch glass containing water and the staining solution was prepared. Very thin section was taken from the petri dish and added to the watch glass containing the prepared staining solution to make it properly stained. When the section was sufficiently stained, it was transferred on a clean slide with help of a hair brush. The section was then mounted at the centre of the slide and a drop of glycerine water was added to the section. Then it was covered with a cover slip without getting air bubble between the slide and cover. The prepared slide was placed on the stage of the compound microscope and fixed with the clips. The light was focused to mounted slide by using the mirror. After this the lens was adjusted at a power of 10X for visualizing the histological parameters of the section. Then the power was adjusted to 40X for getting finer details of the histological parameters. Photographs of the sections were taken using a digital camera at 10X and 40X powers.

III. Powder macroscopic evaluation

A. Materials

Magnifying lens, white paper, digital camera

B. Procedure

Powder of dried root of *Prishniparni –Desmodium gangeticum* (Linn.) DC. was placed on white paper separately and viewed using magnifying lens and naked eye. Texture of powder was assessed using fingers. After that they were subjected to smell and taste to determine the odour and taste. A photograph of powder was taken with a digital camera.

IV. Powder microscopic evaluation

A. Materials

Watch glass, glass slide, cover slips, 3/4 circles (no: 2 thickness), camel hair brush (medium sized), compound microscope, digital camera.

B. Procedure

A pinch of fine powder of sample drug was taken and placed on glass slide. Few drops of water were added and mixed with hair brush. This mixture was then spread throughout the glass slide to overcome the overlapping of constituents of various structures. Cover slip was placed on the glass slide and it was then viewed using compound microscope under 10X powers. Images were then obtained using digital camera.

RESULTS AND DISCUSSION

Pharmacognostical evaluation

A. Macroscopic evaluation of fresh root

Organoleptic features of freshly collected root of the drug were assessed. The observation was similar to the description given in Pharmacognosy of Ayurvedic drugs of Travancore-Cochin by Kolammal and Narayana Iyer[8] and the observations are tabulated as follows.

Table No: 1 Organoleptic features of fresh root of *Desmodium gangeticum* (Linn.) DC. Figure No 1: Fresh root of *Desmodium gangeticum* (Linn.) DC.

B. Microscopic evaluation of fresh root

The transverse section of the root is found to be circular and regular in outline. The cork tissue is visible as a thin light yellowish-brown strip consisting of 4-8 or more rows of rectangular cells nearly twice as long as broad with fairly thick brown walls. The phellogen is evident as a narrow layer. The cortex is composed of several thin-walled

oblong cells, radiating in between are the medullary rays. The region between the rays is composed of cells of sclerenchymatous groups of various shapes and sizes. A distinct cambium is present. The xylem is shown to consist of thick-walled parenchyma that formed the bulk tissue. The patches of sclerenchyma are mostly associated with the vessels and medullary rays. The medullary rays are not plenty in number. Their cells especially in the xylem region is composed of starch grains, there is no pith in the center. The structures seen were similar to the description given in Pharmacognosy of Ayurvedic drugs of Travancore-Cochin,[8]Ayurvedic pharmacopoeia of India [9] and research articles. [10,11,12] Figure No 2: T.S of fresh root of *Desmodium gangeticum* (Linn.) DC. at 10x magnification. Figure No 3: T.S of fresh root of *Desmodium gangeticum* (Linn.) DC. Figure No 4: T.S of cortex and pith of fresh root of *Desmodium gangeticum* (Linn.) DC.

C. Powder macroscopy of dried root

The powder macroscopic features including the colour, texture, odour and taste of the powder of the dried root are identified. The structures seen were similar to the description given in Ayurvedic pharmacopoeia of India [9] and research articles. [10,11,12] The observations were as follows.

Table No: 2 Powder macroscopy of dried root of *Desmodium gangeticum* (Linn.) DC.Figure No 5: Powder of dried root of *Desmodium gangeticum* (Linn.) DC.

D. Powder microscopy of dried root

Fragments of vessels and fibres, large lumned fibres, pitted parenchyma cells, crystal fibres, fibres and medullary rays, starch grains, stone cells, prismatic crystals of calcium oxalate, fragments of bordered pitted vessels and cork cells are identified in powder microscopy of the dried root of *Desmodium gangeticum* (Linn.) DC. The structures observed were similar to that mentioned in Ayurvedic pharmacopoeia of India [9] and research articles.[10,11,12] In addition stone cells, large lumened fibres, pitted parenchyma cells and crystal fibres were also seen. Figure No: 6 shows the Powder microscopy of dried root of *Desmodium gangeticum* (Linn.) DC.

