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"PHARMACOGNOSTIC EVALUATION OF CHIRALBILVA BARK AND HEART WOOD"

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ABSTRACT

Background: Pharmacognosy of a plant gives a comprehensive knowledge regarding its method of identification and determination of quality and purity of the raw drugs. Every species has its own characteristic features which determine the authenticity of that particular drug. Phytochemicals are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans. These compounds are known as secondary plant metabolites and have biological properties such as antioxidant activity, antimicrobial effect, modulation of detoxification enzymes, stimulation of the immune system etc. **Objectives:** The main objective of this study is to evaluate the pharmacognostic properties of *Chirabilva-Holoptelea integrifolia* (Roxb.) Planch. bark and heart wood. **Material and Method:** Fresh *Chirabilva* tender stem is collected for pharmacognostic study and for the Physio-chemical and phytochemical study bark and heart wood of a mature plant is collected. **Results and Conclusion:** The bark of *Chirabilva* is slightly curved, outer surface rough, grey to brownish grey, with lenticels and inner surface yellowish brown, fibrous, smooth; fracture hard; odour not characteristic and taste slightly bitter. The heart wood is light yellow with an unpleasant odour when freshly cut, lustrous, somewhat interlocked-grained, medium and even-textured, moderately heavy. Chemically Tannins, Flavonoids, Saponins are present in the stem bark of *Chirabilva* and *Chirabilva* heart wood.

KEYWORDS: Pharmacognosy; Phytochemicals; Secondary plant metabolites; Physio-chemical; Antioxidant; Antimicrobial; Detoxification

1. INTRODUCTION

Pharmacognosy is a branch of Pharmaceutical science, which deals with naturally occurring biological products especially those derived from plants. The term Pharmacognosy is derived from two Greek words 'Pharmacon' means drugs and Gignosco or Gnosis-to acquire knowledge. Pharmacognosy of a plant gives a comprehensive knowledge regarding its method of identification and determination of quality and purity of the raw drugs. Every species has its own characteristic features which determine the authenticity of that particular drug. So it becomes helpful to differentiate closely related species of the same genus or family. It also enables us to standardize a drug. This is the need of today.[1, 2]

Phytochemicals (from the Greek word phyto, meaning plant) are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and micronutrients.[3] It is well-known that plants produce these chemicals to protect themselves, but recent researches demonstrate that many phytochemicals can also protect human against diseases. These compounds are known as secondary plant metabolites and have biological properties such as antioxidant activity, antimicrobial effect, modulation of detoxification enzymes, stimulation of the immune system, decrease of platelet aggregation and modulation of hormone metabolism and anticancer property.[4]

Chirabilva-Holoptelea integrifolia (Roxb.) Planch; Fam. *Ulmaceae*, is a large spreading deciduous tree found throughout the greater part of India up to an altitude of 660mtrs. *Chirabilva* is the drug which was present in *Vedic kala* by the name of putika. It was also present in all *Samhitas* except in *Harita Samhita*. In *Charaka Samhita* it is described in *Lekhaniya* and *Bhedaniya mahakashaya* with the name of *Chirabilva*, in *Sushruta Samhita* it is described in *Salasaradi gana, Varunadi gana, Argvadhadi gana, Arkadi gana* and *in Shyamadi gana* with the name of *Putika* while in *Astangahridaya Chirabilva* is described in *Argvadhadi gana, Asanadi gana, Varunadi gana, Arkadi gana* with the name of *Putika*. In most of the *Nighantus Chirabilva* is described as a synonym of *Puti karanja*.[5]

Almost all *Acharyas* have mentioned *Katu, Tikta Rasa; Laghu, tikshna Guna; Usna Virya; Katu Vipaka* for *Chirabilva. Chirabilva* is mainly *Kapha-Vata shamaka, Patra* is *Pitta kara* and *Vata-Kapha shamaka. Ankura (Leaf bud)* is *Vata-Kapha shamaka. Phala* is also *Vata-Kapha shamaka*. The properties of *Pushpa* are described by only *Shaligrama Nighantu*, having *Vata-Pitta-Kapha shamaka* properties.

