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Research Article

PHARMACOGNOSTICAL STUDY OF BARK OF *SHIMSHAPA* (*DALBERGIA SISSOO* ROXB)

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ABSTRACT

Purpose: Pharmacognostical evaluation of bark of *Dalbergia sissoo* is done for identification in field and differentiates from other species of Dalbergia. **Methods:** Drug is studied taxonomically and its macroscopic, microscopic features were studied including powder microscopy of bark with suitable instruments. **Results:** Macroscopic study reveals on drying bark is flat curved inward with presence of cracks color reddish brown outer surface rough warty while inner surface was tough, longitudinally striated whereas microscopic study reveals outline of transverse section (TS) exposed rhytidome covering the upper part of section. It was continue with cork cells followed wide zone of secondarycortex. Concentric rings of fibres were present throughout the secondary phloem. The detailed TS showed dark coloured rhytodome cells followed by multilayered cork cells. Secretory cells containing tannin was present in secondary cortex zone. Presence of calcium oxalate crystals present in rays cells and parenchyma cells of cortex. Starch grains were present throughout the parenchyma cells. Powder was dark red in colour, bitter taste, fruity odor. Powder microscopy reveals fragments of cork cells, stone cells, septate fibres, Pitted medullary ray cells, Prismatic crystals of calcium oxalate, simple starch grains and fragments of fibres found present. **Conclusion:** Finding of this study will falicitate pharmacognostic standardization of plant material and become an aid for identification as well as preparation of herbal monographs for the species and to enjoy the Ayuvedic classical claims.

INTRODUCTION

The references regarding *Shimshapa* can be traced both in *Rigveda* and *Atharvaveda*[1] , The word "*Shimshapa*" has been used in *Rigveda* and Atharvaveda for *Shisham* tree. In Charaka Samhita (3000-2000 BC)[2], Sushruta Samhita[3], Ashtanga Hridaya[4] (7 AD) along with Bhela Samhita[5] where he had indicated trees in *Medohara* as well as *Kustahara*. Dhanvantari Nighantu[6] (10-13 AD), Sodhala Nighantu[7] (12 AD), Abhidhana Ratnamala[8] (12-13 AD), Madhava Dravyaguna[9] (1250), Siddha Mantra[10] (Kala-13 AD), Hridaya Dipaka Nighantu[11] (Kala-13AD), Madanapala Nighantu[12] (Kala-14AD), Kaideva Nighantu[13] (Kala-15AD), Bhavaprakasha Nighantu[14] (16 AD), Raja Nighantu[15] (17 A.D), Shaligram Nighantu[16] (1896), Nighantu Shesha[17] and Soushruti Nighantu have mentioned this drug with various synonyms under different Vargas and *Ganas*.

Priya Nighantu[18] (19 AD), Materia Medica of Ayurveda (2000) by VaidyaBhagvandas[19] has given 2 types of *Shinshpa* i.e. *Shimshapa* and *Kushimshapa* in this text. Dravyaguna Vigyana (P.V. Sharma, Part II, IV, V), Illustrated Dravyaguna Vigyana (Dr. J.L.N.Shstri), Guna Ratnamala, The trees of Culcatta and its neighbourhood, Flora of British India (Vol. II), Flora of Assam, Classical uses of Medicinal Plants, A Manual of Indian Botany, , Medicinal Plants of Uttaranchal State, Descriptive list of trees, shrubs and economic herbs of the southen circle central provinces, Botany part IX, Dictionary of Economic Product of India (Vol. III), Economic Botany, Useful Plants of India, Economic Botany, A Manual of Botany for Indian Forest Students, The Ayurvedic Plants etc also have mentioned Shimshapa *Dalbergia sissoo* Roxb.

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Habit: A fairly large, deciduous, handsome tree; reaching 18 m. high; young parts pubescent or tomentose; branches numerous, downy, grey and spreading.

Bark: Grey or light brown, somewhat reticulately longitudinally furrowed, exfoliating in narrow strips; young parts grey downy, inside light- brown, soon turning to dark-brown, very fibrous.

Heart wood: The heart wood is brown, mottled with darker longitudinal veins, hard and close grained, annual rings not distinctly marked; medullary rays very fine; pores uniformly distributed, joined by wavy white concentric bands; wt 45-55 lbs. per c.ft.