CONCLUSION

Macroscopic features of the fresh root showed cylindrical root which is light yellow brown in colour with mucilaginous sweetish taste. The macroscopic features of the dried root on the other hand showed a wrinkled appearance, dark brown colour outside and whitish inside, with presence of lenticels and bitter taste. Microscopic features of the fresh root were analysed and evaluation of microscopic features of root showed cork, phellogen, sclerenchymatous layer, vascular tissue, cambium, starch grains, xylem vessels and xylem parenchyma. Powder macroscopic features like colour, odour, taste and texture of the powder of the dried root when evaluated showed dark brown colour, characteristic odour, fibrous texture, bitter taste. The powder microscopy was conducted and identified fragments of vessels and fibres, large lumened fibres, pitted parenchyma cells, crystal fibres, medullary rays, starch grains, stone cells, prismatic crystals of calcium oxalate, fragments of bordered pitted vessels and cork cells.

ACKNOWLEDGEMENT

I express my sincere gratitude to Dr.T.D Sreekumar, Principal, Government Ayurveda College Tripunithura. I also express my gratitude towards my teachers, Dr.Honey Thomas, Assistant Professor, Dr.Jilu Joy, Assistant Professor, Department of Dravyaguna Vijnana, Dr.Mridula M.K, Former Assistant Professor, Government Ayurveda College Tripunithura, for their encouragement and constant support during the completion of the work.

Financial Support :Nil

Conflict of Interest: Nil

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How to cite this article:, Krishna A R ,P AnsaryY, Oommen S M, Shincymol V V "Pharmacognostic Evaluation Of *Prishniparni- Desmodium Gangeticum* (Linn.) DC." IRJAY.[online]2022;5(9); 28—35
Available from: https://irjay.com
DOI link- https://doi.org/10.47223/IRJAY.2022.5905

Table No: 1 Organoleptic features of fresh root of *Desmodium gangeticum* (Linn.) DC.

Size	7cm in length
Shape	Cylindrical with slender root hairs
Colour	Light yellow or yellowish white
External characters	Nearly smooth, lenticels present, leathery texture
Cut surface	Thick central strand of wood, surrounded by comparatively thin but tough bark, slight yellowish tint
Fracture	Hard and short
Odour	Not characteristic
Taste	Mucilaginous sweetish taste

Figure No 1: Fresh root of *Desmodium gangeticum* (Linn.) DC.

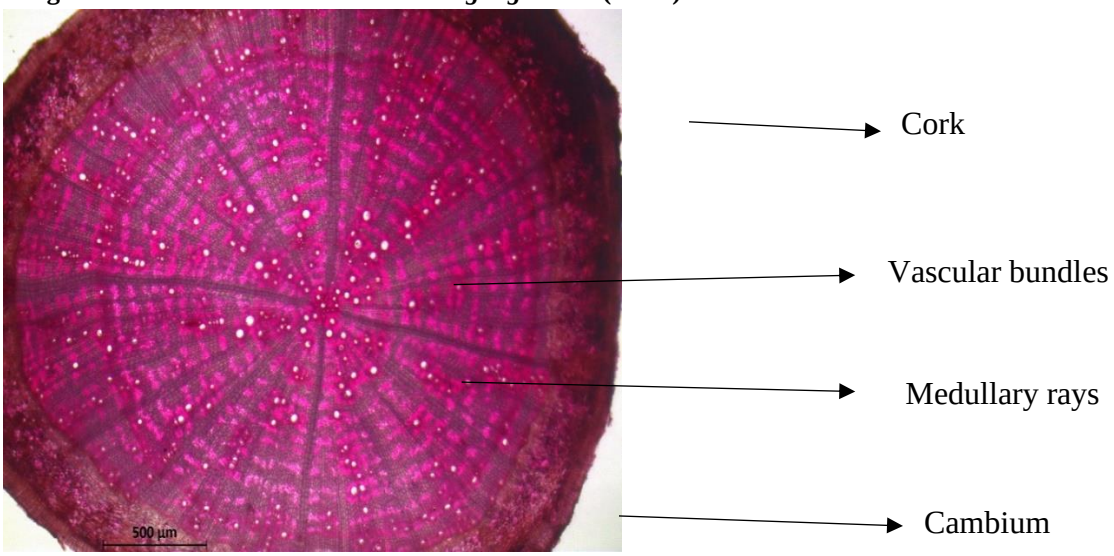


Figure No 2: T.S of fresh root of *Desmodium gangeticum* (Linn.) DC. at 10x magnification.

