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Research Article

STUDY OF ANATOMY AND POWDER MICROSCOPIC CHARACTERS OF *SWETA SARIVA* (*HEMIDESMUS INDICUS* (L.) R.Br)

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ABSTRACT

Proper identification and quality assurance of the raw material is an essential prerequisite to ensure reproducible quality of Ayurvedic medicines. *Sweta Sariva* (*Hemidesmus indicus*), commonly known as Indian Sarsaparilla is a well-known drug and is reputed for its *Dahaprasamana* (alleviates burning sensations), *Deepana* (appetizing) and *Raktashodaka* (blood purifying) properties. Root is the official part of *Sweta Sariva*. It is very popular in Kerala as a medicine and as a health drink. *Hemidesmus indicus* of Periplocaceae family is considered to be the genuine source plant of *Sweta Sariva*, but survey of commercial samples from various states of India reveal that at present root and root-stalk of five different botanically identified plants from dissimilar families are being sold as *Sariva* in different parts of the country. Here a study on the anatomical and powder characters of *Sweta Sariva* was done so that people can easily identify the *Sweta Sariva* from its adulterants. The genuine *Hemidesmus indicus* roots are very slender with a diameter less than 1cm and they possess a characteristic pleasant smell with a sweetish taste. In the transverse section there are plenty of starch grains, prismatic crystals of calcium oxalate crystals and lactiferous ducts are seen in the cortex portion which forms the major identifying features. Three types of vessels are found in the powder microscopy.

KEYWORDS: *Hemidesmus indicus*, *Sariva*, Anatomy, Pharmacognosy, Powder Microscopy.

INTRODUCTION

Ayurveda has a key role in the present health sector. Supply of genuine herbs is a must for the existence of the Ayurvedic system. Correct identification and quality assurance of the raw material is an essential prerequisite to ensure reproducible quality of Ayurvedic formulations. In ancient times physicians were directly involved in drug collection so that there was only minimal chance of adulteration. But now things have changed and most of the drugs in the market are not genuine. The genuineness, purity and quality of raw material has direct impact on the safety and efficacy of Ayurvedic formulations. *Sweta sariva*, commonly known as Indian Sarsaparilla, is a well – known drug of Ayurvedic Pharmacopeia of India and is popular for its *Dahaprasamana* (alleviates burning sensations), *Deepana* (appetizing) and *Raktashodaka* (blood purifying) properties. It was formerly placed under family Asclepiadaceae but recently based on pollinal character it has been transferred to family Periplocaceae[1]. The root is the official part of *Sariva*. In classical Ayurvedic texts two varieties of *Sariva* namely *Sweta sariva* and *Krishna sariva*, both with similar therapeutic attributes, are described. According to API *Hemidesmus indicus* (L.) R.Br. is identified as the source plant of *Sweta sariva* and *Cryptolepis buchanani* Roem. & Schult is identified as the source plant of *Krishna sariva*. But in some modern text books *Ichnocarpus frutescens* is considered as the source plant of *Krishna Sariva*. *Sweta Sariva* is having *Madhura Tikta Rasa, Guru, Snigda guna, Sheeta Veerya, Madhura Vipaka* and *Tridosha samaka karma.* According to API *Hemidesmus indicus* (L.) R.Br. is identified as the source plant of *Sweta sariva*[2] but a review of literature on Indian Medicinal Plants [3] and survey of commercial samples from various states of India reveal that at present root and root-stalk of five different botanically identified plants from dissimilar families are being sold as *Sariva* in different parts of the country. We can easily identify the roots of *Hemidesmus indicus* from its adulterants with simple pharma-cognostical examination.

MATERIALS AND METHODS

1.Collection of plant material

The genuine sample of *Sariva (Hemidesmus indicus)* was collected from Thiruvananthapuram district of Kerala.

2.Pharmacognostical evaluation

This evaluation consist of two phases: a. Macroscopic evaluation. b. Microscopic evaluation

a. Macroscopic evaluation

Materials: Magnifying lens and dissecting microscope were used for the purpose.