Stem bark contains two triterpenoid fatty acid esters holoptelin A and B, 2-aminonaphthaquinone, friedelin, epifriedelinol, B-sitosterol and its B-D- glucose. **Heartwood** contains B-sitosterol, 2a, 3a- dihydroxyloelan-12-en-28 oic acid and hederagenin; **Leaves** contains Hexacosanol, octacosanol, B-sitosterol and B-amyrin; **Driedseed** contains Carbohydrates, pigments, oils, acids, glycosides, sterols, tannins, proteins, free amino acids, major fatty acids; and steroids-b-sitosterol and stigmasterol and **Pollens** contains Histamine and 5- hydroxytryptamine.[5] The Leaves of Chirabilva possess Anti-microbial,[6] Analgesic,[7] Anti-arthritic,[8] Anti-diabetic,[9] Anti-inflammatory,[10] Anti-larval,[11] Anti-tumour,[12] Anti-ulcer,[13] Anti-diarrhoeal,[14] Pollution control activity.[15] Bark of chirabilva has Anti-oxidant,[16] Anti-bacterial,[17] Anti-helminthic[18] and Hypo lipidaemic activity.[19]

Aims and Objective

No previous work was found on the heart wood of chirabilva plant. Most of the previous works were done on bark and leaves and also in **A.P.I.** only description of fruit of Chirabilva (*Holoptelea integrifolia)* is available. So the present study deals with the comparative study of Chirabilva bark and heart wood pharmacognosticly. This study deals with mainly macroscopic, microscopic study of stem bark and heart wood along with other important physic-chemical parameters such as ash value, acid insoluble ash etc. along with phytochemical test. These data will be helpful in identification and standardization of the drug.

2. MATERIALS AND METHODS

For the Pharmacognostic study a fresh tender stem of *Chirabilva* plant was collected from the garden of S.V.Ayurvedic college, Tirupati (AP), dried in shade and was used for present study. Free hand sections of the material preserved in Formaldehyde acitic acid alcohol (FAA) solution were taken and stained with safranine as well as phloroglucinol fallowed by concentrated hydrochloric acid. The pictures were taken with the help of Menoscope (A digital microscope). For the Physio-chemical study bark and heart wood of a mature plant were collected from the garden of S.V.Ayurvedic college, Tirupati (AP), dried in shade and made powder separately. Macroscopic characters, Foreign matter, Moisture content, Total ash, Acid – insoluble ash, Water insoluble ash, Alcohol – soluble extractive, Water – soluble extractive were carried out as per API Part-I, Vol 6, APPENDIX - 2.

3.OBSERVATION AND RESULTS

3.1.Macroscopical characters of Bark

Dried stem bark pieces are of variable in size, mostly 3 cm. in length, 1.5 to 6 cm. in width, 0.5 to 1 cm. thick, slightly curved, outer surface rough, grey to brownish grey, with lenticels and inner surface yellowish brown, fibrous, smooth; fracture hard; odour not characteristic and taste slightly bitter.

Image No 1: Showing Chirabilva bark

3.2. Macroscopic characters of Heart wood

The wood is light yellow with an unpleasant odour when freshly cut, lustrous, somewhat interlocked-grained, medium and even-textured, moderately heavy. It can be kiln-seasoned successfully and retains its brightness and colour.

3.3. Microscopical characters

3.3.1. T. S. of stem with bark

Transverse section of stem bark shows wide zone of cork composed of 15-25 or more layers, consisting of rectangular to square shaped thin walled brownish coloured cells. The continuity of the cork is distrupted here and there due to presence of lenticels. The cork is fallowed by 3 – 5 layers of phellogen and a wide zone of phelloderm; phloem occupied 1/3rd of the bark. Peripheral region of phelloderm shows patch of stone cells which are variable in shape, lignified and radiating canals. Groups of phloem fibres traversed by medullary rays; phloem fibres lignified having narrow lumen and septate and parenchyma cells contains starch grains and prismatic crystals of calcium oxalate. Vascular bundles are arranged on different radeai and xylem and phloem are devided by cambium rings. Clearly visualised large pithin the central.