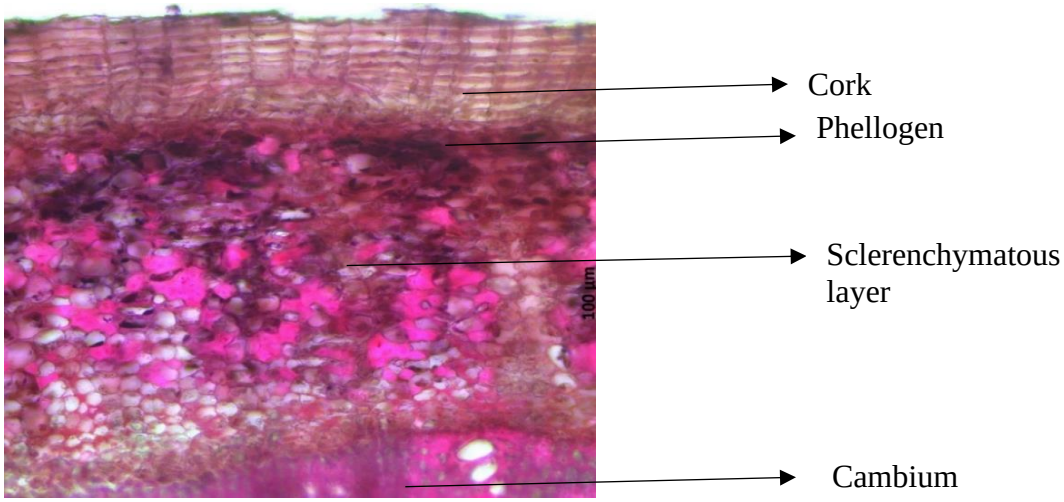


Figure No 3: T.S of fresh root of *Desmodium gangeticum* (Linn.) DC.

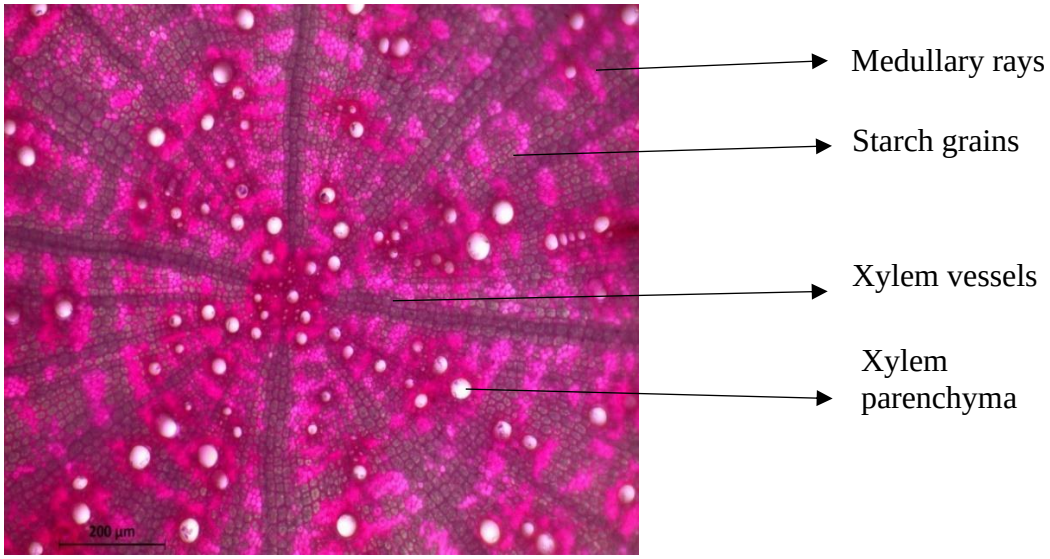
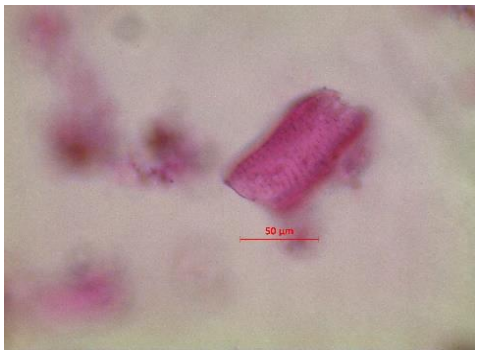


Figure No 4: T.S of cortex and pith of fresh root of *Desmodium gangeticum* (Linn.) DC.

