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PHARMACOGNOSTICAL EVALUATION OF STEM OF *SESAMUM INDICUM* LINN (*TILA NALA*)

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ABSTRACT

Sesamum indicum Linn (*Tila*) is a herbaceous plant extensively cultivated throughout India in the plains and upto an altitude of 1200 m for its seeds. Usually after the harvest of sesame seed (*Tila beeja*), its stalk or stem (*nala*) is discarded. Most of the Ayurvedic texts explained seeds as the useful part of *Tila* plant. The uses of *Tila nala kshara* (alkali preparation from stem or stalk of *Sesamum indicum* Linn.) is mentioned in Ayurvedic text books like *Yoga ratnakara*, *Cakradutta* etc. But characters, properties and uses of stem of *Tila* plant (*tila nala*) are not available. So the present study was undertaken to assess the pharmacognostical characteristics of the genuine drug collected directly. The pharmacognostical characteristics observed in this study may help in standardisation, identification and in carrying out further research in *Sesamum indicum* Linn.

KEYWORDS: *Tila nala*, *Sesamum indicum* Linn, Pharmacognostical evaluation.

INTRODUCTION

Indigenous plants have been used as a potential source of medicine since ancient times. Herbal drugs are the backbone of Ayurvedic system which is used for curing disease and restoring normal health. The whole plant and plant parts like root, stem, bark, leaf, flower, heartwood, latex etc were used individually or in combination in different Ayurvedic formulations. According to Ayurvedic pharmacopeia of India, *Tila* is *Sesamum indicum* Linn. (Family, Pedaliaceae), is a herbaceous plant extensively cultivated throughout the plains of India upto 1200 m for its seeds ^[1]. Usually after the harvest of *Tila beeja* (sesame seed), its *nala* (stalks) is discarded. Most of the Ayurvedic texts explained seeds as the useful part of *Tila* plant. So, data related to *Tila* seeds and *Tila taila* (oil obtained from *Tila* seeds) are available. The uses of *Tila nala kshara* (alkali preparation from stalk of *Sesamum indicum* Linn.) is mentioned in Ayurvedic text books like Cakradatta^[2], Yoga ratnakara^[3] etc. But characters, properties and uses of stem of *Tila* plant(*tila nala*) are not available.

The objective of the present study is to evaluate the pharmacognostical characteristics of the stem of *Sesamum indicum* Linn (*tila nala*).

MATERIALS AND METHODS

Collection of Genuine Samples

Genuine *Sesamum* plant stem samples were procured from natural habitat from Onattukara Regional Agricultural Research Station, Kayamkulam, Kerala.

Study setting

Drug standardisation unit, Dept. of Dravya guna vijnana, Govt. Ayurveda college, Thiruvananthapuram.

Pharmacognostical Evaluation

Pharmacognostical Evaluation included both Macroscopic (Organoleptic) and microscopic evaluation of the crude drug together with its powder characteristics.

Macroscopic evaluation of Stem

The stem of *Sesamum indicum* Linn was subjected to organoleptic evaluation with naked eyes and by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for a better evaluation of surface characters. The characters like Gross appearance, Dimensions, Shape of the pieces, Outer surface, Inner surface, Fracture, Odour and Taste of the genuine sample were analyzed

Microscopic evaluation

The microscopic evaluation of sample drug includes histological evaluation and power microscopy was done according to the Standard procedure detailed in API^[4].

RESULTS

Macroscopic evaluation

The observed macroscopical characters of *Sesamum indicum* Linn were given in Table no: 1

Table no: 1 showing the organoleptic characters of stem of fresh plant

Gross appearance	Herbaceous with distinct nodes and internodes
Shape	Quadrangular
Size	3.5 – 6.5 cm circumference
External characters	With lots of hairs, having ridges and grooves
Colour	Light green to light yellowish
Fracture	Fibrous
Cut surface	White in colour
Odour	No distinct odour
Taste	No characteristic taste

Microscopic Evaluation

Transverse section of stem of *Sesamum indicum* Linn

The stem in transverse section showed quadrangular in outline. Healthy stem showed three distinct regions of epidermis, cortex and vascular tissue.

Epidermis

Epidermis or outermost layer surrounds the stem and it was composed of a single layer of closely packed parenchymatous cells. Epidermis is covered by mucilaginous layer. A large no of Unicellular or multicellular trichomes (Glandular and non glandular type) were present on the surface of the epidermis. Two or three layers of hypodermis composed of collenchymatous cells were found beneath epidermis.

Cortex

Cortex was present next to hypodermis which was multi-layered parenchyma cells. Cells of cortex were separated by intercellular spaces. In discontinuous manner, fiber cells were also present.

