

Pharmacognostical Study of Bark of Chirbilva *Holoptelia Integrifolia* Planch

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Abstract

Purpose: Pharmacognostical study of bark of Chirbilva *Holoptelia integrifolia* is done for identification in field and to avoid adulteration by standardization.

Methods: Drug is studied taxonomically and its macroscopic, microscopic features were studied including powder microscopy of bark with suitable instruments.

Results: Macroscopic study reveals dried bark from trunk of old branches was flat, somewhat curved in shape. Outer surface was grayish brown in color with blackish brown adherent patches of rhytidoma while inner surface was yellow in color. Outer surface was rough, warty due to rounded protuberances of the lenticels. Microscopic study reveals rhytidoma traversed with stone cells, followed by narrow zone of parenchymatous cortex with stone cells. Phloem was very wide, traversed with wavy medullary rays, tangential bands of fibers and stone cells. Uni-to triseriate medullary rays was observed. Powder microscopy reveals fragments of lignified cork with stone cells. Isolated or groups of thick-walled spherical to oblong shaped, pitted stone cells and septate fibres were present. Prismatic crystals of calcium oxalate and simple starch grains were scattered as such throughout or embedded in parenchymatous cells. Fragments of tangentially and radially-longitudinally cut medullary rays associated with fibres were seen.

Conclusion: Finding of this study will facilitate 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 ayurvedic classical claims.

Keywords: *Holoptelia integrifolia* • T.L.C • Chirbilva • Pharmacognosy • Powder microscopy • Standardization

Introduction

Holoptelia integrifolia Planch: F.B.I. v481 wtict 1968 *Ulmus integrifolia* Roxb. Cor.pl.t.78 Bedd.Fl.t.310: It is a deciduous tree; Bark whitish grey with an offensive smell when freshly cut: wood light yellowish grey, moderately hard, little used except as fuel; Leaves alternate, distichous entire pinnately nerved stipules lateral scarious, Flowers polygamous, Fruit dry indehiscent, samaroid flat the wing ovate According to The flora of Presidency of Madras [1]. It is a deciduous tree; Bark whitish grey with an offensive smell when freshly cut: wood light yellowish grey, moderately hard, little used except as fuel; Leaves alternate, distichous entire pinnately nerved stipules lateral scarious; Flowers polygamous or hermaphrodite in fascicles at the scars of the previous years shoots, which are scaly but leafless; Perianth simple calycine 4-8partite, lobes imbricate often unequal; Stamens 4-8 erect: anthers hairy ovary stipitate compressed; ovule solitary pendulous, style short, bifid, the stigmatose; Fruit dry indehiscent, samaroid flat the wing ovate, reticulate membranous; Seeds flat, albumen 0; cotyledons longitudinally folded; radicle small superior. As mentioned in data base [2], the bark and leaves are Tikta (bitter), Kashaya (astringent), acrid and

Ushna veerya (thermogenic). It has anti-inflammatory, digestive, carminative, laxative, anthelmintic, depurative revulsive and urinary astringent properties. They are useful in inflammation, acid gastritis, dyspepsia, flatulence, colic, intestinal worms, vomiting, wounds, skin disease, vitiligo, leprosy, filariasis, diabetes, haemorrhoids, and rheumatism. *Susruta samhita Kalpasthana* 6th Chapter In the form of *Ksharaagada* According to *Bhaisajyaratnavalli* [3] it is used as an ingredient in *Gandhakajjalika*, *Mahasat Palakaghrita*, *Simhyamrita ghrita*, *Chirbilvadi kashaya*, *Chirbilvadi Choorna*, *Puskaradi Kvatha*, *Mahapinda tailam* According to A.P.I [4] it is used in *Piyusavalli rasa*, *Gandharvahastadi Kvatha Churna*. As usage of bark is more so pharmacognostical study of bark is taken. According to *Susruta samhita* 15. *Chirbilwa* is included in *Argvadhadi gana*, *Varunadi gana*, *Arkaadi gana* *Salasradi gana*, which are indicated in *kapha* and *prameha* *medodusti*. *Charaka Samhita* 14 has grouped *Chirbilva* under *lekhaniya* and *bhedaniya mahakashaya Astanga Hridaya* [5] whereas references of regarding this drug also found in these texts such as *Chikitsasara Samgraha* [6], *Astanga Nighantu* [7], *Soushruti Nighantu* [8], *Siddhamantra* [9], *Shodala Nighantu* [10], *Dhanwantri Nighantu* [11], *Madanpala Nighantu* [12] and *Kaideva Nighantu* [13].

