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ORIGINAL RESEARCH ARTICLE

Pharmacognostical and Physico-Chemical Investigations of *Albizia lebbeck* benth. Flower

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ABSTRACT

Albizia lebbeck benth, commonly known as *Shirisha* in Sanskrit and Hindi is a medium to large tree belonging to the family Fabaceae (formerly Leguminaceae) and a member of subfamily Mimosaceae. Different parts of the plant have been explored for activities like anti-inflammatory, anti-histaminic, anti-anaphylactic, anti-asthmatic, anti-microbial etc. Pharmacognostic features of the plant parts like bark and leaf have found available for reference, but the same is not in case flowers of *Albizia lebbeck* benth. Considering this, the current study has been planned. The diagnostic characters of flower of this plant are presence of warty trichomes, lignified fibers, tannin containing cells, prismatic crystals and pollen grain. Physicochemical studies revealed loss on drying (8.35 % w/w), total ash (7.30 % w/w), acid insoluble ash (0.889% w/w), alcohol-soluble extractive (43.80% w/v) and water-soluble extractive (31.60% w/v). The information generated in this study will provide a lead towards providing relevant pharmacognostical and physicochemical data, which is needed for proper identification and authentication of flower of this particular species.

Key words: *Albizia lebbeck* benth, *Ayurveda*, Pharmacognosy, *Shirisha*.

INTRODUCTION

Shirisha is found available throughout India, ascending to 900m in the Himalayas and also in the Andmans. Bark is dark brown to greenish black, rough, with longitudinal and transverse fissures on outer surface; inner surface whitish with fine longitudinal stations. 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 mimosa like, in showy, rounded clusters near stem tips, 5-6 cm (2-2.5 in) across, greenish yellow or yellowish-white, each flower with numerous long stamens [Fig.1-2]. 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 [1] [Fig.3]. Flower contains Triterpene, saponin, lebbekanin, saponin glycosides, and crocetin lebbekanin-D, F, G & H. Various other sterols like Taxerol, cycloartemol, lupeol, campesterol, sitosterol have also found reported in flowers.[2] Flower on steam distillation gave 4.3% colorless sweet smelling oil and the residue gave lupiol[3].The plant also contains saponins[4] Macrocyclic alkaloids[5] Phenolic glycosides[6] Flavonols[7]. In *Ayurveda*, expressed juice of flower is advocated to instill in to nostrils in case of poisoning [8] and *hikka* and *shwasa* in the form of *Leha*[9] and eye disease in form of anjana[10] The plant has been reported to possess anti-inflammatory[11], anti-allergic[12], anti-histaminic[13], anti-tussive[14], anti-oxidant[15], anti-convulsant[16] and anti-spermatogenic effect[17]. No systematic pharmacognostic and phytochemical studies of flowers have been reported till date. Therefore a detailed investigation of powdered flowers of *Albizia lebbeck* benth. has been carried out using various pharmacognostical and physico-phytochemical parameters.

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MATERIALS AND METHODS

Fresh flowers of *Shirisha* were collected from the botanical garden of the Institute for Post Graduate Teaching & Research in *Ayurveda* (IPGT & RA), Gujarat Ayurved University, Jamnagar in the month of April 2011. Plant was macroscopically examined for shape of flowers, organoleptic characters were recorded for usual parameters like colour, taste and odour. Powder microscopy of shade-dried powder (#60) was carried out[18]. Photomicrographs were taken by using Carl zeiss binocular microscope attached with camera. Physicochemical constants, organic analysis were carried out from shade-dried powder.

RESULTS AND DISCUSSION

Macroscopic characters: Flowers are stalked, white fragarant in globose umbellate heads 2-3.8cm diameter. Peduncles 3.8-7.0cm long solitary or 2-5 together from the axils of the upper leaves. Calyx 4 mm. long teeth short, Corolla 1 cm long; tube glabrous; lobes 2.4 mm long. Stamens much longer than the corolla (**Fig 2-5**).

Fig 1: Inflorescence branch

Fig 2: Single inflorescence

Fig 3: Natural habitat

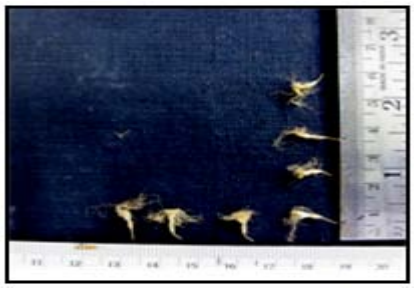

Fig 4: Single flower

Fig 5: Calyx & Corolla

Transverse section of flower: Transverse section of calyx shows epidermal cells with trichomes, vascular strands. And corolla shows fragments of spiral vessels with epidermal cells and stomata (**Fig 6-9**).

