

EVALUATION OF PHARMACOGNOSTICAL STUDIES ON LEAVES OF *ALBIZIA LEBBECK* (L) BENTH

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ABSTRACT

Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years and have served human as well as valuable components such as cosmetics, dyes and medicines. Herbs have been used as food and for medicinal purpose for centuries. Herbal medicines as the major remedy in traditional medical system. Globally, a large population utilizes traditional medicines. The traditional herbal plants are often cheap, available nearby and consumable without any problem and prepared as simple medicinal preparation. Therefore, herbal medicines are rapidly increasing in economic importance. So it becomes necessary that traditionally used medicinal plants should be explored on the basis of

their pharmacological activities and the active constituents responsible for the bioactivities. *Albizia lebeck* is traditional important medicinal plant. It is commonly called as “siris tree” and in tamil it is called as “Vaagai”. It is found throughout India, Bangladesh, tropical and subtropical Asia. It is a deciduous tree with compound leaves, flat oblong fruits and round cream coloured seeds, grow wild. Medicinal plants and their products particularly containing pharmaceuticals play an important role in drug development programme. Hence, pharmacognostical studies needs to be of great value in identification of commercial samples of the market to find their authenticity and identify of adulterant or substituent. Pharmacognostical evaluation of *Albizia Lebeck* leaves provided specific parameters that will provide relevant pharmacognostical data needed for scientific evaluation, identification and authentication of leaves of this particular species.

KEYWORDS: Traditional medicine, herbal medicine, *Albizia Lebeck*. Pharmacognosy.

INTRODUCTION

Man has been using herbs and plants products for combating diseases since times immemorial. Indian systems of medicine have a deep root in our culture heritage and cater to the Medicare of large sections of our population. Medicinal plants being as an important natural resource and potentially safe drugs can play an important role in assuaging human health by contributing herbal medicines. Human beings have used plants for the treatment of diverse ailments for thousands of years (Sofowara, 1982; Hill, 1989). People live in rural areas from their personal experience know that these traditional remedies are valuable source of natural products to maintain human health, but they may not understand the science behind these medicines, but knew that some medicinal plants are highly effective only when used at therapeutic doses (Maheswari *et al.*, 1986; Van *et al.*, 2000).

Herbal medicines are in great demand in both developed and developing countries as a source of primary health care owing to their attributes having wide biological and medicinal activities, high safety margins and lesser costs. From a long period of time medicinal plants or their secondary metabolites have been directly or indirectly playing an important role in the human society to combat diseases. (Wink *et al.*, 2005).

The need of the hour is to screen a medicinal plant for biological activity. Considering the aforesaid, the medicinal plant *Albizzia lebbek* (L) Benth belongs to the family Mimosaceae. The plant in common it is called as Siris tree and in tamil it is called as vaagei. It is a deciduous with compound leaves, flat oblong fruits, round cream colored seeds, grow wild. Plant is found throughout India, Bangladesh, tropical and subtropical Asia and Africa (Kirtikar and Basu, 1980). Bark is dark brown to greenish black, rough, with longitudinal and transverse fissures on outer surface; inner surface whitish with fine longitudinal sections. The sapwood is white or yellowish white and the heartwood is dark brown, streaked with dark and white shades. Leaves are bipinnate with 8-18 leaflets. Flowers are stalked, greenish yellow. Barks are used in toothache and diseases of the gum. Decoction of the leaves and barks are protective against bronchial asthma and other allergic disorders. Barks and seeds are astringent and are given in piles and diarrhea (Gupta *et al.*, 2004, 2005).

Flowering and fruiting season starts from April to June. Pods are yellowish brown with 6-10 seeds. Mature pods remain on the tree for long period and are available till May-July. The tree is a good substitute for Teak (*Tectona grandis* Linn.) and Sala (*Shorea robusta* Gaertn) (Wealth of India, 2006). Leaf has great medicinal as well as nutritional value.