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Materials and Methods

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 [14].

Plant material

The bark of *Holoptelea integrifolia* Planch. (Family- *Ulmaceae*) was collected from college campus of A.L.N. Rao Memorial Ayurvedic Medical College, Koppa in the month of September 2013. Taxonomical verification was done by botanist Prof. Radhakrishna Rao in A.L.N. Rao Memorial Ayurvedic

Medical College. Ayurvedic medical from modern aspects Quality Control Laboratory at A.L.N. Rao Memorial by Dr. Prashant Kumar Jha [15].

Taxonomical validation

The taxonomical characters of grown plant was 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 [16, 17].

Preservation of samples

Bark was washed properly preserved in a solution of formalin-acetoalcohol (FAA) for detailed Microscopic study. For macroscopical studies sample was air-dried under net in sun. An air-dried sample was powdered for powder microscopy.

Macroscopic study

It includes the observations based on organoleptic characters like shape, size, taste, odour, color, touch, texture and fracture. Importance of identification is well mentioned in Ayurvedic texts for better therapeutic effects by applying Panchendriya pareeksha [18-24].

Barks' Microscopy: Free hand transverse section of bark of *Holoptelea integrifolia* Planch was taken. Then 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.

Powder Microscopy: Powder of both drugs 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. Cracks were seen with *Holoptelea integrifolia*. Rhytidome cells were also found on outer surface. Bark also contain longitudinal lining on inner surface which is due to abundance of fibres present with bark. Taste of bark was astringent and bitter. Rasa of *Holoptelea integrifolia* (Roxb.) Planch is given as Katu [11], Tikta [12] and Kashya [13] Odour of bark was characteristic.

Microscopic Study

Holoptelea integrifolia bark seen darker due to bigger portion of rhytidome covering the bark.

Medullary rays were 3-4-celled. Cell inclusions like clusters and prisms of calcium oxalate crystals and starch grains were common in bark. Stone cells or sclereids were seen below the cork cells in this bark. The thickness of wall was four narrower in *Holoptelea*. Secretory cells secreting mucilage and containing tannin Powder of *H. integrifolia* was creamish-brown in colour. Taste of powder was bitter and astringent.

Results

Pharmacognostical study

Macroscopic study

Holoptelea Integrifolia (Roxb.) Planch (Plate number: 0) (Figure 1)

Shape: Dried bark from trunk of old branches was flat, somewhat curved

in shape

Size: 2 – 5 cm in width and 1 to 1.5 cm in thickness

Colour: Outer surface was grayish brown in color with blackish brown adherent patches of rhytidoma while inner surface was with yellowish touch

Surface: Outer surface was rough, warty due to rounded protuberances of the lenticels. Inner surface was tough, longitudinally striated

Odour: Characteristic

Taste: Astringent somewhat bitter

Powder: The powder was yellow in colour, bitter in taste and fetid in odour.

Microscopic study

Holoptelea Integrifolia (Roxb.) Planch (Plate number: 1, 2).

Outline of transverse section (TS) of the bark revealed outermost broad brownish patches of rhytidoma traversed with stone cells, followed by narrow zone of parenchymatous cortex with stone cells. Phloem was very wide, traversed with wavy medullary rays, tangential bands of fibers and stone cells. The detailed TS showed outermost multilayered lignified cork, followed by narrow zone of parenchymatous cortex traversed with isolated or groups of oval to spherical pitted stone cells and prismatic crystals of calcium oxalate. Phloem was wide traversed with stone cells and group of fibres which run tangentially towards the inner side alternating with non-lignified phloem tissue. Phloem was obliterated at places. Isolated spherical mucilage cells and cell containing prismatic crystals of calcium oxalate were often found to

Morphological Characters of Tree and Macroscopical Characters of Bark of *Holoptelea integrifolia* (Roxb.) Planch.



Plate Number: 0

Figure 1. Morphological characters of tree Macroscopical characters of Bark of *Holoptelea Integrifolia* (Roxb.) Planch, plate number 0.