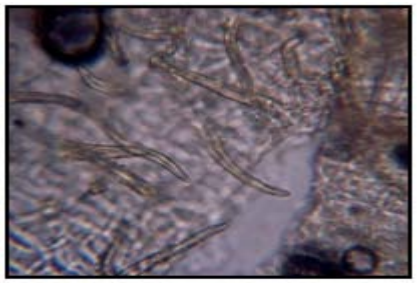

Fig 6: TS of Calyx - Epidermis, Trichomes

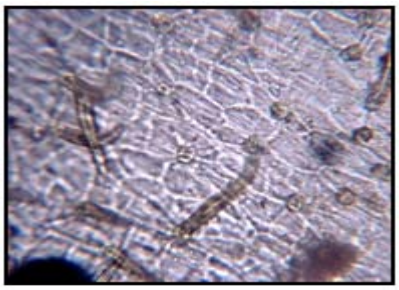

Fig 7: TS of Calyx – Epidermal cells, Trichomes

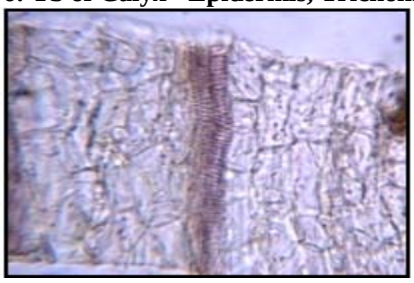

Fig 8: TS of corolla -spiral vessel with epidermal cells

Fig 9: TS of corolla - spiral vessele with stomata

Microscopic Characters: Diagnostic characters of powder of flower shows simple and warty trichomes prismatic crystals of calcium oxalate, spiral vessels from vascular bundle, simple and

compound starch grains with hilum, pollen grain, epidermal cells and thin wall parenchyma cells with brown tannin fragments(**Fig 10-18**).

Fig 10: Warty trichome

Fig 11: Starch grain with concentric line

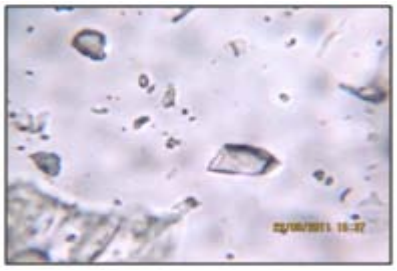

Fig 12: Prismatic crystal

Fig 13: Pollen grain

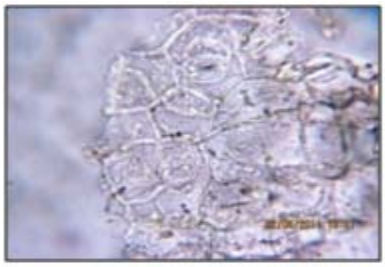

Fig 14: Epidermal cells along with stomata

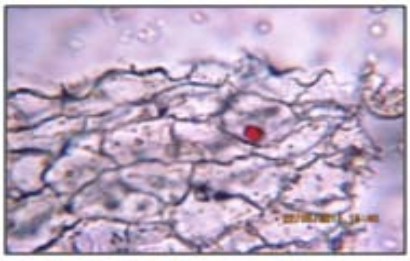

Fig 15: Thin wall parenchyma cells with tanin

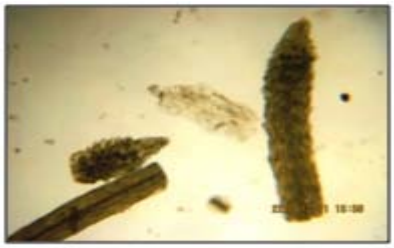

Fig 16: Gynoecium strain

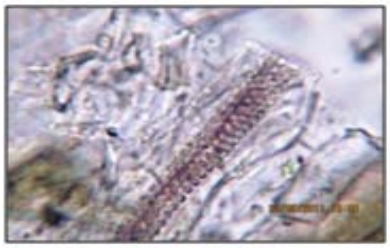

Fig 17: Vascular strain

Fig 18: Simple unicellular trichome

Organoleptic characters of dried powder: Organoleptic characters like colour, odour and taste are tabulated at (**Table 1**)

Table 1: Organoleptic characters of Flower powder of *Albizia lebbeck* benth.

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

Physicochemical parameters: The moisture content [19], total ash[20], acid insoluble ash[21], alcohol-soluble extractive[22] and water-soluble extractive[23] along with extractive values in different solvents were estimated and placed at (**Table 2 & 3**).

Table 2: Extractive values in different solvents

Solvent used	Extractive values on dry weight basis (% w/v)
Petroleum ether	2.5%
Benzene	2.5%
Chloroform	3.07%
Methanol	31.6%
Water	43.80%

Table 3: Physicochemical evaluations of flower powder of *Albizia lebbeck* benth.

Parameters	Values obtained (%w/w)*
Loss on drying	8.35±0.13
Ash value	7.30±0.32
Acid insoluble ash	0.889±0.151

*****average of three reading ±SEM

Preliminary qualitative analysis: Preliminary qualitative analysis for the presence of various functional groups was carried out on the different solvent extractive [24]. Flavonoid, glycoside, phenol

and tannin were found in both methanolic and aqueous extracts. While saponins present only in aqueous extract. Steroids and Alkaloids were present in methanolic and chloroform extract (**Table 4**).

Table 4: Preliminary qualitative analysis of *Albizia lebbeck* benth. flower powder for the presence of various functional groups in various extract.

Constituents	Extracts				
	M	C	B	D	W
Phenols	+	-	-	-	+
Tannin	+	-	-	-	+
Saponin	-	-	-	-	+
Flavonoid	+	-	-	-	+
Glycoside	+	+	+	+	+
Steroid	+	+	-	-	-
Alkaloid	+	+	-	-	-

M= Methanol, C- Chloroform extract, B= Benzene extract, D- Di ethyl ether extract, W- water extract

CONCLUSION

Pharmacognostical evaluation of *Albizia lebbeck* benth. flower provided specific parameters that will be useful in scientific evaluation, identification and authentication of the drug. Warty trichomes, presence of tannin containing cells, prismatic crystals of calcium oxalate and pollen grain are the characteristic features of flower. Phytochemical study revealed the presence of flavonoid, glycoside, phenol and tannin in methanolic and aqueous extracts, while saponins were found only in aqueous extract. The observations of the study may become a reference for future studies.

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