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PRELIMINARY PHARMACOGNOSTIC AND PHYTOCHEMICAL SCREENING OF *SIRISHA* BARK (*Albizia lebbeck* (L.) Benth.)

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ABSTRACT
Sirisha (*Albizia lebbeck* (L.) Benth.), a medicinal plant belonging to the Fabaceae family, is widely used in Ayurveda for its detoxifying and therapeutic properties. Recognized as a potent *vishaghna dravya* (anti-toxic agent) in classical texts, it plays a vital role in addressing toxin-related ailments. The present study aims to establish pharmacognostic standards for *Sirisha* bark by evaluating its macroscopic, microscopic, and physicochemical characteristics. Parameters such as foreign matter content, moisture levels, ash values, extractive values, fiber content, sugar content, and qualitative chemical analysis were analyzed.
The macroscopic analysis of *Sirisha* bark revealed its rough, fissured texture with a dark brown to grayish-black outer surface and reddish-brown inner surface. Microscopic examination showed the presence of cork cells, calcium oxalate crystals, abundant sclereids and parenchymatous cells filled with starch grains. The water-soluble extractive was found to be higher than the alcohol-soluble extractive. These findings contribute to the standardization and authentication of *Sirisha* bark, ensuring its quality and purity for Ayurvedic formulations. Furthermore, this research lays the groundwork for future pharmacological studies, reinforcing the plant's therapeutic significance in traditional and modern medicine.

Keywords: *Sirisha*, *Albizia lebbeck* (L.) Benth., Standardization, Pharmacognosy, Phytochemistry

INTRODUCTION
Sirisha (*Albizia lebbeck* (L.) Benth.), belonging to the Fabaceae family, is a well-known medicinal plant in Ayurveda, esteemed for its detoxifying and therapeutic benefits. Commonly referred to as the Lebbeck Tree in English, it is also known by various synonyms, including *Sukataru, Sukapriya, Bhandi, Bhandila, Kapeetana, and Mrdupuspa.* Among the 152 *Agrya Aushadhas* listed in the Charaka Samhita Sutra Sthana, *Sirisha* holds the distinction of being the foremost *vishaghna dravya* (anti-toxic substance), highlighting its importance in treating toxin-related ailments[1,2].
Traditionally, *Sirisha* has been used to address a variety of health conditions, such as night blindness, ulcers, respiratory ailments, skin disorders, piles, snake bites, and leprosy. Additionally, it has demonstrated effectiveness against scorpion stings, gonorrhea, gum infections, cough, and

pharyngitis. Due to its extensive pharmacological properties, it is incorporated into numerous Ayurvedic formulations, including *Dasanga Lepam, Vajraka Tailam, Brihatmarichadi tailam* etc.

According to WHO, the macroscopic and microscopic description of a medicinal plant is the first step towards establishing its identity and purity and should be carried out before any test are undertaken. The present study aims to assess the pharmacognostic and phytochemical parameters of the plant, contributing to the authentication of the plant.

METHODOLOGY

Sample Collection

The bark of *Albizia lebbeck* (L.) Benth. was collected personally from Thiruvananthapuram, Kollam and Alappuzha.

The samples were authenticated for its botanical identity at the Pharmacognosy Unit, Poojappua. Thereafter all the collected samples were cleaned, shade dried and stored in standard condition.

Figure 1: Collection of bark of *Sirisha*

PHARMACOGNOSTIC EVALUATION OF *Albizia lebbeck* (L.) Benth. BARK

Pharmacognostic studies are essential for identifying crude drugs and assessing their quality and purity. The macroscopic and microscopic evaluation of bark of *Albizia lebbeck* (L.) Benth. was carried out as per standard procedures. The details are described below.

Macroscopic evaluation

Macroscopic evaluation refers to the evaluation of drug by colour, odour, taste, size, shape, surface characters, texture etc. The general appearance of a crude drug suggests whether it is likely to meet its prescribed standards.