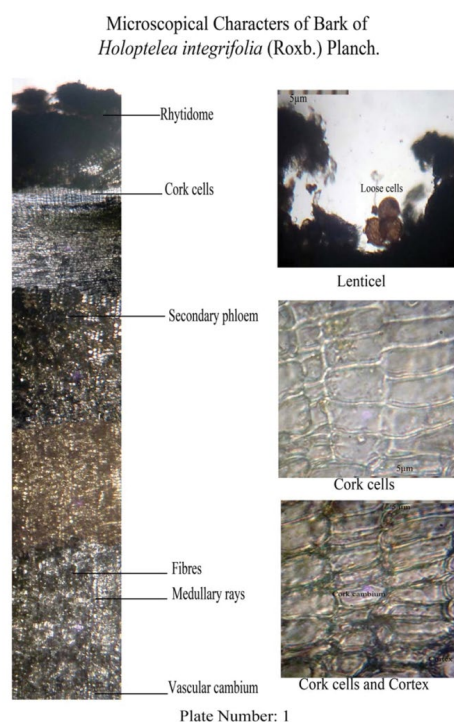


Figure 2. Microscopical characters of Bark of *Holoptelea Integrifolia* (Roxb.) planch, plate number 1.

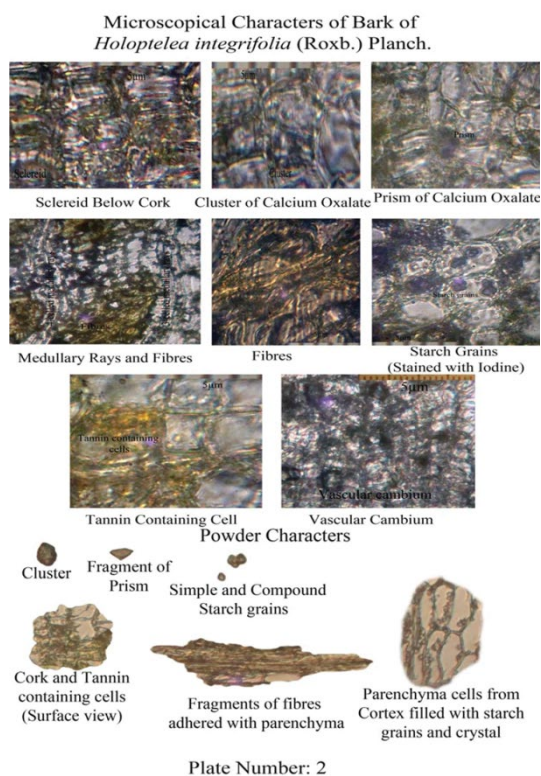


Figure 3. Microscopical characters of Bark of *Holoptelea Integrifolia* (Roxb.) planch, plate number 2.

be embedded in these fibres. Uni-to triseriate medullary rays was observed running spirally in the outer phloem becoming narrower and somewhat straight towards the inner region. Simple, spherical starch grains traversed throughout the parenchymatous tissue of the section.

Powder microscopy: Under compound microscope, it revealed fragments of lignified cork in surface view often traversed with stone cells. Isolated or groups of thick-walled spherical to oblong shaped, pitted stone

cells and septate fibres were present. Prismatic crystals of calcium oxalate and simple starch grains were scattered as such throughout or embedded in parenchymatous cells. Fragments of tangentially and radially-longitudinally cut medullary rays associated with fibres were seen (Figures 2 and 3).

Conclusion

Present work is Pharmacognostical study of bark of Chirbilva *Holoptelea integrifolia* Planch. After observing from different aspects following conclusion can be drawn [25].

Dried bark from trunk of old branches was flat, somewhat curved in shape 2 – 5 cm in width and 1 to 1.5 cm in thickness. Outer surface was grayish brown in color with blackish brown adherent patches of rhytidoma while inner surface was with yellowish touch. Outer surface was rough, warty due to rounded protuberances of the lenticels. Inner surface was tough; longitudinally striated. Characteristic in Odour Bark of *Holoptelea* was more flat and with yellow color. Taste was astringent and bitter. Apart from normal histological characters of bark, more obliteration of phloem was seen in *Holoptelea*. Bark had idioblasts as sclereids/stone cells, but the lumen of idioblast was found narrower. Secretory cells and mucilage containing cells were observed in bark. Medullary rays were 3-4 celled in *Holoptelea* bark. Powder of *Holoptelea* was yellowish in colour. Pitted walled stone cells were observed clearly in *Holoptelea* bark.

Acknowledgement

None.

Conflict of Interest

No potential conflict of interest was reported by the authors.

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