

ORIGINAL RESEARCH ARTICLE

# Pharmacognostical Study of the Bark of *Chirbilva Holoptelia integrifolia* Planch

Author: Vinod Katoch<sup>1</sup>

Co Authors: Prashant Kumar Jha<sup>2</sup>

<sup>1</sup>Department of Dravyaguna, Abhilashi Ayurvedic Medical College and Research Institute Chailchowk Mandi, H.P, India

<sup>2</sup>Quality Control Laboratory at A.L.N. Rao Memorial Ayurvedic Medical College Koppa Chikmagalur Karnataka, India

## 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.

**Key Words** *Holoptelia integrifolia*, T.L.C, *Chirbilva*, Pharmacognosy, Powder microscopy, Standardization

Received 19<sup>th</sup> July 22 Accepted 12<sup>th</sup> August-22 Published 10<sup>th</sup> September 2022

## 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;

## ORIGINAL RESEARCH ARTICLE

Leaves alternate, distichous entire penni nerved stipules lateral scarious, Flowers polygamous, Fruit dry indehiscent, samaroid flat the wing ovate According to The flora of Presidency of Madras<sup>1</sup>. 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 penni 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<sup>2</sup>, 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*<sup>3</sup> it is used as an ingredient in *Gandhakajjalika*, *Mahasat Palakaghrita*, *Simhyamrita ghrita*, *Chirbilvadi kashaya*, *Chirbivadi Choorna*, *Puskaradi Kvatha*,

*Mahapinda tailam* According to A.P.I<sup>4</sup> 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*<sup>5</sup>, *Chirabilwa* is included in *Argvadhadi gana*, *Varunadi gana*, *Arkaadi gana* *Salasradi gana*, which are indicated in *kapha* and *prameha medodusti*. *Charaka Samhita*<sup>14</sup> has grouped *Chirbilva* under *lekhaniya* and *bhedaniya mahakashaya Astanga Hridaya*<sup>5</sup> whereas references of regarding this drug also found in these texts such as *Chikitsasara Samgraha*<sup>6</sup>, *Astanga Nighantu*<sup>7</sup>, *Soushruti Nighantu*<sup>8</sup>, *Siddhamantra*<sup>9</sup>, *Shodala Nighantu*<sup>10</sup>, *Dhanwantri Nighantu*<sup>11</sup>, *Madanpala Nighantu*<sup>12</sup>, *Kaideva Nighantu*<sup>13</sup>.

## 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.

### 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.

## ORIGINAL RESEARCH ARTICLE

### Taxonomical Validation<sup>16,17</sup> :

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

### Preservation of samples:

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

### Macroscopic study<sup>18</sup> :

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*.

### Microscopic Study<sup>18,19,20,21,22,23,24</sup> :

**1) 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.

**2) 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 was seen with *Holoptelea integrifolia*. Rhytodome 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*<sup>11,12</sup>, *Tikta*<sup>13</sup> and *Kashya*<sup>13</sup> 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 foun narrower in *Holoptelea*. Secretory cells secreting



ORIGINAL RESEARCH ARTICLE

mucilage and containing tannin Powder of *H. integrifolia* was creamish-brown in colour. Taste of powder was bitter and astringent.

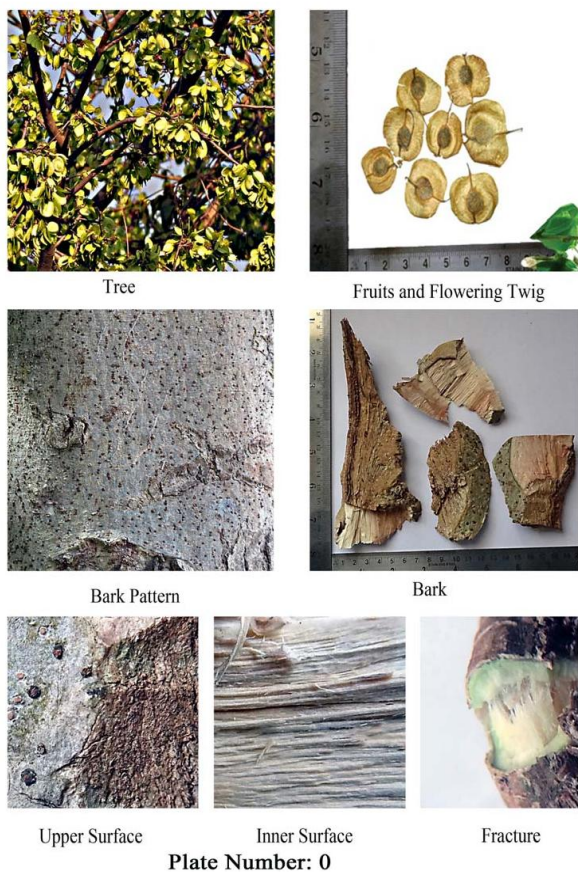
RESULTS

PHARMACOGNOSTICAL STUDY

Macroscopic study:

