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# PHARMACOGNOSTICAL AND PHYTOCHEMICAL STUDIES ON LEAVES OF *VITEX LEUCOXYLON LINN*

**Akila Elias*[1], Vijayabharathi Rajkishore[2], N. Jeyashree[2]**

[1*]Department of Pharmacognosy, Sri Ram Nallamani Yadava College of Pharmacy, Tenkasi, Tamilnadu, India.
[2]Department of Pharmacognosy, Madras Medical College, Chennai, Tamilnadu, India.

**ABSTRACT**

*Vitex leucoxylon Linn*, belongs to the family Verbanacea. It is an endemic tree found in peninsular India and Srilanka. Trees are mostly seen along river banks and hills. In Tamilnadu, it is found in Tirunelveli, Salem and Palani hills. The leaves have been used as a folk medicine in many countries to treat Leprosy, cancer, emetic and headache. This paper deals with the microscopic study of leaves of Vitex leucoxylon, along with this physico-chemical like ash values, extractive values and preliminary phytochemical analysis were also studied.

**KEYWORDS**

*Vitex leucoxylon*, Verbanacea, Leprosy, Ash values and Extractive values.

**Author for Correspondence:**

Akila Elias,

Department of Pharmacognosy,

Sri Ram Nallamani Yadava College of Pharmacy,

Tenkasi, Tamilnadu, India.

**Email:** akilapharma.23@gmail.com

## INTRODUCTION

*Vitex leucoxylon* Linn (Verbanacea) is known as paravatapadi in sanskrit, attanochi or neernochi in malayalam and Kattunochi in Tamil. It is a deciduous trees, up to 15 m tall. The bark is brownish, smooth, blaze yellowish. Young branchlets quadrangular, minutely pubescent, lenticellate. Leaves are compound, digitate or rarely trifoliate, opposite, decussate; rachis pulvinate, planoconvex in cross section, minutely pubescent; petiolule 0.5-1.5cm long, canaliculated, glabrous; Leaflets 5 (rarely 3), lamina 7-11.5 × 2-3.5 cm ,elliptic, apex acute to obtuse, base cuneate - attenuate, margin entire, chartaceous or thinly

coriaceous, glaucous beneath, glabrous; midrib canaliculated above; secondary nerves 6-14 pairs; tertiary nerves reticulo-percurrent, not prominent. Inflorescence axillary corymbose cymes, minutely pubescent; flowers zygomorphic, sessile; corolla white with purplish pubescent; anther lobes purple. Fruit and Seeds are drupe, smooth, obovoid, purplish black; 4 seeds[1]. The plant is used in the treatment of psychosis, depressant, inflammation and also used as anti-parkinsonim. The leaves are smoked for relieving headache and catarrh and are also used for medicinal baths in fever and anaemia[2].

In spite of the numerous medicinal uses attributed to this plant, there is no pharmacognostical report on the anatomical and other physico-chemical standards required for the quality control of the crude drug. Hence the present investigation includes morphological and anatomical evaluation, determination of physico-chemical constants and preliminary phytochemical screening of the ethanolic leaf extract of *V.leucoxylon*.

## EXPERIMENTAL METHODS

### Plant material

The leaves of plant of *Vitex leucoxylon* Linn were collected from Tirunelveli District, Tamilnadu, during July 2011. Leaves were collected in fine dry weather and were dried in sunshade for a week. The plant was identified and authenticated by prof. P. Jayaraman, Ph.D (Reg.No. PARC/2012/1135). The shade dried plant material was coarsely powdered and used for further studies.

### Microscopic analysis

### Staining Method

Fixation of plant organ- different organ samples were cut and fixed in FAA solution (Formalin -5ml + acetic acid-5ml +70% Ethanol -90ml).

Dehydration of specimen- After 24 hours of fixing, the plant parts like leaves, root, stem were graded with series of tertiary butyl alcohol, as per the standard method.

