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Pharmacognostical Studies on the Bark of *Artocarpus hirsutus* Lam.

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1. Abstract

*Artocarpus hirsutus Lam.,(*Wild jack) belonging to the family Moraceae a large evergreen tree up to 70m height, found up to an altitude of 1200M in evergreen India. The wood is straight blackish brown in color; it is very strong tree and has main advantage of lightness. It is used for the treatment of ulcers, diarrhea and pimples. The present study includes Pharmacognostical studies of the bark of Artocarpus hirsutus Lam.

Key words: *Artocarpus hirsutus, Pharmacognostical, Sectioning,*

2. Introduction

The plant *Artocarpus hirsutus* Lam, (Moraceae) [1, 4] is a large evergreen tree upto 70m in height, found up to an altitude of 1200M, in evergreen forest of peninsular India. The outer colour of bark is grey and inner colour is brown. The leaves are elliptic rhomboid or ovate and dark green in colour. Male head narrowly cylindrical, female heads simple. Seeds are long ovoid. It distributed in southern part of India. It requires heavy rainfall probably notes than 175cm.The wood is light straight or interlocked-grained and even tentured. Its colour is blackish brown. The heartwood is almost as strong; contain all type of flavanoid except nor-artocarpin. The main property and uses of unripe fruits are sour, astringent, sweet, thermogenic, indigestible, an aphrodisiac, constipating and cause flatulence. An infusion of the bark is applied to cure small pimples and cracks on the skin. Powered bark is used to heal sores. Dry leaves are useful in treating bubose and hydrocele.

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For over viewing medicinal properties of the plant, my effort was to study Pharmacognostical parameter of the bark of *Artocarpus hirsutus* Lam.

3. Materials and methods[5-7]

3.1. Collection of specimens

The plant specimens for the proposed study where collected from Kollam district, Kerala, care was taken to select healthy plans and normal organs. The required samples of different organs were cut and removed from the plant and fixed in FAA (Formalin 5ml+Acetic acid 5ml+70% Ethyl alcohol 90ml). After 24 hours of fixing the specimens were dehydrated with grader series of tertiary butyl alcohol as per the schedule given by Sass, 1940. Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point58-60^{0}C) until TBA solution attained supersaturation.The specimens were cast into paraffin blocks. The voucher specimen no. is PARC 2009/411.

3.2. Sectioning [8]

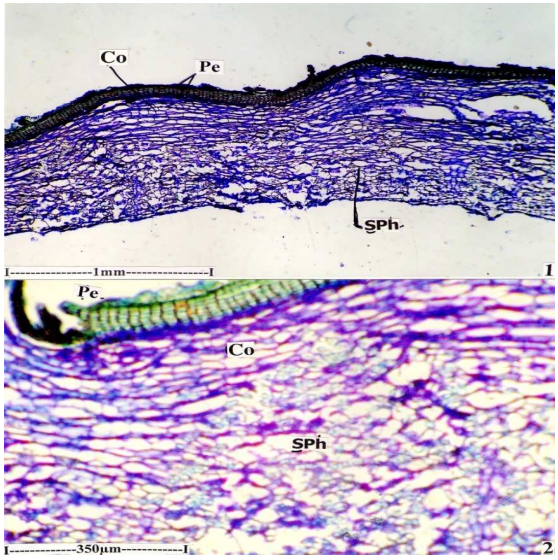
The paraffin embedded specimens were sectioned with help of rotary microtome. The thickness of the section was 10-12 µm. dewaxing of the section was customary procedure (Johnsen 1940).the section were stained with toluedene blue as per the method published by O´brien et al(1964).Since toludine blue is a polychromatic stain. The staining results were remarkably good; and some cytochemical reactions were also obtained. The dye rendered pink colour to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc. where ever necessary sections were also stained with safranin and fast green and IKI(for starch).

3.3. Photo micrographs[9]

Microscopic descriptions of tissues are supplemented with micrographs where ever necessary. Photographs of different magnifications were taken with Nikon lab photo 2 Microscopic unit. For normal observations bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Since these structures have birefringent property, under polarized light they appear bright against dark background. Magnifications of figures are indicated by the scale-bars. Descriptive terms of the anatomical feature are as given in the standard anatomy books. (Esau 1964).