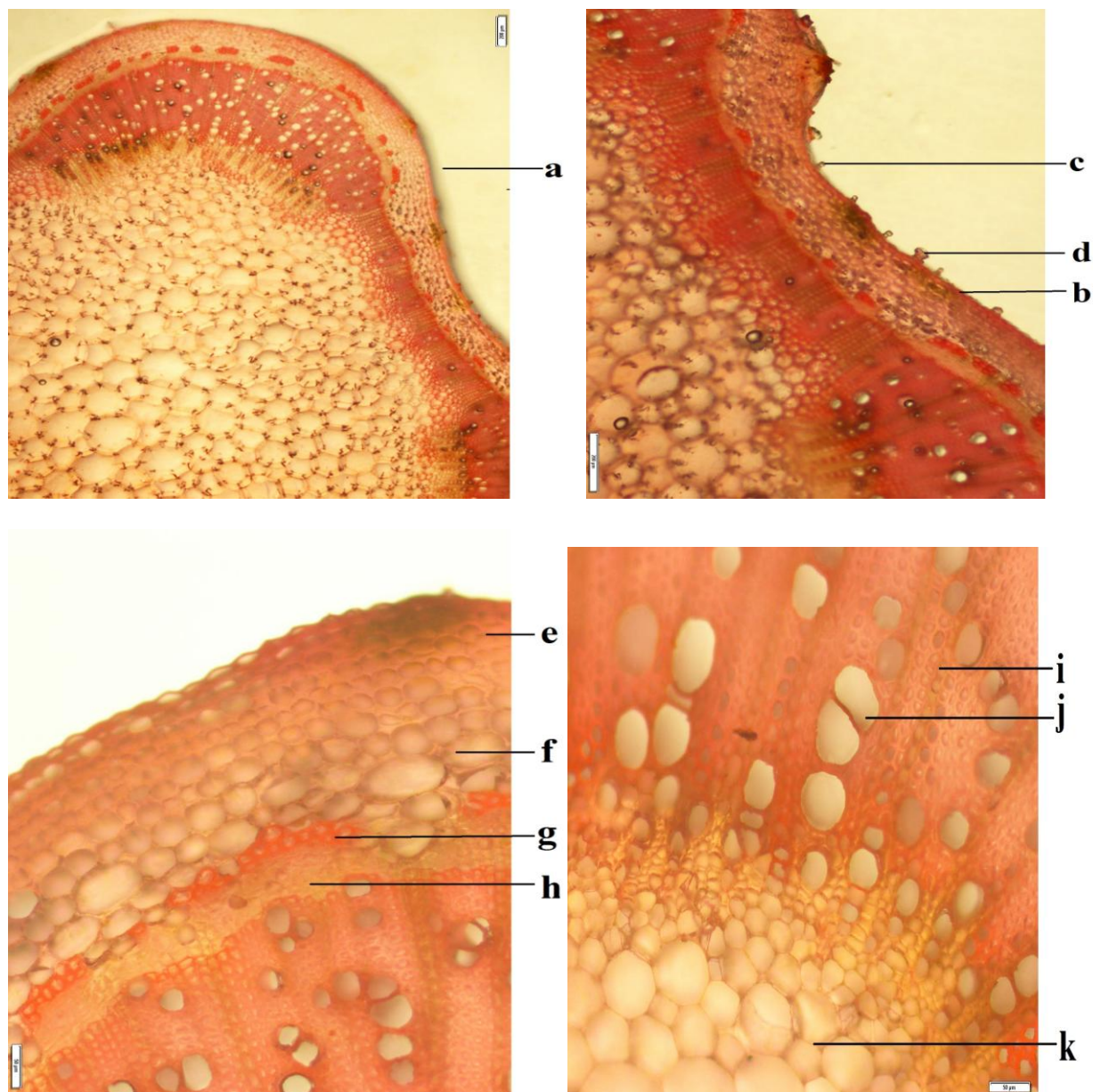
Vascular tissue

Vascular tissues consists of xylem, which transports water and minerals and phloem which transports food. Xylem was present towards the centre and phloem was present outside. Protoxylem was present towards centre and metaxylem towards outside. Uniseriate or multiseriate medullary rays also present between the vascular bundles. Large pith was composed of parenchymatous cells and occupies the centre position.

Powder microscopy

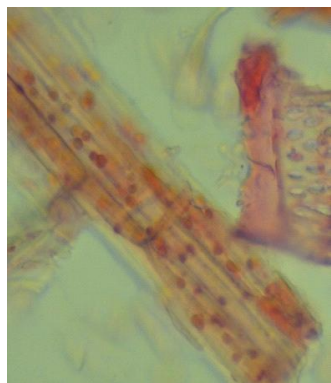
In powder microscopy, the stem of *Sesamum indicum* Linn. showed presence of Cells with oil globules, bundle of fibres, pitted vessels, tracheids with spiral thickening and also the cell inclusions like prismatic crystals, calcium oxalate crystals etc.