Phytochemically the leaves contain saponin, tannin (Ganguly and Bhatt, 1993) and cardiac glycoside (El-Mousallamy, 1998). In Ayurveda, expressed juice of leaf is advocated to instill in to nostrils in case of poisoning (Acharya and Charaka Samhita, 2001). The plant has been reported to possess anti-inflammatory (Paramanic *et al.*, 2005), antiallergic (Tripathi *et al.*, 1979), antihistaminic (Kumar *et al.*, 2010), antitussive (Shyاملal Singh Yadav *et al.*, 2010), antioxidant (Resmi, 2006), anticonvulsant effect (Kasture, 1996) and antispermatogenic effect (Gupta *et al.*, 2004).

Pharmacognostic study of *Albizia lebeck* leaves is not available up to present day so this study is helpful to increase attraction towards this plant. So a detailed investigation of fresh as well as powdered leaves of *Albizia lebeck* has been carried out using various pharmacognostical parameters.

MATERIALS AND METHODS

The leaves of *Albizia lebeck* were collected and the specimens were deposited in the Alpha Omega Hi- Tech Bio research centre. The fresh leaves of *Albizia lebeck* were authenticated by Dr. A. Balasubramanian, ABS Botanical conservation, Research & Training Centre, Salem (dt.). The fresh plant materials were washed with running tap water and shade dried. The leaves were crushed to coarsely powdered by grinder.

Macroscopical and Microscopical Characters

Plant was macroscopically examined for shape of leaves, apex, base, margin etc (Khandelwa, 2006). Organoleptic characters were recorded for usual parameters like colour, taste and odour. Surface studies and histochemical studies were carried out by taking free hand sections of petiole, through midrib and also lamina region of the leaf. The sections were stained with phloroglucinol and conc HCl. Powder microscopy of shade-dried powder (#60) was carried out. Photomicrographs were taken by using binocular microscope attached with camera. Physicochemical constants, organic analysis were carried out.

Organoleptic characters of dried powder

Organoleptic evaluation can be done by means of organs of sense which includes the above parameters and thereby define some specific characteristics of the material which can be considered as a first step towards establishment of identity and degree of purity (Khandelwal, 2003). The organoleptic investigations (color, shape and size, odour and taste, surface characteristics and texture) were performed.

RESULTS

Pharmacognostic Studies of *Albizia lebbek* (Benth).

Macroscopic characters: Leaf is compound and opposite bipinnate paripinnate with oblong shape mucronate apex and average length of 15–20 cm. Single leaflet is 2–3 cm long and 10–15 mm in breadth, linear, oblong, mucronate, setaceous deciduous. On an average, in a mature compound leaf, there are 8–10 paired leaflets. Diagnostic characters of leaf powder like parasitic stomata from epidermis, simple and warty trichomes of lower epidermis, prismatic crystals of calcium oxalate, mesophyll tissue, simple fibres, lignified fibres, spiral vessels from vascular bundle, epidermal cells, fragments of palisade parenchyma with chloroplast and dark yellowish brown tannin fragments.



Fig.1. Plant in natural habitat.

Fig.2. Compound leaves.

Fig.3. Dried leaves.

Microscopic Characters

1 Surface preparation: Surface preparation of leaflets revealed the presence of unicellular trichomes, warty trichomes and parasitic stomata and parenchymal cells of epidermis.

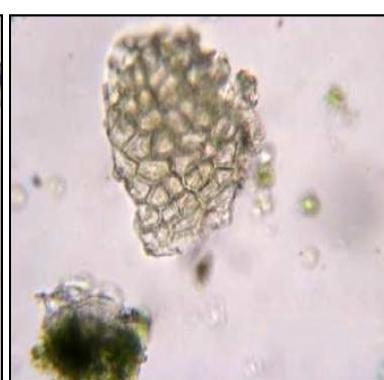


Fig. 4. Simple trichome.

Fig.5. Warty trichome.

Fig.6. Epidermal cells

2 Transverse section of fresh rachis: Transverse section of rachis was found to be somewhat triangular in outline. It showed a single layered thin walled tangentially elongated

parenchymatous epidermis covered with smooth cuticle. Following the epidermis was a wide zone of cortex, composed of 3-5 layers of outer parenchyma with chloroplast, 3-6 inner simple parenchyma. Vascular bundles were open and collateral, 3-5 vascular bundles cover the pith region and result with reduced pith, each vascular bundle upper thick walled fibres followed by phloem underneath xylem with xylem fibres. Two prominent meristeels were situated at wider part of the cortex zone of the rachis.