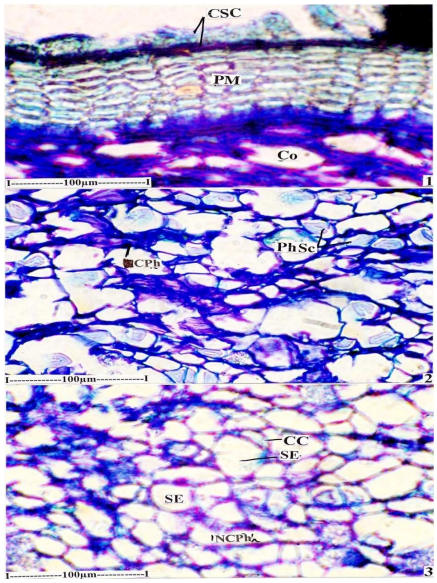
4. Microscopical characters

Figure1.1 T.S of bark-entire view
Figure1.2 T.S of bark-Periderm wit Secondary Phloem enlarged



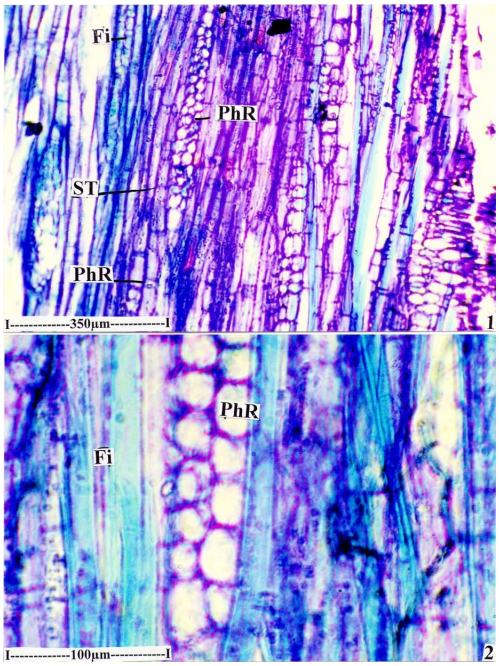
(**Co**-Cortex, **Pe**- Periderm, **SPh**-Secondary Phloem)

Figure 2.1 T.S of bark – Outer Phellem and Cortex
Figure 2.2 T.S of bark- Collapsed Phloem
Figure 2.3 T.S of bark- Non Collapsed Phloem



(**CC**-Companion Cells, **Co**-Cortex, **CSC**-Crushed Surface Cell, **CPh**- Collapsed Phloem, **NCPh**- Non Collapsed Phloem, **PhSc**-Phloem Scleroids, **PM**- Phellem, **SE**-Sieve Elements.)

Fig 3 TLS of phloem
Fig 3.1 TLS of Phloem showing FIbres phloemrays Sieve Tube members
Fig 3.2 TLS of Phloem showing Fibers Phloem rays Sieve Tube members enlarged



(**Fi**- Fibre, **PhR**-Phloem Rays, **ST**-Spongy Mesophyll Tissue).

Powder microscopy of the bark

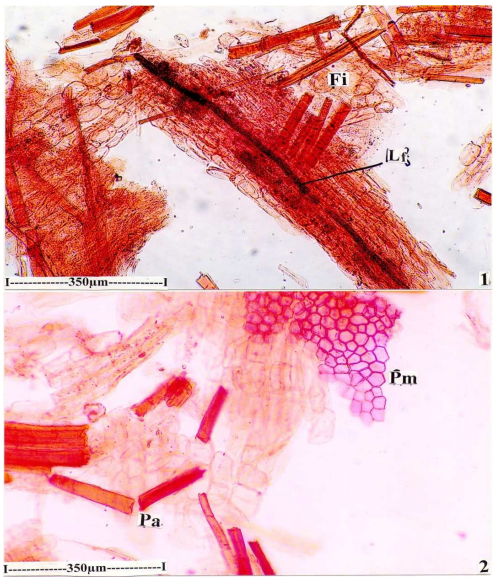
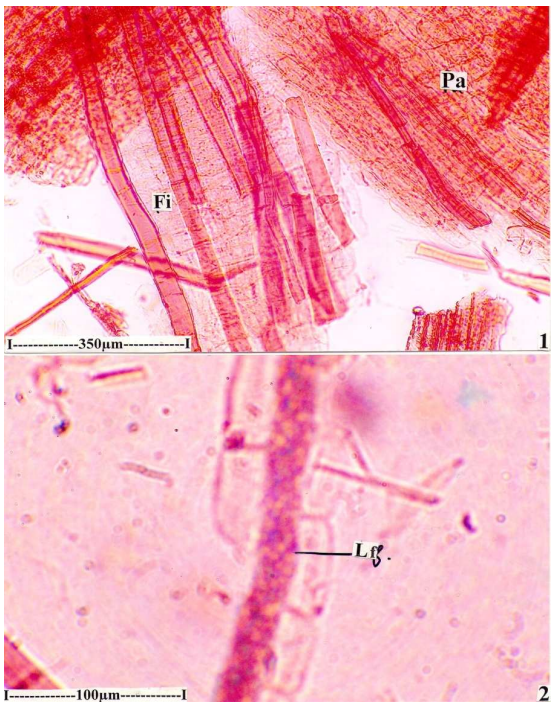


Fig 4.1 Laticefer and Fibers in the bark powder
Fig 4.2 Parenchyma cells and fragment of Phellem cells