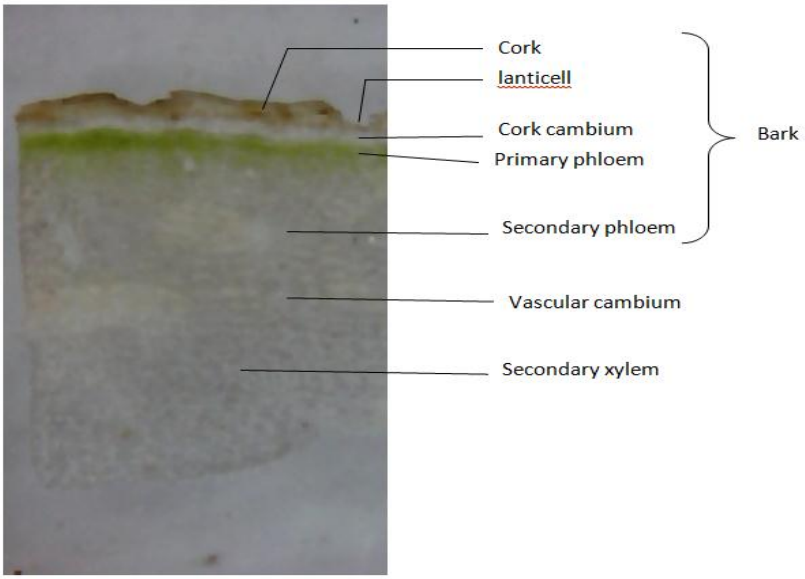

Image No. 2: T.S. of stem bark

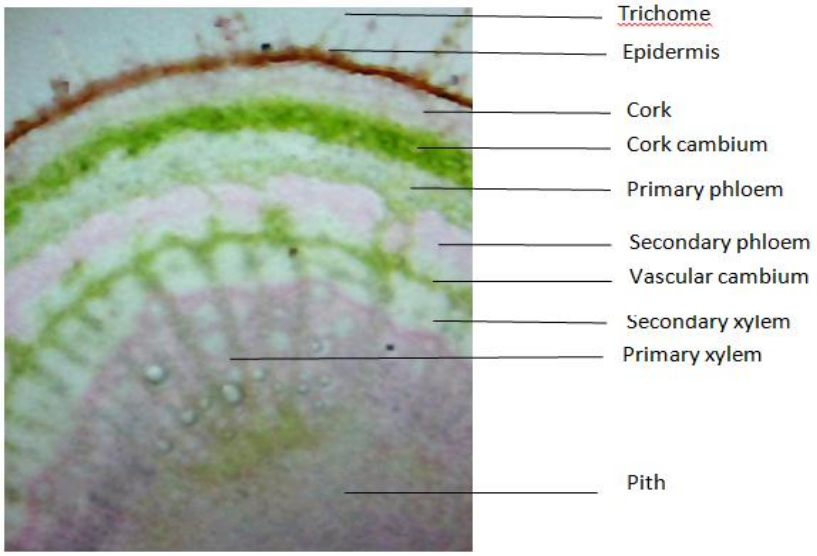

Image No. 3: T.S. of total stem

Image No 4: Digital microscopic image of powdered heart wood

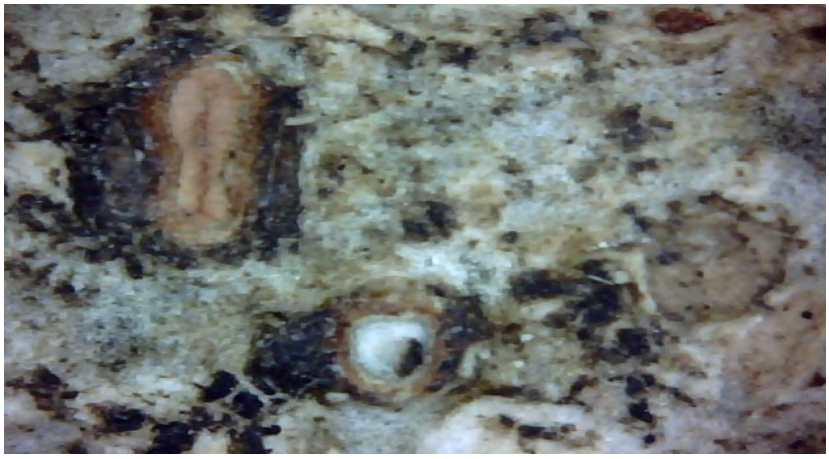

Image No. 5: Digital microscopic image of bark of *Chirabilva*

Table No. 1: Physico-chemical parameters of stem of *Holoptelea integrifolia* Planch