Microscopic evaluation

Fine transverse sections of the root, stem and leaf were taken and stained with safranin was mounted in glycerine and observed under microscope. Various identifying characters and cell composition were recorded and micro-photographed.

Powder microscopy

Sufficient amount of powder of dried whole plant was mounted in glycerin. The slide was then examined under digital microscope. Objectives 40x and 100x were used for all observations and diagnostic features were photographed.

STANDARDIZATION OF *SIRISHA CHOORNA*

The preliminary physicochemical and phytochemical analysis of *Sirisha choorna* was done as per the standard procedures described in API [3].

Quantitative Analysis

Estimation of Foreign Matter

A weighed quantity of drug specimen was spread out as a thin layer on a clear white surface. The foreign matter if detected was separated, weighed and the percentage was calculated.

Estimation of Moisture content 10 g of the powdered and air-dried sample drug was taken in a round bottomed flask and approximately 100 ml of xylene and few porcelain chips were added. The flask was then fitted into a Dean and Stark's Apparatus, connected to a water condenser (continuous distillation apparatus). It was heated on an electric mantle for about one hour. The heating was continued till the level of water remained constant and was kept undisturbed until room temperature was attained. The moisture evaporated from the drug got condensed and collected in the graduated tube of the apparatus. The level of water content in the graduated tube was directly measured. The percentage of water content was calculated by dividing the water content by the weight of the original sample dividing the water content by the weight of the original sample taken and multiplied by 100.

Estimation of Ash value

a) Total Ash value

2g of powdered and accurately weighed sample drug was taken in previously weighed dry silica crucible. It was then scattered in a fine even layer at the bottom of the crucible and incinerated on an electric Bunsen burner by gradually increasing heat, not exceeding 450˚C (dull red heat) until it is free from all the carbon. It was then allowed to cool slowly and weighed to a constant weight in an accurate digital weighing machine. The percentage of ash was then calculated.

b) Acid Insoluble ash

Adhering sand and dirt may be determined by Acid insoluble ash. Total ash obtained in the above procedure was washed out from the crucible into a 100 ml beaker using 25 ml of 2 N HCl and boiled for 5 minutes. The solution obtained was filtered through an ash less filter paper no: 41 and the residue were repeatedly washed with warm distilled water until it is freed from chloride. Together the filter paper and the residue were then placed in a previously weighed dry silica crucible, incinerated gently in an electric Bunsen burner until vapours ceased and then the heat is increased gradually until the residue was freed from carbon. It was then allowed to cool slowly and weighed to a constant weight in an accurate digital weighing machine to get a constant weight. The percentage of acid insoluble ash was calculated with reference to the sample drug.

Determination of Extractive values:

a) Estimation of Water-soluble extractive

5gm of the coarsely powdered drug was weighed and transferred into a round bottomed flask. To this 100ml of chloroform water was added. The content was shaken for about 24hrs occasionally. It was filtered through ordinary filter paper. The filtrate was evaporated to dryness in a previously weighed beaker. The beaker was then dried at 105 ˚C, allowed to cool and weighing was continued till a

constant weight was obtained. The percentage of cold-water soluble extract was calculated with respect to the sample drug taken.

b) Alcohol soluble extractive

5gm of the coarsely powdered drug was weighed and transferred into a round bottomed flask. 100ml of 95% ethanol was added. The contents were occasionally shaken for first 6 hours and allowed to stand for next 18 hours and rapidly filtered. The filtrate was evaporated to dryness in a previously weighed beaker and dried at 110˚C. The beaker was then allowed to cool and weighing was continued till a constant weight was obtained. The percentage of alcohol soluble extractive was calculated with respect to the sample air dried drug powder taken.