(**Fi**-Fibers, **Lf**-Laticefer, **Pa**-Parenchyma, **Pm**-Phellem)

Figure 5.1.Fibres with Parenchyma cells
Figure5.2 Laticefer magnified



(**Fi**-Fibers, **Pa**-Parenchyma, **Lf**-Laticefer)

Results and Discussion[10-15]

The bark of the lateral branch is thick and scaly. It is 850-900µm thick, somewhat wavy superficial periderm and inner zone of secondary phloem (fig1.1).On the surface of the periderm is seen a dark layer of crush and obliterated epidermal and sub epidermal cells. The dark surface layer tends to break and liberated small fragments on the surface (fig 2.1). The periderm has only phellem cells and phelloderm layers are not evident. The phellem has 9 or 10 layer of tangentially oblong, tubular cells with suberised wall. There the tangential walls are straight, but the radial walls are varies.

Secondary phloem is wider than the periderm. In between the periderm and secondary phloem is a narrow zone of cortex where the cells compressed and tangentially elongate. (Fig 1.1 and 1.2)

The secondary phloem can be differentiated into outer or collapsed phloem, and inner is non collapsed phloem. (fig 2.2, 2.3). The collapsed phloem consists of crushed dark thick irregular lines of phloem elements and isolated scattered sclerenchyma elements. (fig2.2) The non collapsed phloem has intact phloem elements, isolated scleranchyma are located in the non collapsed phloem (fig2.3)

TLS View Of Bark (fig 3.1, 3.2)

In tangential longitudinal section, the bark shows phloem rays, phloem sclerenchyma and sieve element. The rays are mostly uniseriate or biseriate (having single vertcular rows or two vertical rows cells). The rays are heterocellular having wider cells at the end and squqrish swollen cells in the middle.(fig3.1). Average length of rays is 550 µm and breadth is 40 µm.

Phloem sclerenchyma includes long, wide, thick walled and less lignified fibres. (fig 3.2). They are straight solitary lines. Phloem parenchyma cells are vertically oblong and occur in vertical shades (fig3.1)

Powder Microscopy

The bark powder shows the following inclusions.

Laticefers (fig 4.1, 5.2)

These are long narrow and wide unbranched canal like tubes which are the laticefers. These cells are latex secreting tubes, scatter in vertical orientation in the bark. The content of the laticefers is glandular and dence (fig5.2). The laticefers are non-separate and anastomosing.

Phellem cells (fig 4.2)

Small piece of polygonal compact parenchyma cells are seen the powder. The pieces are the phellem cells of the periderm seen in surface tubes.

Phloem fibres (fig 5.1)

Fibers of broken cuts are abundant in the powder. They have thick walls and wide lumen, measuring 30-40µm diameter. No pits are seen on their walls.Verticulary elongated rectangular parenchyma cells are also common in the powder; these cells have thick walls and wide lumen (fig4.2). The parenchyma cells have no special inclusion.

References

1. Indian Medicinal Plants Volume-4 Orient Longman, 100-103.
2. The Wealth of India Vol-1A Publications and Information Directorate Council of Scientific and Industrial Research New Delhi, 453.
3. K.N Subramanian Dir Institute of forest genetics and tree breeding 1995, 355.
4.Nadakarnis. K.M Indian Materia Medica, 145.
5. Easu K. Plant Anatomy John Wiley and sons. New York, 1964, 767
6. Easu K. 1979. Anatomy of seed Plants. John Wiley and sons. New York, 550
7. Gamble JS, Fiora of the Presidency of Madras. Botanical survey of India, Vol. I, II and III. 1935. Calcutta, India.
8. Henry AN; Kumari, GR., Chitra, Flora of Tamilnadu, India. Botanical survey of India, Southern Circle, Coimbatore, India, Vol I 1987, 258.
9. Johansen DA, Plant Micro technique. Mc Graw Hill Book Co; New York.1940.
10. Metcalfe CR, Chalk L. Anatomy of Dicotyledons. Clarendon Press, Oxford. Vol I & II.1950
11. Metcalfe CR., Chalk L, Anatomy of Dicotyledons. Clarendon Press, Oxford . Vol. I 1979,276
12. O'Brien TP, Feder N, Mc Cull ME, Polychromatic staining of Plant cell walls by toludine blue-O. Protoplasma, 59, 1964, 364-373.
13. Sass JE, 1940.Elements of botanical Micro technique. McGraw Hill Book Co; New York, 1940, 222.
14. Wallis TE, Text Book Of Pharmacognosy, CBS Publishers and Distributors, Shahdara, Delhi, India. 1985.
15. Yoga Narasimhan, S. N. Medicinal Plants of India. Vol. II. Tamilnadu .Regional Research Institute. Bangalore, India, Vol II, 2000, 715