

MICROSCOPICALLY BASED INVESTIGATION OF *ACACIA LEUCOPHLOEA*

Kumar Pushpander¹, Kumar Sunil^{1*}, Saini Meenu¹ and Priya Kanu²

¹Department of Pharmaceutical sciences, Kurukshetra University Kurukshetra, Haryana, India

²Plant Biotechnology Lab, Department of Biotechnology, Kurukshetra University Kurukshetra, Haryana, India

*Sunil Kumar, Department of Pharmaceutical sciences, Kurukshetra University Kurukshetra, Haryana, India E-mail: sunilmadhuban@yahoo.com

Article Received on: 15/11/10 Revised on: 30/11/10 Approved for publication: 10/12/10

ABSTRACT

The plant *Acacia leucophloea* has huge therapeutic significance in Indian medicine. The current aim of study deals through microscopically based analysis of bark and leaf of *A. leucophloea*. We studied the phenotypical, microscopically appearance with powder estimation of the Indian medicinal plant in Kurukshetra Region.

KEYWORDS: *Acacia leucophloea*, microscope, pharmacognosy, phenotypical parameter, bark, leaf.

INTRODUCTION

Acacia leucophloea (Fabaceae) also called safed kikar is a moderate sized deciduous tree grows up to 3m in height. It is found in plains of Punjab in dry forests tracts throughout in India¹. Leaves are bipinnates with spines. Flowers are in yellow heads arranged in terminal panicles. The bark is light yellowish grey to nearly white and light red inside, smooth and exfoliates in irregular scales. The tree yields a gum which is in indigenous medicine. The gum is demulcent and used as an emulsifying agent¹. Bark has astringent properties². New leaves appear in April, and yellowish white flowers appear from August to October. The pods ripe in April and the seeds germinate readily if moisture is available. The tree is very hardy and stands drought well. It is frost hardy except in young age³. The chemical constituents found are n-hexacosanol, beta-amyrin, beta-sitosterol and tannin⁴. Traditionally the bark is used as anthelmintic, vulnerary, demulcent, constipating, expectorant and antipyretic, vulnerary, bronchitis, cough, vomiting, wounds, ulcers, diarrhoea, dysentery, haemorrhages, dental caries, oral ulcers etc⁵. The current aim is consequently undertaken, to study the microscopically based characteristics of the bark and leaf of *Acacia leucophloea* in Kurukshetra region.

MATERIALS AND METHODS

Collection of samples

Bark and leaves of *Acacia leucophloea* were collected from the campus of Kurukshetra University, Kurukshetra, India and were identified by Dr. H.B. Singh, scientist F& Head, Raw Material Herbarium & Museum, NISCAIR, New Delhi, India. A voucher specimen of the plant is preserved in the herbarium (NISCAIR/RHMD/Consult/-2010-11/1582/180).

Methods

All the samples were immediate phenotypical investigated after sample collection. The shape, size, surface, taste and odour of leaf were determined. All the samples were air dried for more than three weeks followed by boiling of barks for further microscopically (Olympus) studies. Microscopically based characterization was done by preparing a thin dispense segment of the bark and leaves among standard thickness. The bark and leaves fragment were cleared with Chloral-hydrate for 60 minutes followed by stained with phloroglucinol and hydrochloric acid. These are mounted in glycerin and observed under

microscope. Squash/mash of the dried bark (60 mg) and leaf (20 mg) were used for the inspection of powder based microscopically typeset.

RESULTS

Phenotypical Characterization of the Leaf

The leaves were pinnately compound as phenotypical based characterization. The morphological estimation exposed the shape of the leaves as oblong with entire margin, acute apex, and truncate base. Venation is running parallel and petiole of length 2 mm. Its surface is smooth. Leaves were 1.0-1.5 cm in length and 2 mm in width (Fig. 1 A). Leaves were duly green colour (Fig.1 A) with agreeable odour and bitter taste.

Powdered microscopically Characterization of Leaf

Transverse Section (T.S) of the leaf shows epidermis and is single layered, stomata (Fig.1B), simple unicellular elongated trichomes and vascular bundles, with leaf vein (Fig.1C) crystal of Calcium Oxalate and trichome respectively (Fig.1 D, E).

Phenotypical characterization of bark

The phenotypical view revealed the nature of the bark as, incurved, exfoliating in uneven scales solid, hard, irregular, 0.7-1.1 cm superficially almost black and internally light brown to reddish-brown, internal surface longitudinally striated and fibrous, fracture, fibrous (Fig.4) odor and taste, not distinct.