Estimation of Sugar content

Principle: Reducing sugar reduces Fehling's solution to Cuprous oxide (Cu2O). Approximately 10g of the sample drug was weighed and transferred into a 250ml round bottomed flask. 100ml of distilled water was added and refluxed for one hour. The solution filtered hot and using an ordinary filter paper into a conical flask, then made up to 100ml. The made up 100ml filtrate was then transferred into a standard flask and 2ml of lead acetate solution was added, then a precipitate was formed indicating the presence of tannins. Again, the solution was filtered with Whatman no:41 filter paper into a conical flask. Into this sufficient amount of sodium oxalate crystals were added to remove excess lead acetate. After filtering, the solution was ready for testing sugar content.

a) Estimation of Reducing sugar

20ml of filtrate was pipetted out into a 250ml beaker, to which 50ml of Fehling's solution, prepared by mixing 25ml of Fehling's solution A and 25 ml of Fehling's solution B and 30 ml of distilled water were added and the mixture was boiled for 4 minutes on a heating mantle. While boiling, the beaker was covered with watch glass. The hot solution was filtered through a sintered crucible with the help of vaccum pump. A reddish precipitate thus obtained was collected and the filtrate was discarded. A hot solution of 25ml ferric alum and sufficient 4N H2SO4 (20ml) was added into the mantle sintered (G 4) crucible to dissolve the precipitate. The solution was collected in the filtering flask. The crucible was washed with distilled water and the washing was collected along with the filtrate. The resulting solution was titrated against standard KMnO4 solution. From the titre value the weight of cuprous oxide (Cu2O) in milligrams was calculated. The actual weight of the sugar was obtained from Munson & Walker table of standard value.

b) Estimation of Total sugar

20ml of the filtrate was pipetted out into a 250 ml beaker. To this 2ml of 6N HCl was added for hydrolysing, made just to boil and then cooled. To these few crystals of anhydrous sodium carbonate (Na2CO3) was added till the solution was neutralized (until the effervescence is stopped) and made up to 100ml by adding 50ml Fehling's solution (prepared by mixing 25ml each of Fehling's solution A & B) and 28ml distilled water. It was heated and boiled for 4 minutes on a heating mantle covered with watch glass and a glass rod to the solution. The hot solution was filtered through a sintered crucible with the help of vacuum pump. The precipitated cuprous oxide (Cu2O) was collected (and filtrate was discarded) and dissolved in a hot solution of 25ml ferric alum and sufficient 4N H2SO4 (20ml) in the G4 crucible. The solution was collected in the filtering flask. The crucible was washed with distilled water and the washing was collected along with the filtrate. The resulting solution was titrated against standard KMnO4 solution. From the titre value the weight of cuprous oxide (Cu2O) in milligrams was calculated. The actual weight of sugar was obtained from Munson and Walker table of standard value. Thus, the total sugar was estimated.

Qualitative analysis

The alcoholic extractive obtained was subjected to qualitative analysis for identification of various plant constituents.

a) Detection of steroids

Steroids were detected by evaporating the methanolic extract in a watch glass and to the residue added acetic anhydride and conc. H2SO4 through the sides. A play of colours from yellow to brown indicated the presence of steroids.

b) Detection of flavonoids

The residue of extract was dissolved in alcohol. Magnesium ribbon and concentrated HCl were added to it. A reddish-brown colour indicated the presence of flavonoids.

c) Detection of phenols

The residue of extract was dissolved in alcohol and neutral FeCl3. A violet colour indicated the presence of phenols.

d) Detection of alkaloids

To the residue dil. HCL were added and filtered. To the filtrate Dragendroff's reagent (potassium bismuth iodide solution) was added, an orange brown precipitate which indicated the presence of alkaloids.

e) Detection of tannins

10g of the sample drug was weighed and transferred into a 250ml round bottomed flask. 100ml of distilled water was added and refluxed for one hour. The solution was filtered hot using an ordinary filter paper into a conical flask and made up to 100ml. The made up 100ml filtrate was then transferred into a standard flask and 2ml of lead acetate solution was added, then a precipitate was formed indicating the presence of tannins.

f) Detection of saponins

A few drops of sodium bicarbonate solution were added to the alcoholic extractive and shaken well. A honey comb (frothy) appearance indicates the presence of saponins.