*Holoptelea integrifolia* (Roxb.) Planch. (Plate Number: 0)

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



Shape: Dried bark from trunk of old branches was flat, somewhat curved in shape  
 Size: 2 - 5cm 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

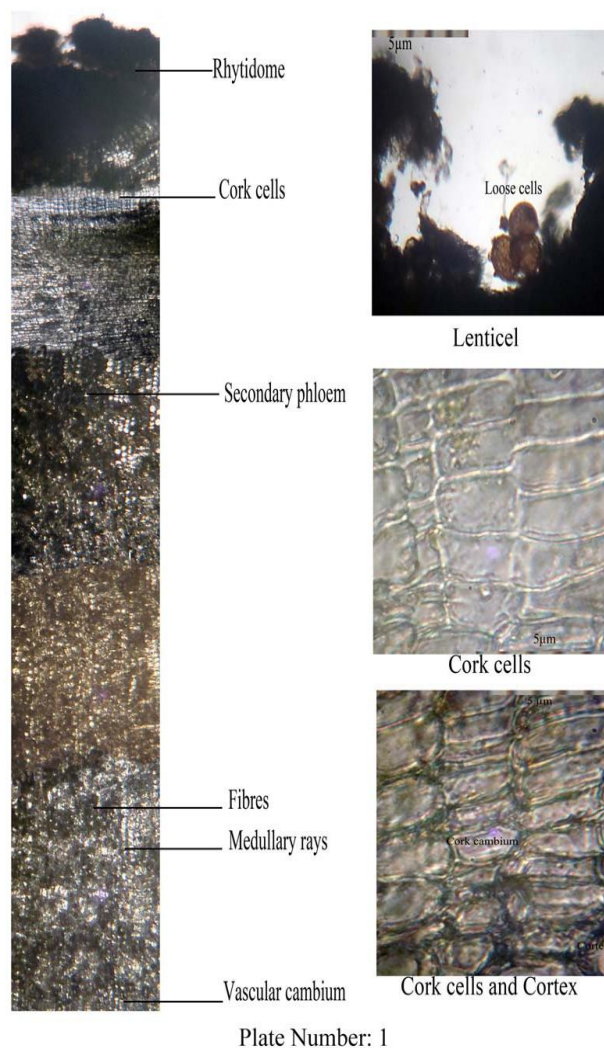
Taste: Astringent somewhat bitter

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

Microscopic Study:

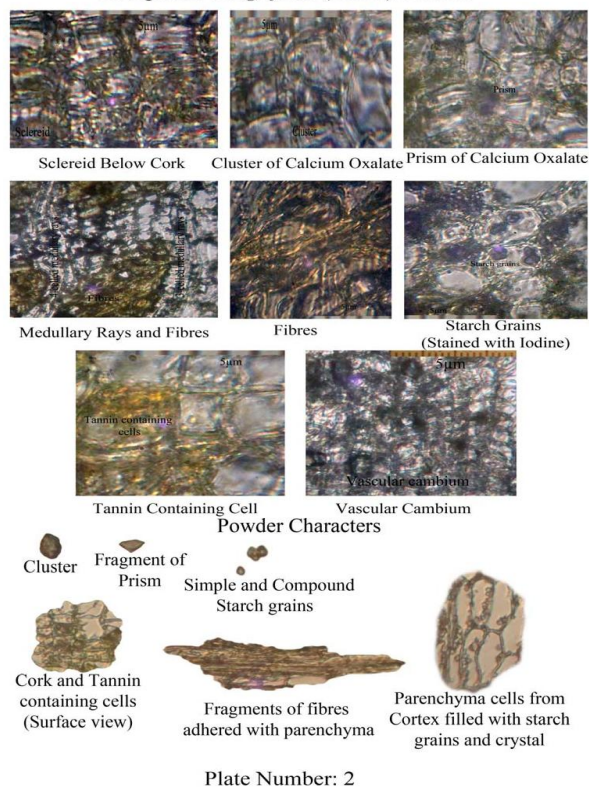
*Holoptelea integrifolia* (Roxb.) Planch. (Plate Number: 1, 2)

Microscopical Characters of Bark of *Holoptelea integrifolia* (Roxb.) Planch.



ORIGINAL RESEARCH ARTICLE

Microscopical Characters of Bark of *Holoptelea integrifolia* (Roxb.) Planch.



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 fibres 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 be embedded in these fibres. Uni-to triseriate medullary rays was observed running spirally in the outer phloem becoming narrower and some what straight towards the inner region. Simple, spherical starch grains traversed through out 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.

CONCLUSION

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

Dried bark from trunk of old branches was flat, somewhat curved in shape 2 - 5cm 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

### ORIGINAL RESEARCH ARTICLE

*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. Medullar 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.