Leaves: Alternate, bifarious, imperipinnate; leaf-rachis 2-4" long, zigzag, pubscent when young, Pale green.

Petioles: Terete, very downy when young;

Stipules: Lanceolate, Caduceus.

Leaflets: 3-5, firm, 3.8-6.3 by 3-5.4 cm. (the terminal the largest and the lowest the smallest), distant, alternate, broad ovate or rhomboid, tough, slightly waved on the margin. suborbicular, conspicuously and abruptly acuminate, puberulous when young, soon glabrescent and shining when old, base narrowed or cuneate, lateral nerves about 5 on either half, rather in distinct, very slender, tertiaries prominent.

Petiolules: 3-6 mm. long.

Flowers : 0.2-0.3" long, yellowish white, scented, each shaped after the plan of a pea flower, sessile or nearly so, in axillary panicles shorter than the leaves and composed of several short subsecund spikes; rachis and branches of the panicle densely hairy; bracts linear-subulate hairy.

Calyx: Downy, about half the length of the flower. Standard with a long.

Materials and Methods

For any scientific experiments, materials are resources available for relevant experiment while the methods are established scientific procedures for selected experiments.

Pharmacognostical Study

The methods adopted for this study were taken as suggested by Wallis (1985), API, Quality control methods for medicinal plant material, published by W.H.O., Trease and Evans (1934) etc.

Collection of samples

The bark of *Dalbergia sissoo* Roxb. (Family-*Papilionaceae*) was collected from Umbalebillu (District Shimoga) during September 2013.

Taxonomical Validation[20,21]

The taxonomical characters of grown plants of both species were matched with various floras for distinguished identifying structures. Taxonomical verification was done by noted botanist and visiting professor Prof. Radhakrishna Rao, at the Dept. of Dravyaguna A.L.N. Rao memorial Ayurveda medical college and in Quality Control Laboratory at A.L.N. Rao memorial Ayurvedic medical from modern aspects by Dr. Prashant Kumar Jha.

Macroscopic study[22]

It includes the observations based on organoleptic characters like shape, size, taste, odour, colour, touch, texture and fracture. Importance of identification is well mentioned in Ayurvedic texts for better therapeutic effects by applying *Panchendriya pareeksha*.

Microscopic Study[22-28]

1) Barks' Microscopy: Free hand transverse sections bark of *Dalbergia sissoo* Roxb. was taken. It was cleared with chloral hydrate and stained with phloroglucinol + HCl, saffranine green, iodine, sudan solution etc. to observe the nature of cellular bodies and ergastic materials. This was further mounted in glycerine. Photomicrographs were taken by using Sony digital camera attached to BESTO RCM-20XL microscope with the help of Quality Control Department, A.L.N. Rao Memorial Ayurveda Medical College, Koppa.

2) Powder Microscopy: Powder of drug was studied microscopically and microscopic characters of the powder were photographed by using Sony digital camera attached to BESTO microscope.

Discussion

Pharmacognostical Study

Macroscopic study

The bark of this genus was flat to somewhat curved inwardly. Flatness was more seen in *Dalbergia sissoo*. Cracks were clearly seen with *Dalbergia sissoo*. Rhytodome cells were seen more on outer surface of *Dalbergia sissoo*, the reason is quite clear for cracks formation. Barks contain longitudinal linings on inner surface which is due to abundance of fibres present with bark. Taste of bark was astringent and bitter. Rasa of *Dalbergia sissoo* was *Katu*, *Tikta* and *Kashya*[29].

Microscopic Study

More dark colours were seen with bark of *Dalbergia sissoo* due to bigger portion of rhytidome covering the bark. Medullary rays were 4-5- celled in *Dalbergia sissoo.* Cell inclusions like clusters and prisms of calcium oxalate crystals and starch grains were common in bark. Concentric rings of fibers alternating with secondary phloem elements including obliterated phloem were more evidently seen in bark of *Dalbergia sissoo.* Stone cells or sclereids were seen below the cork cells in bark. The thickness of wall was more in those in *Dalbergia sissoo* while lumen was narrower in this case. Secretory cells secreting mucilage and containing tannin Powder of *D. sissoo* was reddish-brown in colour. Taste of powder was bitter and astringent.