Procedure

The samples were subjected to macroscopic evaluation by observation with naked eyes, by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for a better evaluation of surface characters.

b. Microscopic evaluation

Microscopic evaluation will be carried out in two phases:

- Histological evaluation

- Powder microscopy

b.1. Histological evaluation

Materials: Sharp blades, Safranin stain, glass slides, water, cover slips, glycerine, petri dishes, watch glass, brushes, needles and digital microscope.

Procedure

A cylindrical portion of the root near the stem part was selected, the root hairs were removed. The blade was dipped in water so as to contain some water on it to prevent entrapment of air bubbles in the cells of section. The blade was moved back and forth from one end to other for obtaining fine slices. Enough number of transverse sections of the root of genuine and market samples were taken. The sections were carefully transferred to a petri dish containing water using a fine camel painting brush for selection of good sections. A few thin sections that floated in water were selected and moved to a watch glass containing safranin stain using a thin brush. Sections were kept there for 2-3minutes. The sections were then transferred to pure water to remove the excess stain. It is then transferred on a clean glass micro slide using thin brush. Two drops of water was added on section using a dropper. With the help of a forceps and a needle a clean cover slip was placed gently over the section. With the help of a blotting paper excess water was removed and the slide was then examined under a binocular digital microscope (Olympus Student's microscope with CCD camera and software 5.1 version) for histological examination and direct images were taken at 4x,10x and 40x magnifications.

b.2. Powder microscopy

Materials: Powdered drug, glass slides, cover slips, microscope, glycerine and safranin stain.

Procedure

For examining characters of the powder, sufficient amount of powder of samples were mounted on a glass slide after mixing with glycerine. The slide was then examined under a binocular digital microscope (Olympus Student's microscope with CCD camera and software 5.1 version) for examination of powder characters and direct images were taken at 10x,40x and 100x magnification.

Study Setting: Pharmacognosy unit, Dept. of Dravyaguna vijnanam, Govt. Ayurveda College, Thiruvananthapuram.

RESULTS AND DISCUSSION

a. Macroscopic evaluation of genuine sample

The different characters of the *Hemidesmus indicus* observed in the sample are tabulated below.

Table 1: Organoleptic characters of genuine sample

Shape	Cylindrical
Size	Variable in size 20-30 cm in length, less than 1cm diameter
External colour	Dark Brown
Internal colour	Pale yellow
External surface	Marked with transverse cracks and longitudinal fissures and bark was very thin easily detachable from the hard central core
Fracture	Short at the periphery and fibrous at the centre
Texture	Hard
Odour	Characteristic pleasant smell
Taste	Sweetish

Images of Macroscopic features of *Hemidesmus indicus* (L)R.Br

Fig.1-Root of *Hemidesmus indicus*

Fig.2-Root with bark

Fig.3-Root transversely cut

b.1. Histological evaluation

Major characters seen in the Histology of root of *Hemidesmus indicus* are tabulated below

Table 2: Histological characters of root of *Hemidesmus indicus*

1.Periderm	
a. Phellem	i. Reddish brown coloured rectangular cells ii. 3-6 layered iii. Empty
b. Phellogen	i. Colourless, compressed rectangular cells ii.1-2 rows
c. Phelloderm	i. colourless, rectangular cells ii. 4-6 rows iii. Sometimes loaded with starch grains
2.Cortex	
a. Starch grains	All cortical cells are fully loaded with large sized starch grains
b. Laticiferous ducts	Scattered throughout cortex
c. Calcium oxalate crystals	Prismatic crystals are seen
3.Stele	
a. Xylem	Vessels vary in size
b. Phloem	i. 1-3 layered ii. Alternate with uni-seriate medullary rays iii. Sometimes laticiferous ducts are seen
c. Cambium	1-2 layered compressed cell
d. Medullary rays	i. Large number of uniseriate medullary rays, sometimes biseriate ii. Cells are smaller than xylem parenchyma iii. Rich in protoplasmic contents
e. Pith	Absent