## ORIGINAL RESEARCH ARTICLE

### REFERENCES

1. J.S Gamble , Flora Of Presidency Of Madras Volume-3 published under the authority of secretary of State Of India in Council London and Son Limited 21 Hart Street. W.C, Page No.-1341.
2. Database On Medicinal Plants Used In Ayurveda by Central Council For Research in Ayurveda and Siddha Department of ISM & H, Ministry of Health and Family Welfare Government of India, Page No.-171.
3. Govind Das Bhaisajya Ratnvali commented upon by Vaidya Shri. Ambika Datta Shastri Vol – I,II published by Chaukhambha Sanskrit Sansthan, Page No.-160-166, 436 567-571.
4. Anonymous (1999) Ayurvedic Pharmacopeia Of India Part – I , Vol – III IV Ist Edition Government Of India, Ministry of Health and Family Welfare, Department of Ayurveda Yoga Naturopathy Unani, Siddha and Homeopathy (AYUSH) New Delhi.
5. Astanga Hridaya Of Vagbhata Edited with Vidyotini Hindi commentary oby Kaviraja Atrideva Gupta Edited by Vaidya Yadunandana Upadhyaya published by Chaukhambha Prakashan Edition :reprint 2012, Page No.-141-142.
6. Vangasena, Vangseena samhita or Chikitsasara Samgraha, text with English translation by Dr.Nirmal Saxena. Vol.II Chaukhamb Sanskrit series office,Varanasi 1<sup>st</sup> edition 2004, Page No.-797.
7. Astanga Nighantu – Of Acarya Vahata Edited by Dr.P.V Sharma Reprinted from The Kuppuswamy Sastri Reseach Institute Madras-4 1973, Page No.-10
8. Soushruti Nighantu – Editor Dr.Kashiraja Sharma Suvedi and Dr.Narendra nath Tiwari Published by Mahendra Sanskrit Vishwavidhyalaya Baelghundi Daad Nepal–2000, Page No.- 60-62
9. Siddhamantra of vaidhyacharya kesava with prakash commentary of vopa deva edited by P.V Sharma, Chaukhamba Amarbharti Prakashan, Varanasi, Page No.-14.
10. Shodala- Shodala Nighantu Commentor Prof.Gyanendra Pandey editor Prof. R.R Dixit Foreward Prof.M.S Baghel 1st Edition, Page No.-116-117
11. Dhanwantari Nighantu- Edited by Dr.Jharkhande Ojha ,Chaukhamba Surbharti Prakashan Varanasi- 2004, Page No.-226
12. Madanpal Nighantu Edited by Shri Madan Pal Naval Kishore Press Publications p.90
13. Kaiyadeva Nighantu – Edited and translated by Prof. P.V.Sharma and Guruprasada Sharma. 1st Edition Chaukhambha orientalia Varanasi. 2016, Page No.-178
14. Agnivesha elaborated by Caraka & redacted by Drdhabala Vol – I Edited with Vaidyamanorama' Hindi Commentary along with special deliberation etc by Acharya Vidyadhar Shukla, Prof.Ravi Dutt Tripathi Foreward by

**ORIGINAL RESEARCH ARTICLE**

- Acharya P.V Sharma Chaukhamba Sanskrit Pratishthan Delhi-2007, Page No.-72
15. Susruta – Maharasi – Susruta Samhita Edited with Ayurveda – Tattva – Sandipika by Kaviraja Ambikadutta Shastri Part –I Edition reprint 2018 Chaukhamba Sanskrit Sansthan Publication Varanasi, Page No.-183-184
16. Theodore Cooke, Flora of the Presidency of Bombay, Vol-I,II&III, Page No.-394,550 &223
17. Gamble J.S- Flora of Presidency of Madras, Vol.I, Adlard & Son Ltd.,London, 1928, Page No.-136
18. Evans William Charles, Trease And Evans' Pharmacognosy, Edition, 14. Publisher, Harcourt Brace & Co, 1997. ISBN, 0702024015, Page No.-96-98.
19. T.E.Wallis, Textbook Of Pharmacognosy, CBS Publishers & Distributors, Fifth edition, 2005, ISBN: 81-239-0886-5, Page No.-527-533
20. Eames, A.J. and Macdaniels, L.H. 1947. An Introduction to Plant Anatomy, McGraw-Hill Book Co. New York, Page No.-293
21. Esau, K. 1965. Plant Anatomy 2nd Edition, John Willey and Sons, New York, Page No.-211, 255, 291, 323, 357.
22. Fahn, A. 1967. Plant Anatomy. Pergamon Press, Oxford, London, Page No.-78,446,468,469
23. Foster, A.S. 1949. *Practical Plant Anatomy*, Van Nostrand, Princeton, New Jersey, Page No.-32, 45, 57, 67, 73,101
24. Metcalfe, C. R. and Chalk L. 1979, *Anatomy of the dicotyledons and its revised edition*. Clarendon Press-Oxford, Page No.-33,68.
25. <https://ijapr.in/index.php/ijapr/article/view/2381/1635>