RESULTS

Pharmacognostical Study

Macroscopic study

Dalbergia sissoo Roxb. (Plate Number: 1)

Shape: Dried bark was somewhat curved inwardly **Size:** 5-7cm in length and 2-3cm in width, 0.8-1cm in thickness Colour: Outer surface was dark brown while inner surface was reddish-brown Surface: Outer surface was rough and warty while inner surface was tough, longitudinally striated.

Odour: Characteristic to slightly aromatic Taste: Slightly astringent and bitter

Dalbergia sissoo Roxb. (Plate Number: 2, 3)

The outline of transverse section (TS) exposed rhytidome covering the upper part of section. It was continued with cork cells followed wide zone of secondary cortex. Concentric rings of fibres were present throughout the secondary phloem. The detailed TS showed dark coloured rhytodome cells followed by multilayered cork cells. Stone cells with varying diameters of lumen were present just below the cork cells. Obliterated phloem cells were present below parenchyma cells of secondary cortex. Secretory cells containing tannin was present in secondary cortex zone. Prisms of calcium oxalate crystal were present in rays cells and parenchyma cells of cortex. 3-layered medullary rays were present. Starch grains were present throughout the parenchyma cells. Fibres were composed of concentric lumen.

Powder: The powder was dark red in colour, bitter. taste, fruity odor. Under compound microscope, it revealed fragments of cork cells in surface view. Isolated or groups of thick-walled stone cells and septate fibres were present. Pitted medullary ray cells crossing fibres in radially longitudinal cut fragments were present. Prismatic crystals of calcium oxalate and simple starch grains were scattered in parenchymatous cells. Fragments of fibres were present.

CONCLUSION

Oxford dictionary mentions conclusion as the judgment reached by reasoning.

Present work is Pharmacognostical Study of bark of *Shimshapa* (*Dalbergia sissoo*.Roxb).

After observing from different aspects following conclusion can be drawn:

1. Bark of *Dalbergia* was flat and colour was reddish-brown.
2. Taste of bark was astringent and bitter.
3. Apart from normal histological characters of bark, obliteration of phloem was seen in *Dalbergia* and having better appearance of concentric rings of fibres.
4. Bark contain iodioblasts as sclereids/stone cells.
5. In *Dalbergia* secretory cells were found with tannin.
6. Medullary rays found 2-3 celled in *Dalbergia* bark.
7. Powder of bark found dark red.

Morphological Characters of Tree and Macroscopical Characters of Bark of *Dalbergia sissoo* Roxb.