Table No: 2 Powder macroscopy of dried root of *Desmodium gangeticum* (Linn.) DC.

Characters	powder of dried root
Colour	Dark brown
Texture	Fibrous
Odour	Characteristic
Taste	Bitter

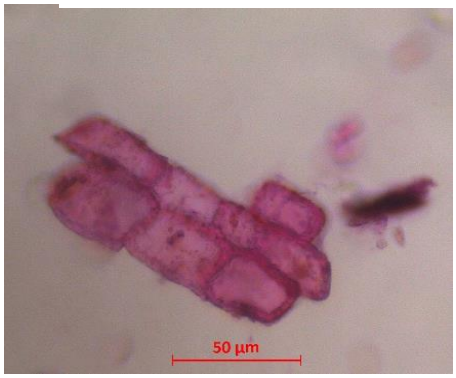
Figure No 5: Powder of dried root of *Desmodium gangeticum* (Linn.) DC.



Fragments of vessels

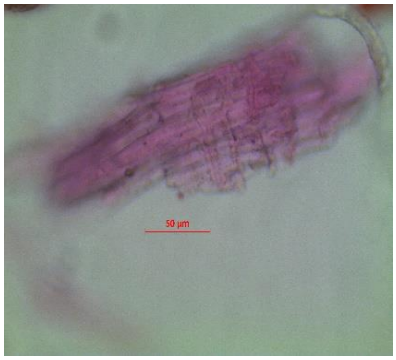
Fragments of fibres

Large lumened fibres

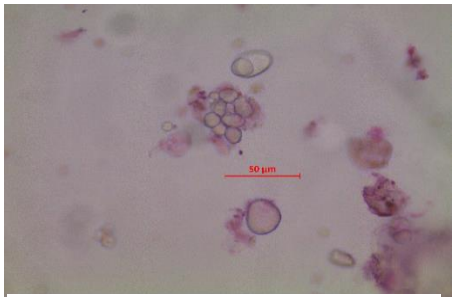


Pitted parenchyma

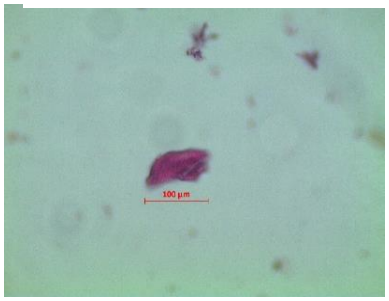
Crystal fibres



Fibres and medullary rays

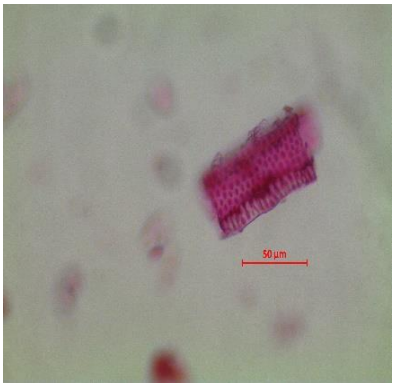


Starch grains

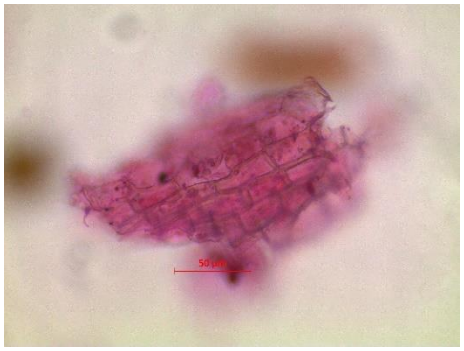


Stone cells

Prismatic crystals of calcium oxalate



Fragments of bordered pitted vessel



Cork cells

Figure No: 6 Powder microscopy of dried root of *Desmodium gangeticum* (Linn.) DC.