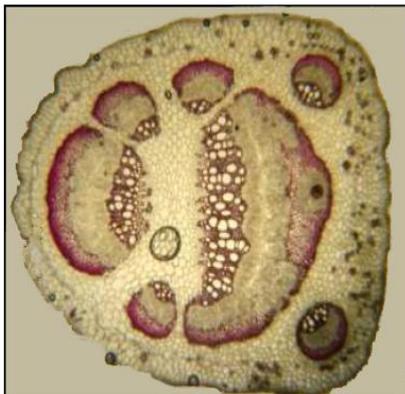


Fig.7. TS of Rachis [stained].



Fig.8. TS of Rachis [unstained].

3 Transverse section of fresh leaflet

Lamina: Transverse section showed dorsoventral structure, epidermal cells were parenchymatous and covered with smooth cuticle. Upper epidermis was made up of large, squarish, columnar or rectangular cells. Palisade parenchyma was single two layered followed by spongy parenchyma. Spongy parenchymatous cells were three to four layered and were round and oval. Some of the cells consist prismatic crystals of calcium oxalate. Large mucilaginous cavities were present towards lower side of palisade parenchyma. Simple and warty trichomes could be seen at lower epidermis. Vascular strands were found to be scattered between palisade and spongy parenchyma.



Fig.9. TS of Leaflets Through lamina. Fig.10. TS of Leaflets through.

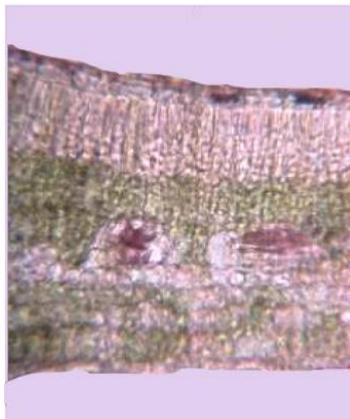


Fig.11. T.S. of leaflet midrib (unstained) through (stained)

Midrib: Transverse section showed both epidermises as mentioned in lamina. Both epidermis were followed by two to three layers of collenchyma cells, followed by parenchyma cells. Vascular bundle consisted of xylem towards upper and phloem towards lower epidermis and was bounded by thick walled lignified fibers. Metaxylem towards phloem, protoxylem towards upper epidermis, xylem surrounded by xylem parenchyma and some fibres were also found.

Organoleptic characters of dried powder

Organoleptic characters like colour, odour and taste were recorded and are shown in Table:1.

Table 1: Organoleptic characters of leaf powder of *Albizia lebbbeck* benth.

S. No	Character	Observation
1	Color	Light green
2	Texture	Coarse
3	Taste	Astringent
4	Smell	Characteristic

DISCUSSION

Albizia Lebbeck (Benth) is one of the Indian medicinal plant and is commonly used for various diseases by Traditional Indian Systems of Medicine like Ayurveda and Siddha and in Folk Medicine. All parts of this tree is used one for the other in most parts of the country. The conventional pharmacognostical study is based on macroscopic, microscopic and quantitative microscopy. Macroscopic characters include shape, size, colour and texture of the drug in crude or powdered form while microscopic characters include the anatomical details of drug producing plant, maceration study and the size measurement of various types of cells. The quantitative microscopy includes the vein islet number, palisade ratio, stomatal number and

stomatal indices and so restricted to leaf drug only. (Wallis, 1967). In this study, the pharmacognostic evaluation of the leaf powder of *Albizia Lebbeck* was done. Parasitic stomata, warty trichomes are important identification characters of *Siris*. The organoleptic characters such as Color, Texture, Taste, and Smell were found to be light green, coarse, astringent and characteristic respectively. Amrish and Tarasingh (2011) also reported that by studying the organoleptic parameters of *Albizia odoratissima* bark, it was found that that the drug was light skin or cream in color, with a characteristic odor, astringent and sweet taste, and fibrous texture.

CONCLUSION

Considering the pharmacological evaluation of *Albizia Lebbeck* (benth), leaves possess specific parameter that will be useful in scientific evaluation, identification and authentication of the drug and also to identify adulterant and test the purity and quality of the drugs. The present observations of the study may become a reference for further researches.

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