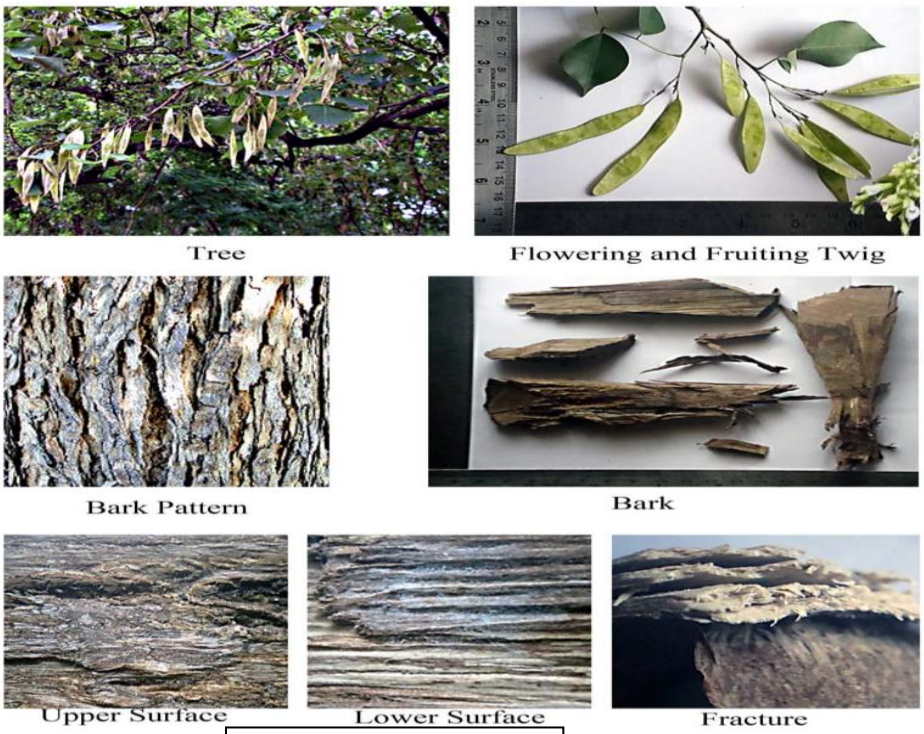


Plate Number - 1

Microscopical Characters of Bark of *Darlbergia sissoo* Roxb.

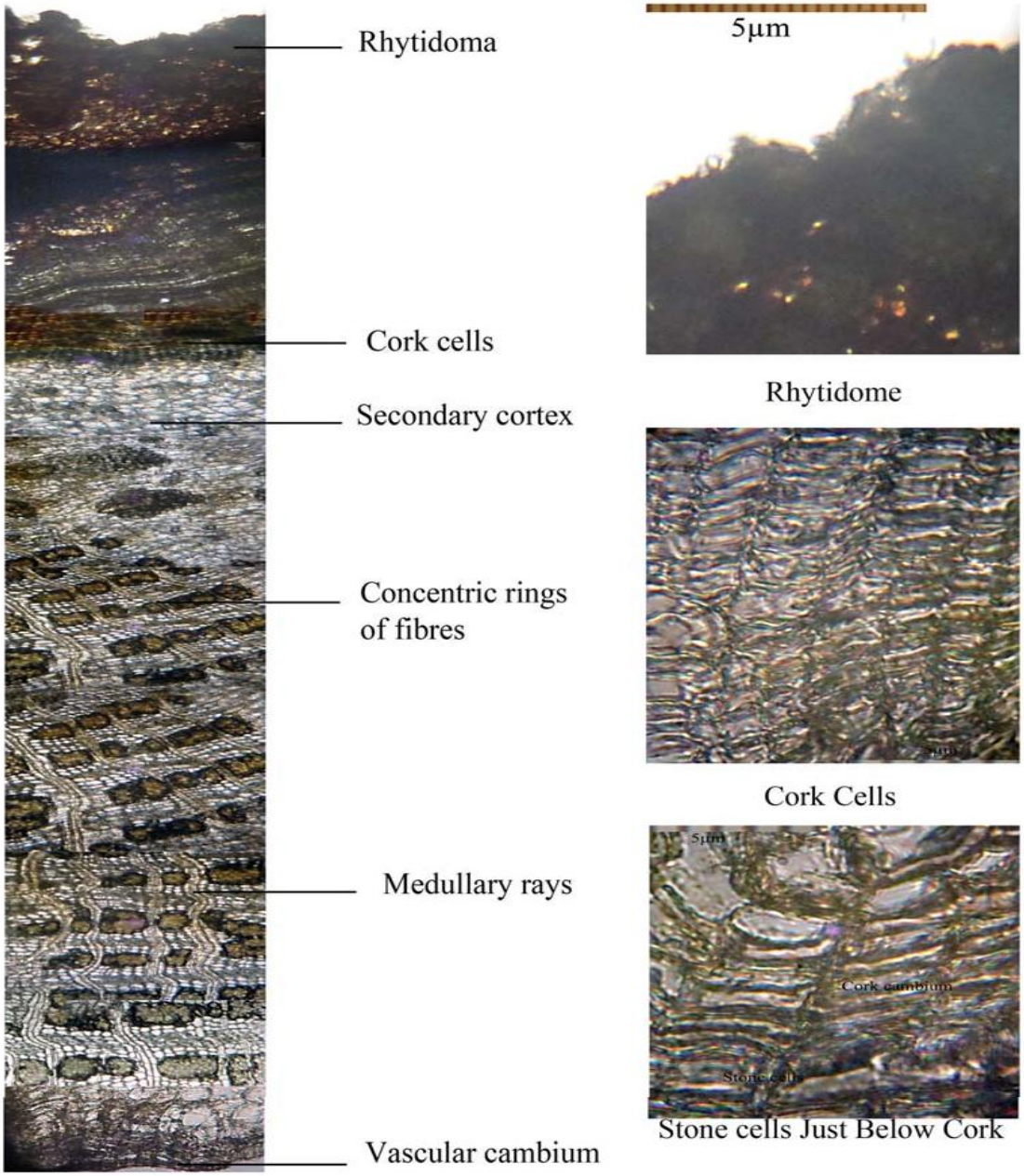
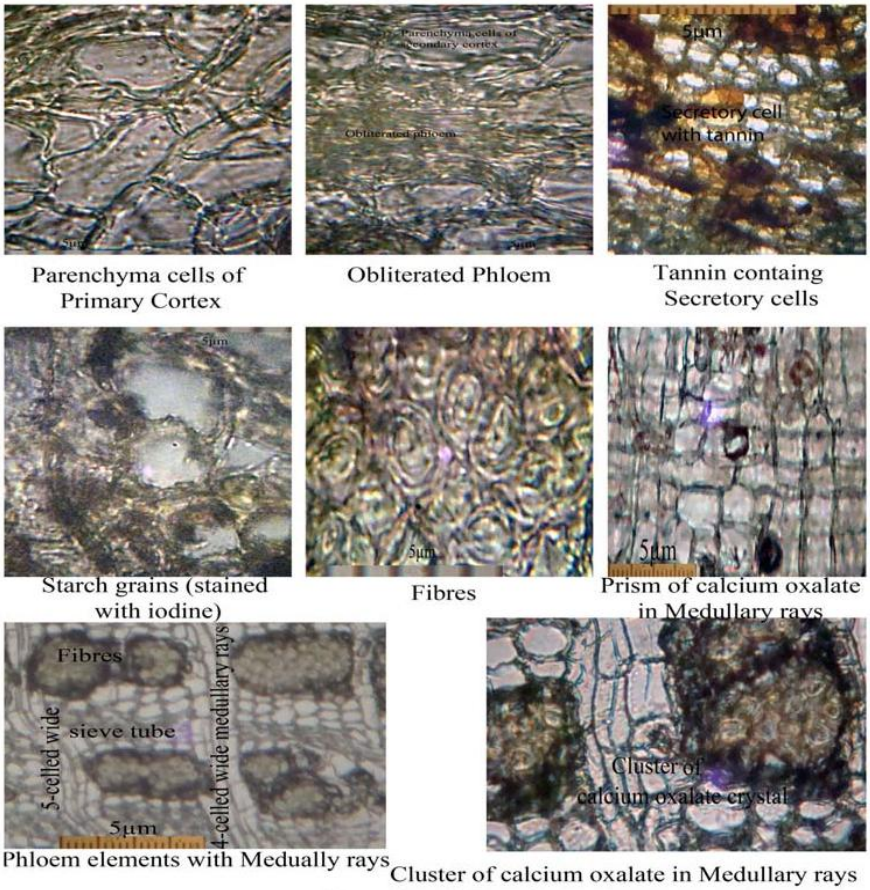