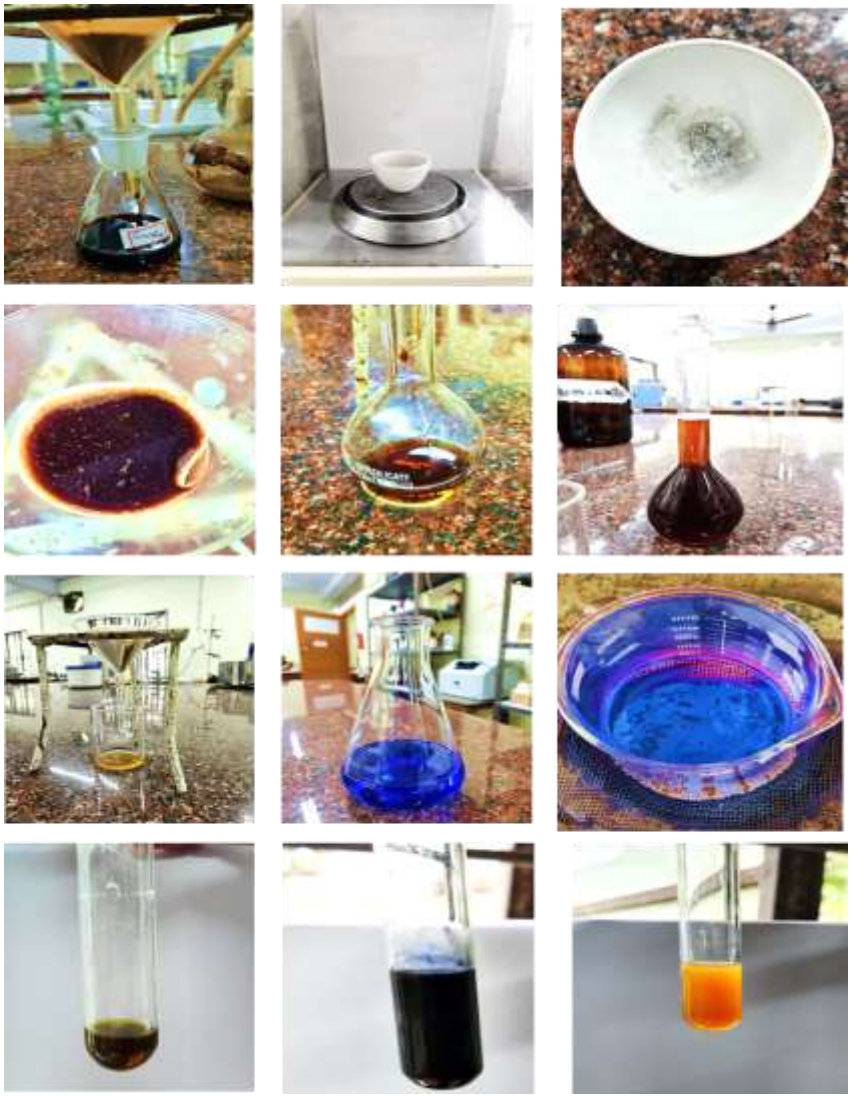

Figure 2: Standardization of *Sirisha choorna*

RESULTS

PHARMACOGNOSTIC EVALUATION

Preliminary pharmacognostic evaluations were carried out as a part of testing genuineness of the collected samples of *Albizia lebbeck* (L.) Benth. Stem bark

The results are as follows:

Macroscopic evaluation

The macroscopic characters of samples of *Albizia lebbeck* (L.) Benth. Stem bark were evaluated. The observations are as follows:

- The bark was appreciably thick and rough, dark brown to greyish black with vertical and transverse deep fissures.
- The 'woody' external portion was hard, thick, compressed, deeply fissured and easily separable or detaching in irregular pieces.
- The corky portion was thick yellowish brown with an occasional tint of light rose, soft, easily friable and composed of numerous, dry very thin or papyraceous layers.
- The inner bark was thin and fibrous in texture.
- In the fresh condition it was reddish white, but after drying, the portion turned reddish
- It had a very astringent, acrid taste.