Infiltration of the specimen- It was carried out by gradual addition of 58-60$^0$ C of melting pointed paraffin wax until TBA solution attained super saturation. The specimens were cast into paraffin blocks[3].

### Sectioning

The paraffin embedded specimens were sectioned with the help of Rotary Microtome. The thickness of the sections was 10-12 µg. Dewaxing of the sections was done by customary procedures. Since toluidine blue is a polychromatic stain, the sections were stained as per the method published by Brein *et al*[4].

### Physico-chemical analysis

Physico-chemical values such as the percentage of ash values and extractive values were performed according to official methods prescribed Indian Pharmacopoeia, (1996) and the WHO guidelines on Quality Control Methods for Medicinal Plant Materials (WHO/QCMMPM, 1992).

### Preliminary phytochemical screening

Preliminary phytochemical screening of ethanolic leaf extract of *V.leucoxylon* was carried out by using standard procedures described by Kokate[5] and Harborne[6].

## RESULTS AND DISCUSSION

### Microscopic features

### Leaflet

The leaflet has planoconvex prominent Midrib and uniformly thick lamina. The Midrib is flat on the adaxial side and semicircular on the abaxial side. It is 700µm thick and 750µm wide. It consists of a thin epidermal layer of small thick walled cells with prominent cuticle. Three or four layers of outer ground tissue are collenchymatous and the remaining five or more layers of cells are angular thin walled cells. The vascular system includes a wide deeply bowl shaped main vascular strand and a central horizontal band three small vascular strands placed towards the adaxial side. The abaxial bowl shaped main strand consists of several, short parallel lines of circular ,thin walled xylem elements and thick walled fibres distributed in between the xylem elements. A continuous band of phloem occurs on the lower end of the xylem arc. The adaxial central strands have thick clusters of four xylem elements, each cluster having small nests of phloem placed on the adaxial (upper) and abaxial ends. The entire

vascular system is surrounded by thick layer fibres. The microscopical features of leaflet have been shown in Figure No.1.

**Lamina**

The lamina is uniform in thick and exhibits dorsiventral symmetry. The adaxial epidermal layer is thick with dilated squarish cells and thick cuticle. The cells are 30 µm thick. The adaxial epidermis is apostomatic. The abaxial epidermis is comparatively thin with cylindrical narrow cells. It is stomatiferous. The lateral veins and their vascular strands occur in regular interval in horizontal series. The vascular strands possess small group of xylem elements and a small nest of phloem elements. On the upper and lower ends of the vascular strand occur a paren of fibres. The vascular strand ensheathed by a layer of parenchymatous cells with adaxial and abaxial extensions of vertical pillar of cells. The mesophyll tissue includes two or three layers of thin vertical cylindrical palisade cells and five or more small lobed spongy parenchyma cells. Total thickness of the lamina is 230 µm. The Lamina portion details are shown in Figure No.2.

**Epidermal Cells and Stomata**

Epidermal tissue and Stomata were studied from the paradermal sections which are shown in Figure No.3. The epidermal cells are small, fairly thick walled and the anticlinal walls are slightly wavy. The stomata are broadly elliptical or circular measuring 30×30 µm in size. The stomata are cyclocytic type; the stomata are surrounded by six slightly radiating Subsidiary cells. Very often, many stomata are crowded forming a nest.

**Physico-chemical analysis**

Sulphated ash value was more when compared with acid insoluble and water soluble ash. Ethanolic extractive value was more than ether and water extractive value. The details are tabulated in Table No.1.

**Preliminary phytochemical analysis**

Ethanolic extract of *V.leucoxylon* showed presence of carbohydrates, alkaloids, steroids, glycosides, flavonoids, phenolic compounds, proteins, mucilage and Terpenoids and the results are tabulated in Table No.2.