Plate Number 2

Microscopical Characters of Bark of *Dalbergia sissoo* Roxb.



Powder Characters

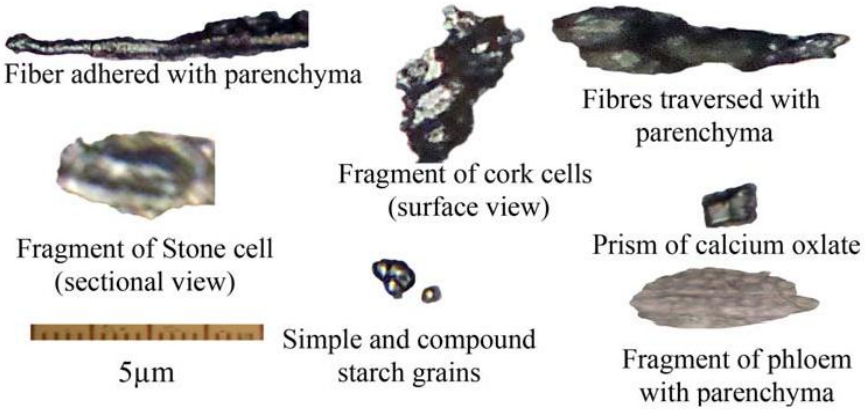


Plate Number 3

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