Images of histological evaluation of *Hemidesmus indicus* (L.) R.Br

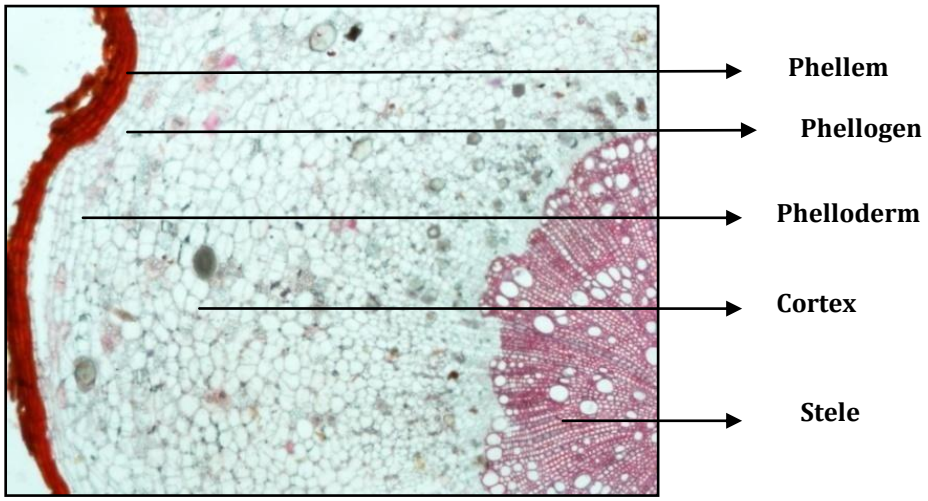


Fig.4- T.S of root of *Hemidesmus indicus*-4x

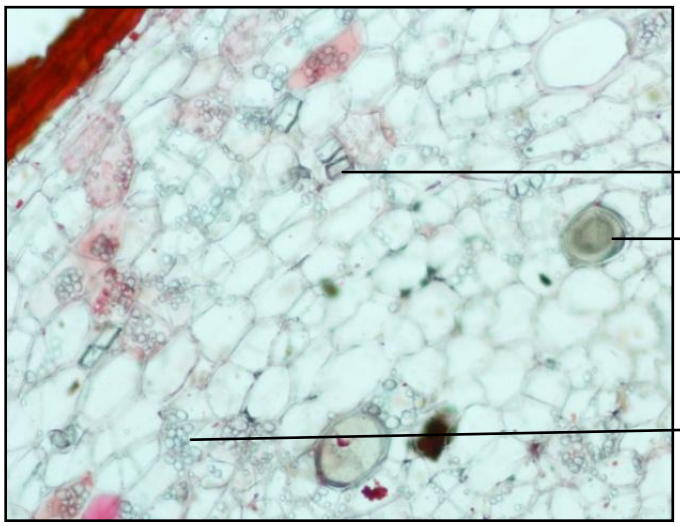


Fig.5- T.S of cortex-10x

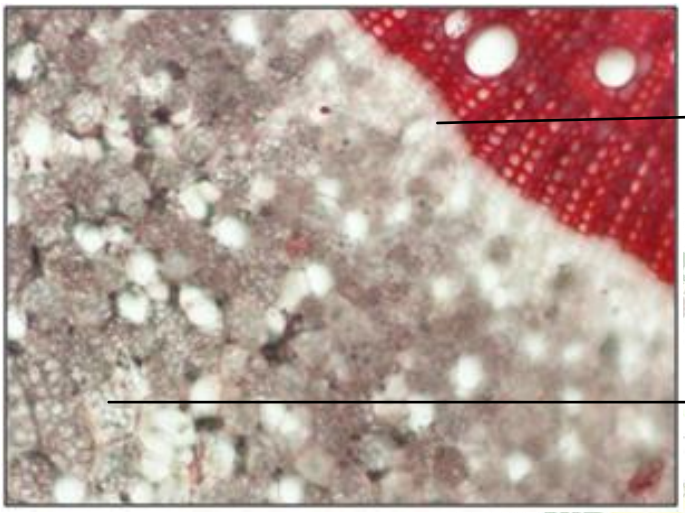