Figure 3: Stem bark of *Sirisha*

Microscopic evaluation

- TS of stem bark showed cork consisting of a few layers of thin-walled, transversely elongated and radially arranged cells
- Cork cambium is composed of 5-6 layers of elongated rectangular cells
- Secondary cortex is wide, composed of radially elongated to squarish, moderately thick-walled cells containing orange to reddish-brown contents;
- A few of the cells contain prismatic crystals of calcium oxalate, starch grains, stone cells or sclereids, variable in shape and size, present in singles or in groups throughout the region.

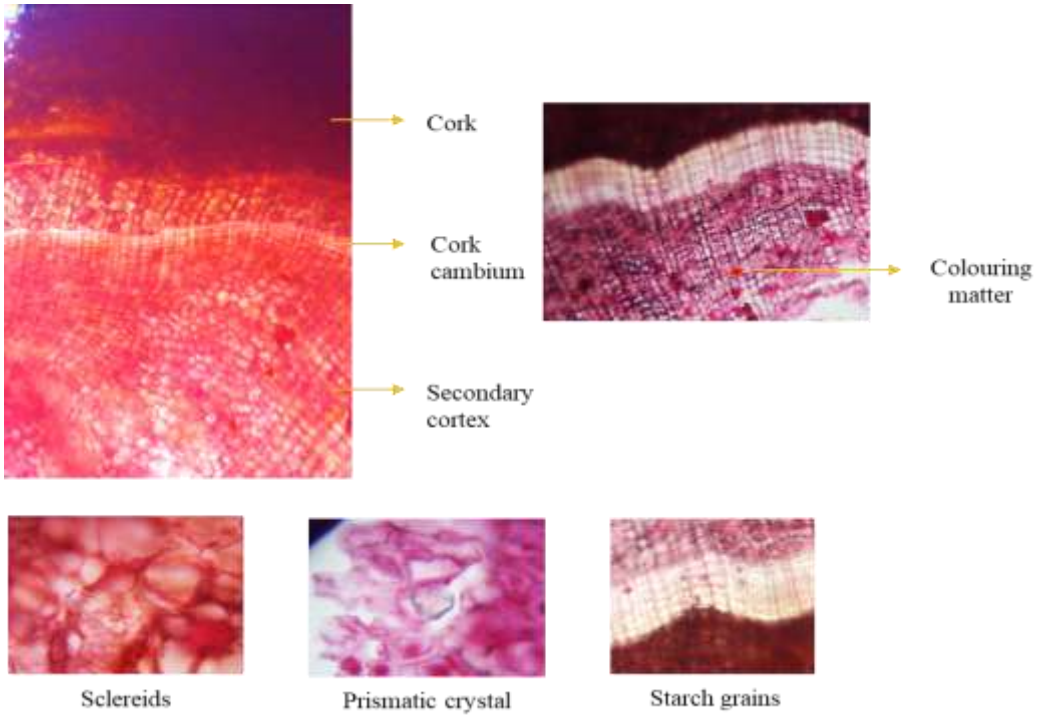

Figure 4: TS of stem bark of *Albizia lebbeck*(L.) Benth.

Powder microscopy

The powder microscopy of *Albizia lebbeck* (L.) Benth. stem bark revealed the presence of prismatic crystals, fibres, colouring material, starch grains and sclereids.