**Table No.1: Ash and Extractive values of *V. leucoxylon* Leaf**

| S.No | Parameters | Percentage (%W/W) |
|---|---|---|
| **I** | **Ash Values** | |
| 1 | Total Ash | 10.54 |
| 2 | Acid insoluble Ash | 3.5 |
| 3 | Water soluble Ash | 4.32 |
| 4 | Sulphated Ash | 12.42 |
| **II** | **Extractive Values** | |
| 1 | Water soluble extractive | 8.49 |
| 2 | Ethanol soluble extractive | 8.66 |
| 3 | Ether soluble( non-volatile)extractive | 4.51 |
| 4 | Ether soluble (volatile)extractive | 4 |

**Table No.2: Preliminary phytochemical screening of *Vitex leucoxylon* Leaf**

| S.No | Chemical Constituents | Ethanol extract |
|---|---|---|
| 1 | Carbohydrates | + |
| 2 | Alkaloids | + |
| 3 | Steroids | + |
| 4 | Glycosides | + |
| 5 | Saponins | - |
| 6 | Flavanoids | + |
| 7 | Tannins | - |
| 8 | Phenolic Compounds | + |
| 9 | Proteins | + |
| 10 | Amino acids | + |
| 11 | Mucilage | - |
| 12 | Terpenoids | + |

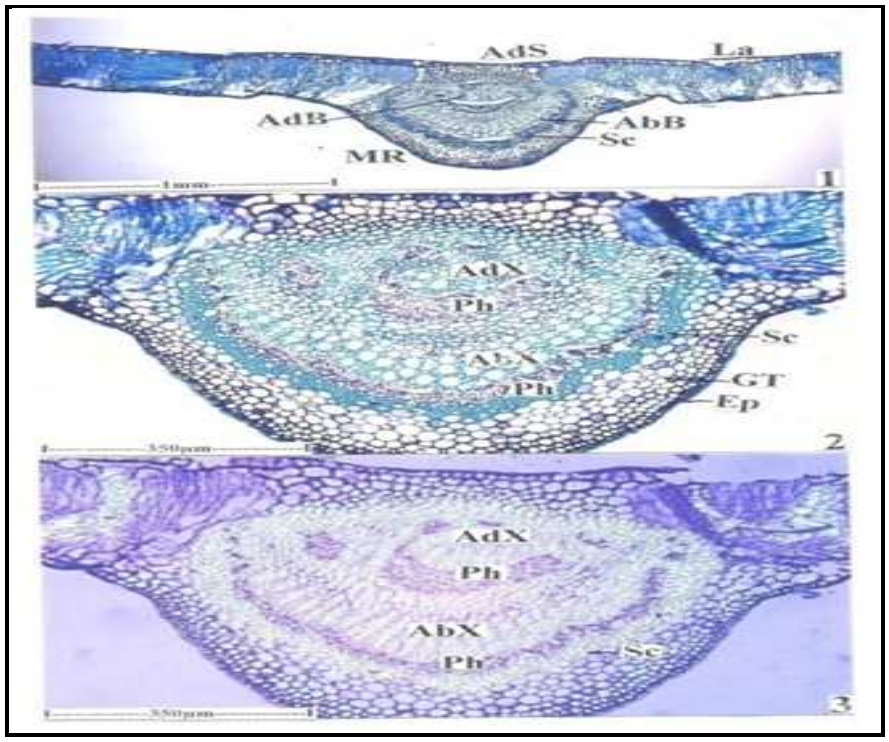


**Figure No.1: T.S of Leaf, AbB-Abaxial Bundle, AbX-Abaxial Xylem, AdB-Adaxial Bundle, AdX-Adaxial Xylem, Ep-Epidermis, GT-Ground Tissue, La-Lamina, MR-Midrib, Ph-Phloem, Sc-Sclerenchyma**