Fig no: 1 Microscopy of *Sesamum indicum* Linn stem

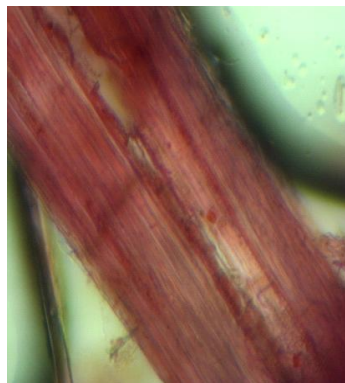


a. Mucilagenous layer **b.** Epidermis **c.** Non-glandular trichome **d.** Glandular trichome
e. Hypodermis **f.** Cortex **g.** Pericyclic fibre **h.** Phloem **i.** Medullary ray **j.** Xylem **k.** Pith

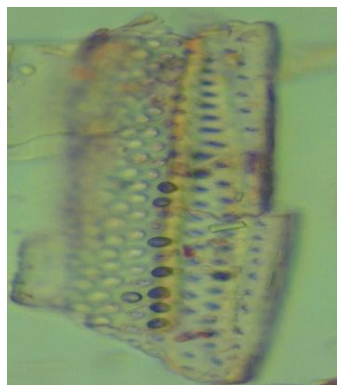
Fig no:2 Powder Microscopy of stem of *Sesamum indicum* Linn.



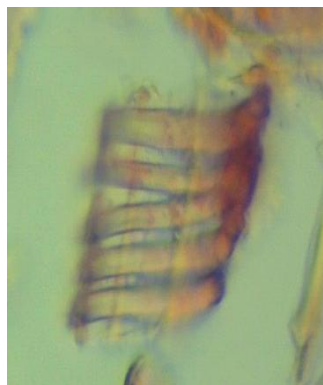
Cells with oil globules



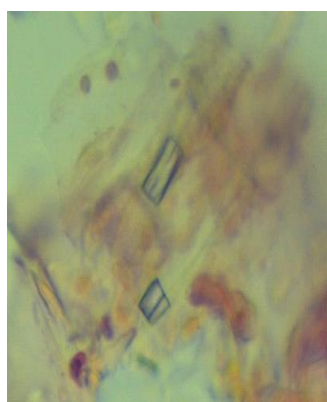
Bundle of fibres



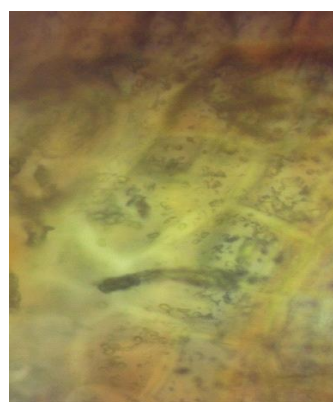
Pitted vessels



Tracheids with spiral thickening



Prismatic crystals



Calcium oxalate crystals

DISCUSSION

As part of the study, macroscopical and microscopical evaluation of stem of *Sesamum indicum* Linn was carried out. In macroscopical evaluation, herbaceous stem with distinct nodes and internodes was observed. Also quadrangular in shape with lots of hairs, having ridges and grooves were observed. In microscopical evaluation, the outline of stem is quadrangular in shape. An important feature of the stem of the plant *Sesamum indicum* Linn was the presence of mucilaginous layer seen outer to the epidermis. A large no of Unicellular or multicellular trichomes (Glandular and non glandular type) were present on the surface of the epidermis. Two or three layers of hypodermis composed of collenchymatous cells were found beneath epidermis. Next cortex layer contained multi-layered parenchyma cells with intercellular spaces. Vascular tissue consists of xylem towards the centre and phloem was present outside. In discontinuous manner, fibre cells were also present. Large pith was composed of parenchymatous cells and occupies the centre position. Different cell inclusion like prismatic crystals, calcium oxalate crystals and tannin were seen in powder microscopical examination of powder of dried stem. These findings can be used for future reference.

CONCLUSION

In the present study, Pharmacognostic evaluation including macroscopy and microscopy was done to ascertain the genuineness, purity and quality of the drug. The observations and results obtained will be useful for further research works along with the standardization of the drug. So the values obtained in the study can be taken as a reference for further studies and in future may help to enrich the therapeutic uses of *Sesamum indicum* Linn.

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CONFLICT OF INTEREST - Nil