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Preliminary pharmacognostical and phytochemical analysis of *Leea indica* (Burm. f.) Merr. Root

Dr. Greeshma KC and Dr. N Manoj KumarDOI: <https://doi.org/10.22271/phyto.2023.v12.i2a.14622>**Abstract**

Background: *Leea indica* (Burm. f.) Merr. is distributed in various parts of the world such as India, Malaysia, China, and Thailand. The plant is gathered from the wild for local use as a food and medicine. The root is antidiarrheal, antidysenteric, antispasmodic, cooling, and sudorific. The juice of young leaves is digestive. Preliminary phytochemistry of leaves and stem has already done and revealed the presence of alkaloids, flavonoids, glycosides, phenols, lignins, saponins, sterols, tannins, arthraquinone and reducing sugar.

Aim: The present study was carried out for the establishment of Pharmacognostical and phytochemical standardization of root.

Methods: Macroscopy, powder analysis (Organoleptic and powder microscopy), physiochemical properties like ash values, extractive values of root was done.

Results and Conclusion: Microscopy shows normal root structure with 2-5 layered parenchymatous cortex, xylem and phloem. Medullary rays are heterogenous. Total ash of the drug was found to be 6%. The highest percentage of extract was obtained by the extraction with hot water (9.1%) and least with cold alcohol (4.92%). Qualitative phytochemical analysis showed the presence of tannins, phenols, saponins, steroids and glycosides. Maximum phytoconstituents was obtained for cold alcohol extract.

Keywords: Flavonoids, glycosides, phenols, lignins, saponins, sterols, tannins, arthraquinone

Introduction

Leea indica (Burm.f.) Merr., belonging to the family Vitaceae, is commonly known as Bandicoot berry in English, Chhatri in Sanskrit, and Hastipalash in Hindi. It is an erect shrub to small tree, often with several stems ^[1]. The plant is distributed in various parts of the world such as India, Malaysia, China, and Thailand ^[2]. The plant is gathered from the wild for local use as a food and medicine. It is locally cultivated in India and China for medicinal purposes. It is often grown as an ornamental, and is also grown as a green manure ^[3]. The plant is medicinally important and is widely used in indigenous systems of medicine.

The juice of young leaves is used as a digestive. Young shoots are chewed to relieve a severe cough. The pounded leaves are used for poulticing cuts and skin complaints in general ^[4]. The root is considered antipyretic and diaphoretic. It is used to relieve muscular pain. It is an ingredient of a preparation to treat leucorrhoea, intestinal cancer and cancer of the uterus ^[5]. A decoction of the roots is taken to relieve stomach-ache, colic, dysentery and diarrhoea. The crushed roots are applied as a poultice to treat ringworm and sores. The crushed root is also applied to rashes, stings, allergic reactions etc from other plants ^[6]. Study of leaves of *Leea indica* yielded twenty-three known chemical compounds including 11 hydrocarbons, phthalic acid, palmitic acid, 1-eicosanol, solanesol, farnesol, three phthalic acid esters, gallic acid, lupeol, β -sitosterol and ursolic acid ^[7]. Phytochemical screening of leaves yielded alkaloids, flavonoids, glycosides, phenols, lignins, saponins, sterols, tannins, arthraquinone, and reducing sugar. Methanol and ethanol extracts showed higher phenolic content than aqueous extract ^[8].

Materials and method

The plant specimen for the proposed study was collected from natural habitat of Kerala. It was identified and authenticated by Department of Dravyaguna Vijnana, V.P.S.V Ayurveda College, Kottakkal.. The pharmacognostical and phytochemical work was carried out in Department of Dravyaguna Vijnana, V.P.S.V Ayurveda College, Kottakkal.

Macroscopy

The external features of the test samples were documented using Canon IXUS digital camera. The macroscopic features were compared to local flora for authentication.

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Microscopy

A cylindrical portion of almost straight and sufficient length to hold the sample is selected. The blade was moved back and forth from one end to other for obtaining fine slices. Enough number of sections were taken. The sections were carefully transferred to a Petri dish containing water. A few thin sections floated in water were selected and moved to a watch glass containing Safranin stain using a thin brush. Sections were kept there for 2-3 minutes. The sections were then transferred to pure water to remove the excess stain and thus made ready for mounting on a slide. A stained section was carefully transferred on a clean glass micro slide. The Photographs of the sections were taken using digital camera.

Powder microscopy

A pinch of powder was warmed with drops of chloral hydrate on a microscopic slide and mounted in glycerine. Slides observed under microscope and diagnostic characters were observed and photographed using Zeiss AXIO trinocular microscope attached with Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.

Preliminary phytochemical analysis

The phytochemical analysis included total ash, water insoluble ash, acid insoluble ash, moisture, volatile oil content, sugar content, fibre content. Cold water soluble extract, hot water soluble extract and cold alcohol soluble extract was also done.

Qualitative analysis

The extracts obtained were subjected to qualitative tests for the identification of various plant constituents which include detection of alkaloids, steroids, phenols, flavonoids, tannins, saponins, anthraquinones and glycosides.