Fig.6-T.S -Cortex -10x

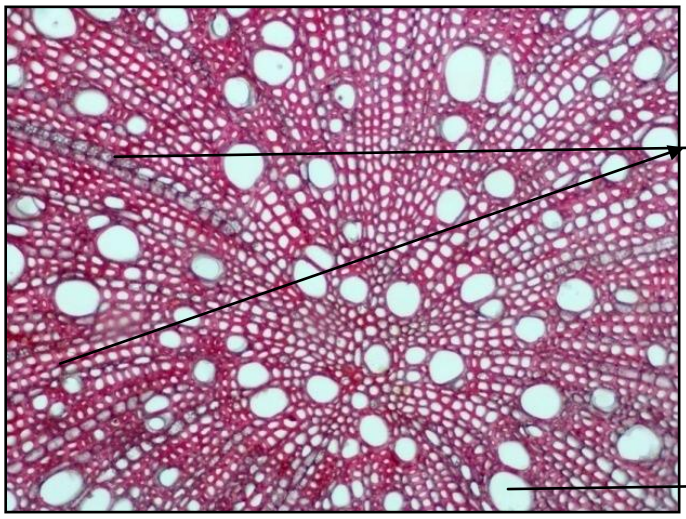


Fig.7-Stele portion -10x

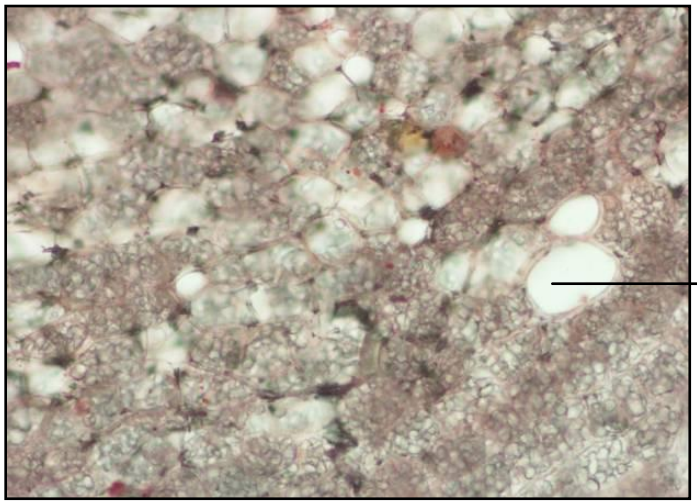


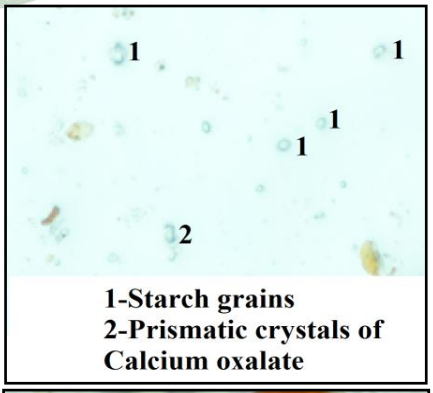
Fig.8-Starch grains -10x

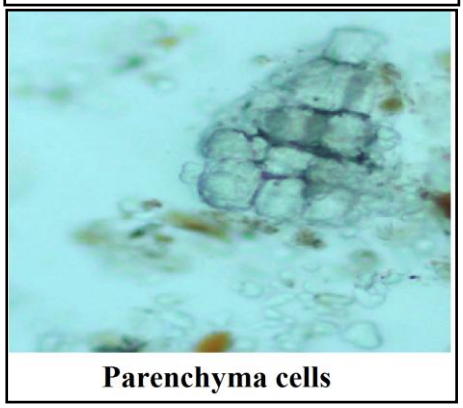
b.2. Evaluation of powder characteristics