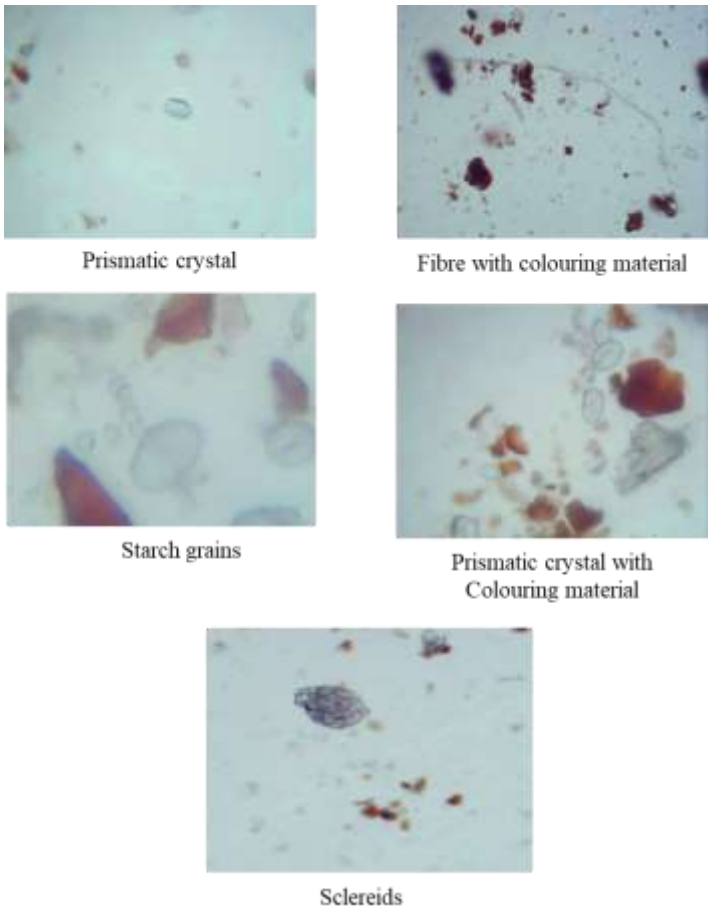

Figure 5: Powder microscopy

STANDARDIZATION OF *SIRISHA CHOORNA*

Preliminary physicochemical and phytochemical evaluation of bark of *Albizia lebbeck* (L.) Benth. was done for the standardisation purpose. The parameters assessed were loss on drying, water-soluble extractive, alcohol soluble extractive, total ash, acid insoluble ash, total sugar and reducing sugar. The qualitative tests for the detection of steroids, phenols, alkaloids, flavonoids and tannins were done for analysing the presence of secondary metabolites.

Preliminary physicochemical evaluation of bark of *Albizia lebbeck* (L.) Benth.

Preliminary physicochemical analysis was done and the results are tabulated below.

Table 1: Preliminary physicochemical analysis of stem bark of *Albizia lebbeck* (L.) Benth.

Parameter	Observations
	Albizia lebbeck (L.) Benth.
Foreign matter	Nil
Loss on drying	6.18%
Water soluble extract	16.9%
Alcohol soluble extract	15.68%
Total ash	4%
Acid insoluble ash	0.5%
Total sugar	Nil
Reducing sugar	Nil

Qualitative tests of bark of *Albizia lebbeck* (L.) Benth.

Preliminary phytochemical analysis was done and the results are tabulated below.

Table 2: Preliminary phytochemical analysis of stem bark of *Albizia lebbeck* (L.) Benth.

Constituents	Observations
	Albizia lebbeck (L.) Benth.
Alkaloids	+
Flavonoids	+
Phenols	+
Saponins	+
Steroids	+
Tannins	+

CONCLUSION

The findings of this research help establish pharmacognostic standards for *Albizia lebbeck* (L.) Benth., ensuring its accurate identification, purity, and quality. These results play a vital role in the standardization and validation of *Sirisha*-based Ayurvedic formulations, reinforcing its importance in

traditional medicine. Additionally, this study provides a strong foundation for future research to further explore the plant's therapeutic potential and expand its applications in modern pharmacology.

REFERENCES

1. The Ayurvedic Pharmacopoeia of India. Government of India,Ministry of Health and Family Welfare, Department of ISM & H; 291–293 p. (Part 1; vol. 3).
2. Vd. V.M.Gogte. Ayurvedic Pharmacology & Therapeutic uses of Medicinal plants. 2017th ed. Varanasi: Chaukhambha Publications; 2017. 502–504 p.
3. Department of AYUSH. Ayurvedic Pharmacopoeia of India, Part II (Formulations). New Delhi: Government of India, Ministry ofHealth and Family Welfare; 2008