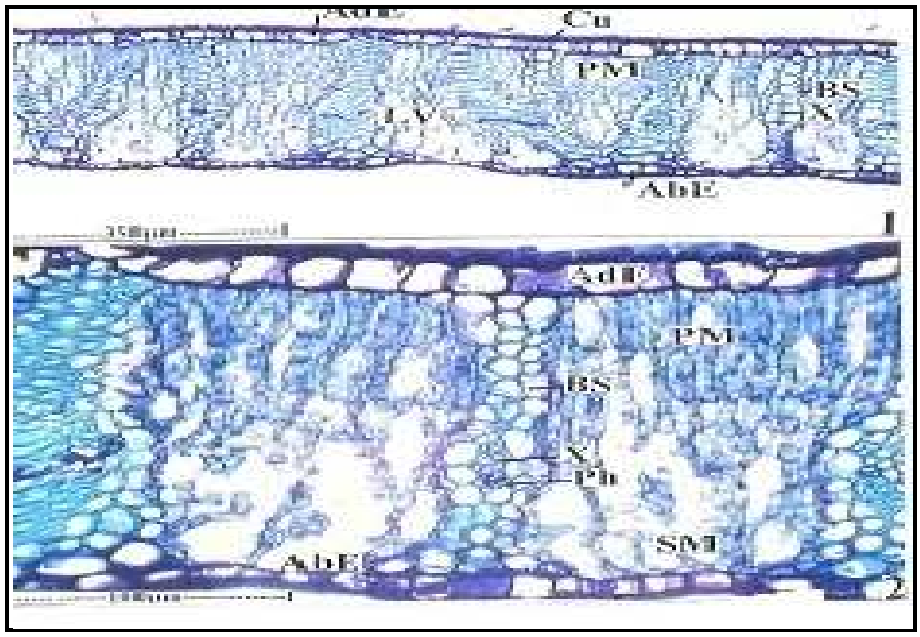


**Figure No.2: T.S of Lamina, AbX -Abaxial Epidermis, AdE -Adaxial Epidermis, BS-Bundle Sheath Extension, Cu-Cuticle, LV-Lateral Vein, Ph-Phloem, PM-Palisade Mesophyll, SM-Spongy Mesophyll, X –Xylem**

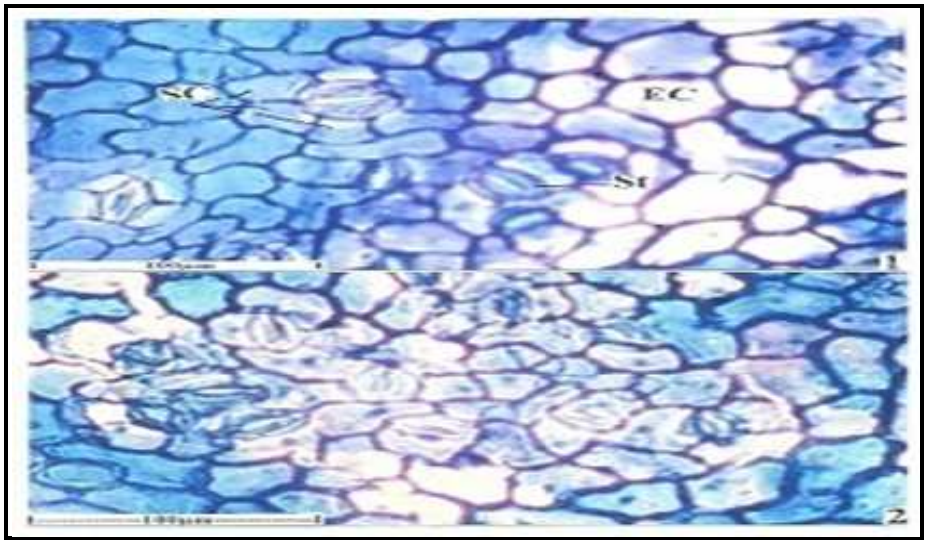


**Figure No.3: EC- Epidermal Cells and St- Stomata**

## CONCLUSION

As there is no pharmacognostical work on record of this traditionally much valued drug, the present work was taken up with a view to lay down standards, which could be useful to detect the authenticity of this medicinally useful plant. Micro and morphological standards discussed here can be considered as identifying parameters to authenticate the drug.

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**CONFLICT OF INTEREST**

We declare that we have no conflict of interest.

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