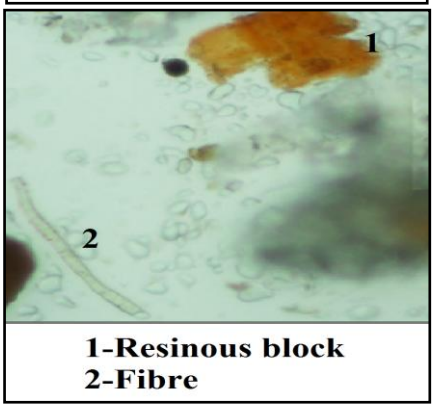
The powder was creamy brown in colour. The powder characteristics of the *Hemidesmus indicus* obtained were tabulated below:

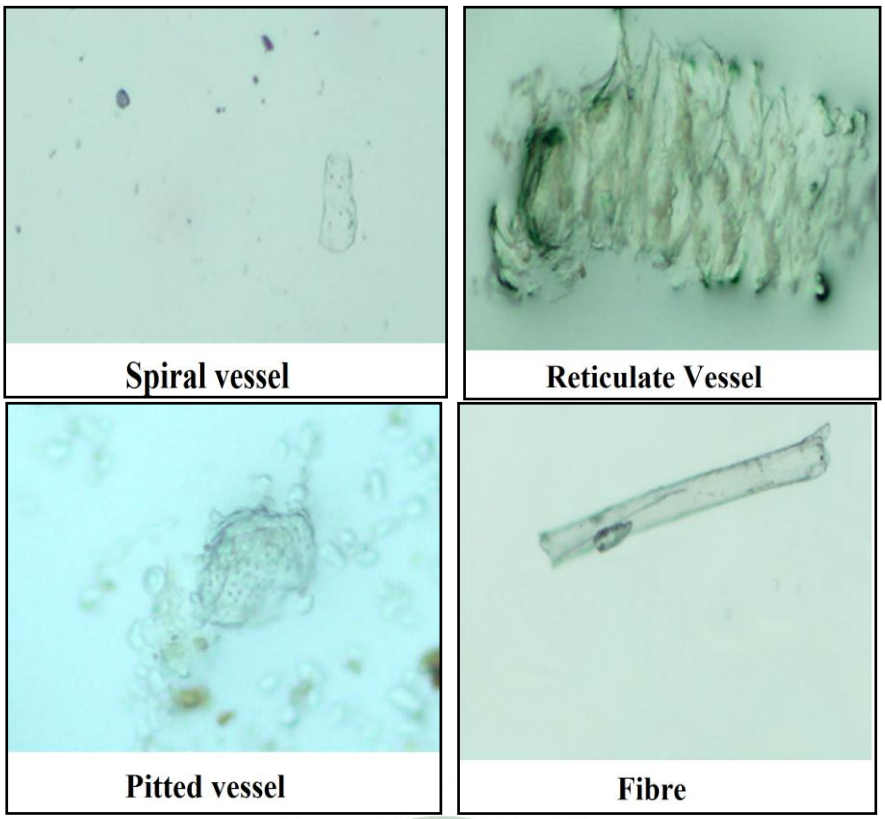
Sl.No	Powder Characters	
1.	Crystals	Prismatic crystals of various sizes
2.	Starch grains	Round or oval with various sizes occur as singly, dyad, triad or in groups
3.	Parenchyma	Shape vary from square to rectangular
4.	Resin block	Reddish brown Golden yellow
5.	Fibre	Long and small fibres were seen Wiry fibres were also seen Fibres with narrow lumen were seen
6.	Vessels	3 types vessels were seen 1.Spiral 2.Reticulate 3.Pitted

Fig.9-Images of Powder characteristics of genuine sample









CONCLUSION

The macroscopical and histological characters of *Hemidesmus indicus* obtained were matching with the available standards mentioned in API. Powder characters are not available in the API. So these powder characters can be used to test the genuineness of the market samples.

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