Powder microscopy of bark

The powder revealed the occurrence of fragments of extended unicellular trichomes, solitary crystals of calcium oxalate, epidermal cells, rubiaceous stomata and leaf veins (Fig. 2).

Microscopically characterization of bark

We used the transverse section of bark consisting of cork cells (Fig. 3), cortical cells followed by phellogen, phelloderm, phloem cells, cortex, pericycle, medullary rays; cork consisting of 3-6 layers of thin-walled, cubic to rectangular cells (Fig. 2C), xylem parenchyma thin-walled some cells contain prismatic crystals of calcium oxalate, secondary phloem wide, consisting of sieve elements, parenchyma, fibers, phloem fibers are thin-walled, through conical ends, sparkler fibres stretched, thick-walled having numerous cavities containing a prismatic crystals of calcium oxalate in all compartment; medullary rays composed of thin-walled, radially elongated cells. Pith is also present.

DISCUSSION

Acacia leucophloea is broadly used in the conventional method of medication for the healing of numeral of disorders. Some of the researcher⁵⁻⁶ used *Acacia leucophloea* for microscopical and macroscopical methods, but our group used and studied the medicinal plant in warm conditions. The current effort was taken up through a view to arrange along with pharmacognostical standards, which could be used in validating the remedies. Furthermore experimental studies of *Acacia leucophloea* are under observations.

REFERENCES

1. Anonymous, 1992. The Wealth of India Raw material. Vol. 1: A, New Delhi: Publication and Information Directorate, Council of Scientific & Industrial Research; 1992. p. 33-34.
2. Nadkarni AK, Nadkarni KM. Indian Materia Medica, vol 1, Mumbai: Bombay Popular Prakashan; 2005. p. 16.
3. Ghosh RC. Hand book on afforestation techniques, Delhi: Controller of Publications; 1977.
4. Anonymous. Department of Indian System of Medicine and Homoeopathy. The Ayurvedic Pharmacopoeia of India. Vol.II (I), New Delhi: The Controller of Publications; 1999.
5. Gupta R, Gupta AK, Aiswarya G. Pharmacognostical Investigations on *Acacia leucophloea* Leaf. RJPBCS 2010; 1(4): 360-365.
6. Gupta AK, Gupta R, Aiswarya G. Pharmacognostical Investigations on *Acacia leucophloea* bark. IJPSR 2010; 1(10): 160-163

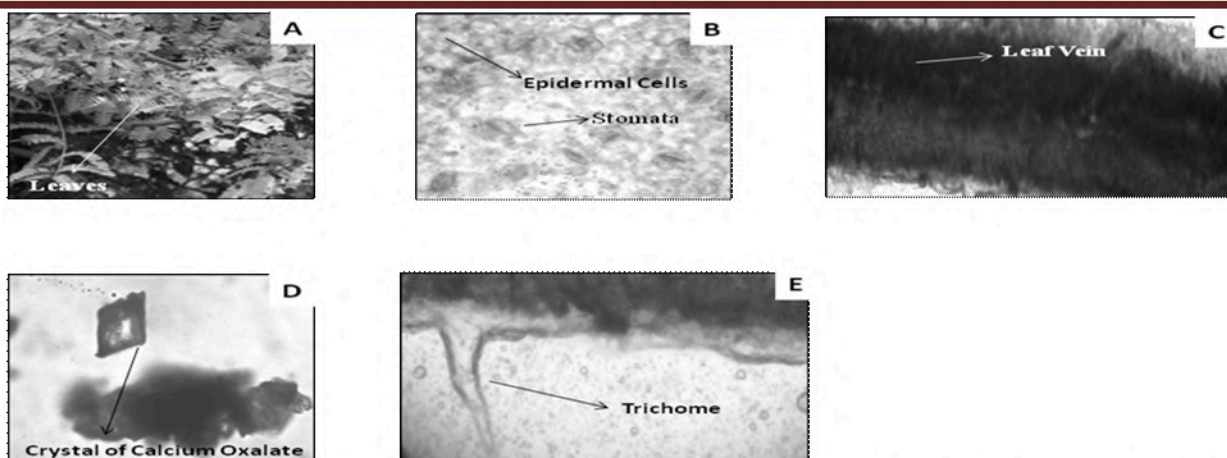


Figure 1: (A) Leaves of *Acacia Leucophloea* (B) T.S. section of leaf having stomata and epidermal cells (C) Leaf Containing leaf vein (D) Powder of leaf having crystal of Calcium Oxalate (E) Leaf containing Trichome.