Parameters	Bark	Heart wood
Foreign matter	2.0 %	0%
Moisture content	4.31 %	8.5%
Total ash	6.63 %	4.0%
Acid – insoluble ash	0.98%	1.0%
Water insoluble ash	2.8%	2.4%
Alcohol – soluble extractive	5.6 %	5.8%
Water – soluble extractive	12.3 %	11.3%

3.4. Phytochemical Study: The water and alcohol soluble extractives of the drug were tested qualitatively for various chemical constituents.

Table No. 2.

SL. No.	Phytochemicals	Test	Results	
			Crude Chirabilva Bark	Crude Chirabilva Heart Wood
1	Alkaloids	Mayer's Test	-	-
2	Carbohydrates and Glycosides	Molisch's Test	-	-
3	Tannins	Ferric Chloride Test	+	+
4	Flavonoids	Alkaline Reagent Test	+	+
5	Saponins	Foam Test	+	+
6	Starch	Iodine solution Test	-	-
7	Proteinsand Amino Acids	Ninhydrin, Biuret Test	-	-
8	For steroids		-	-
9	pH	Strip Test	8	8

+ Positive; - Negative

The results obtained are tabulated above which show that tannins, flavonoids, saponins are present in bark of *Chirabilva* and *Chirabilva* heart wood. Both of the samples did not show presence of alkaloids, starch, amino acids, gum and steroids.

The pH of bark of *Chirabilva* and *Chirabilva* heart wood is 8.

Image No. 6: Phytochemical study of bark of *Chirabilva*

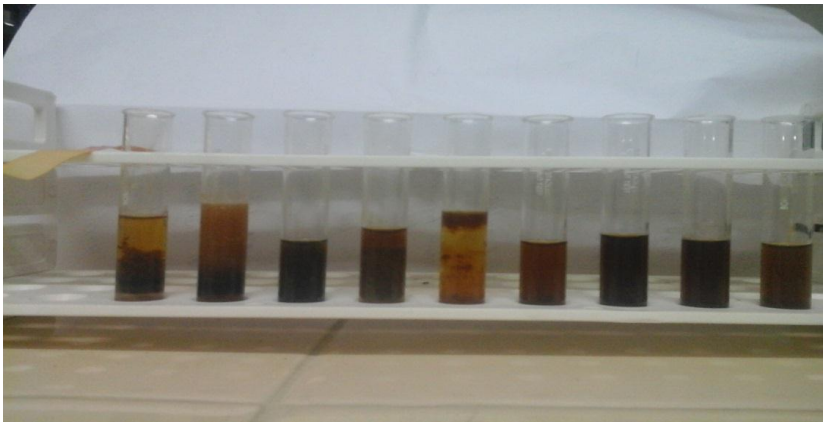

Image No. 7: Phytochemical study of *Chirabilva* heart wood

4. DISCUSSION AND CONCLUSION

Pharmacognosy of a plant gives a comprehensive knowledge regarding its method of identification and determination of quality and purity of the raw drugs. Every species has its own characteristic features which determine the authenticity of that particular drug.

The bark of *Chirabilva* is of variable in length, 6 to 10 mm thick, slightly curved, outer surface rough, grey to brownish grey, with lenticels and inner surface yellowish brown, fibrous, smooth; fracture hard; odour not characteristic and taste slightly bitter.The heart wood is light yellow with an unpleasant odour when freshly cut, lustrous, somewhat interlocked-grained, medium and even-textured, moderately heavy. It can be kiln-seasoned successfully and retains its brightness and colour.

Microscopically, outer-most cork is followed by cork-cambium and then phelloderm,lanticells are also present. Many prismatic crystals of calsium oxalate and simple rounded starch grains present in phelloderm and phloem cells. Secondary phloem with many scattered groups of phloem fibers are also present.

Chemically Tannins, Flavonoids, Saponins are present in the stem bark of Chirabilva and Chirabilva heart wood. This work is conducted in our institude as per the A.P.I. norms and available resources. Till to date, no autherized work has been conducted on the heart wood of Chirabilva.

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