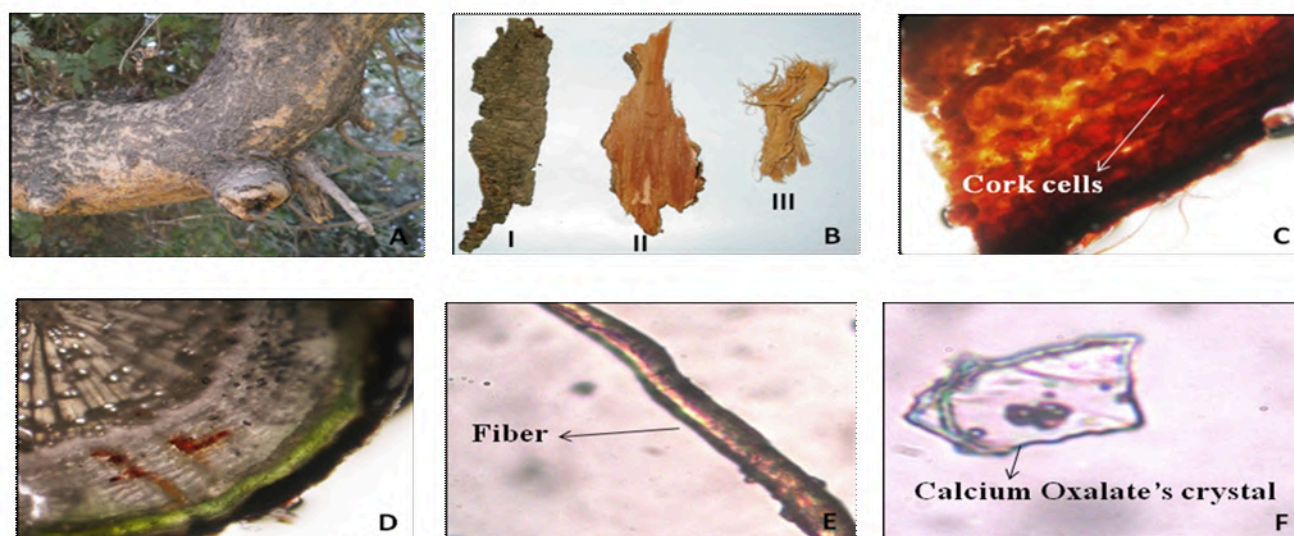


Figure 2: (A) Bark of *Acacia Leucophloea* (B) I. Exo-bark part II. Endo-bark part III. Fibrous bark (C) Bark having cork cells (D) Complete T.S. of stem bark (E) Fibrous like structure in bark powder (F) Bark having of Calcium Oxalate's crystal.

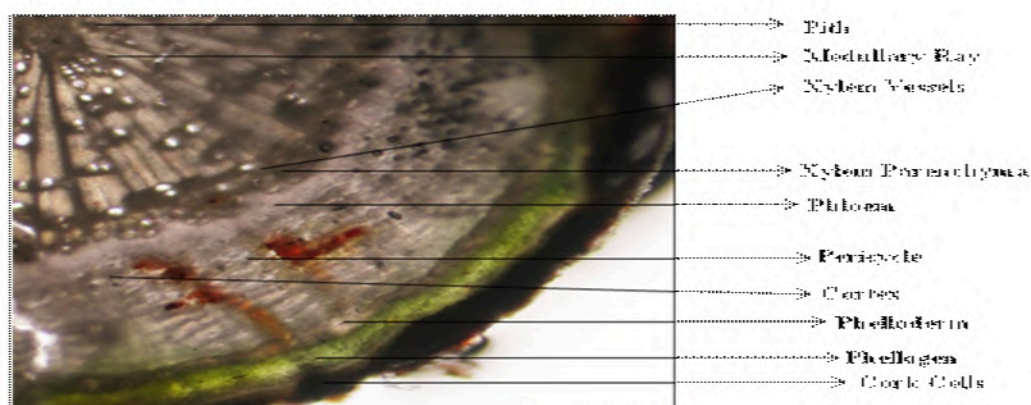


Fig. 3 Transverse Section of young stem bark of *Acacia leucophloea*

Source of support: Nil, Conflict of interest: None Declared