Results

Preliminary Pharmacognostical and Phytochemical Study Macroscopy of *Leea indica* (Burm. f.) Merr. root

Pieces of root mostly about 10-15 cm long and 0.1 – 0.5 cm in thickness, sub cylindrical, stout, thick, lightweight and branched. Outer surface is dark brown in colour and inner greyish brown.



Organoleptic evaluation of root powder

Organoleptic evaluation refers to evaluation of formulation by color, odor, taste, texture etc. It means conclusions drawn from studies resulted due to impressions on organs of senses.

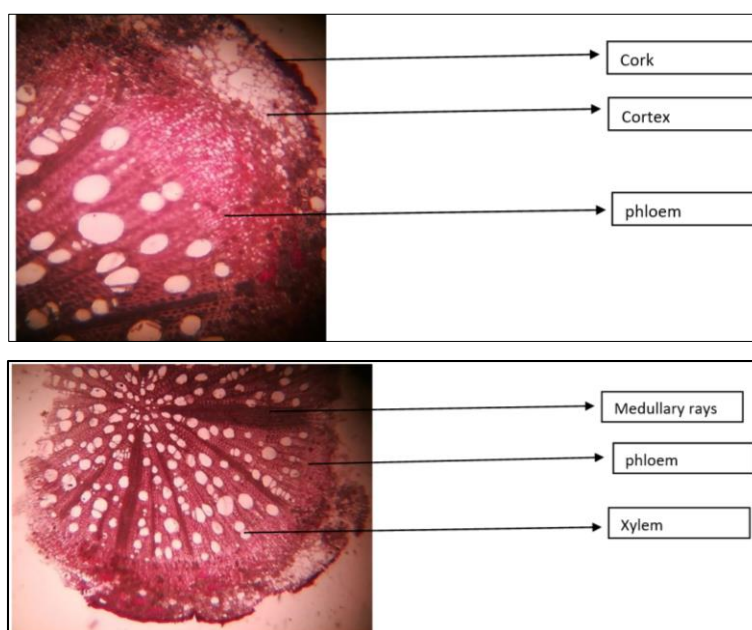
Table 1: Organoleptic evaluation of *Leea indica* (Burm. f.) Merr. Root powder

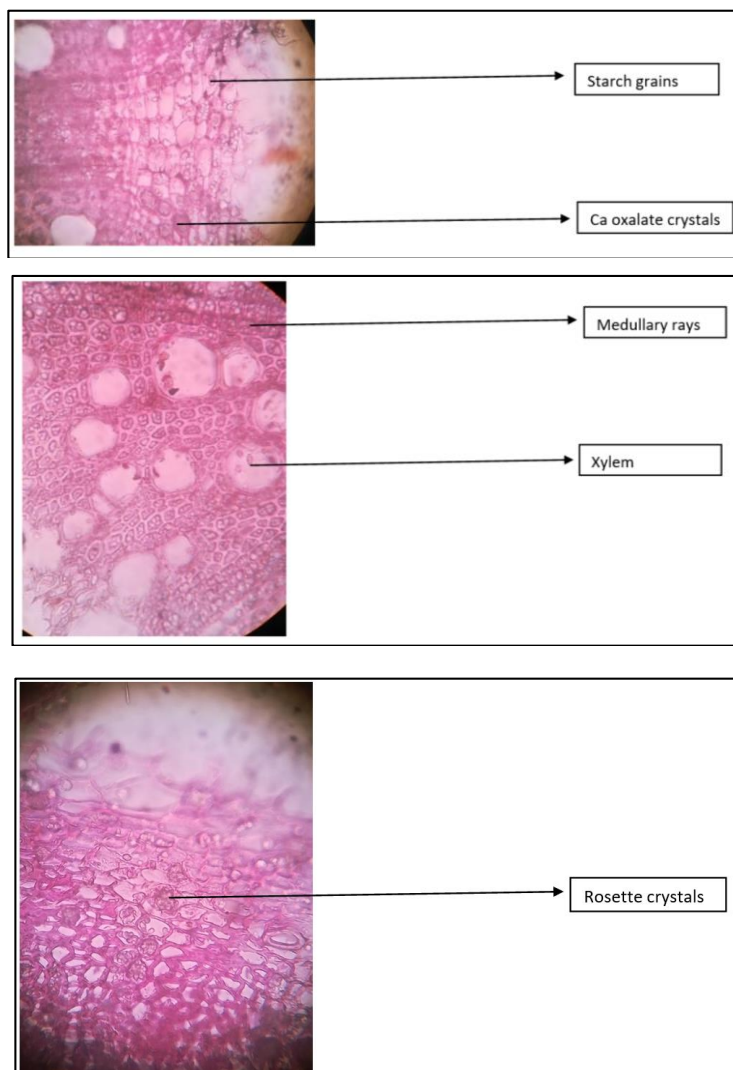
1	Touch	Course and powdered
2	Colour	brown
3	Taste	astringent
4	Odour	Not pleasant
5	Consistency	Coarse

Microscopy of *Leea indica* (Burm. f.) Merr.

Root

Transverse section of root shows: outer cork – 2-5 layered tangentially elongated, thick walled cells. Cortex consist of loosely arranged parenchymatous cells. Phloem consist of 5-10 layered tightly packed cells. Xylem consist of xylem vessels and other xylem elements. Medullary rays are broad and heterogenous.

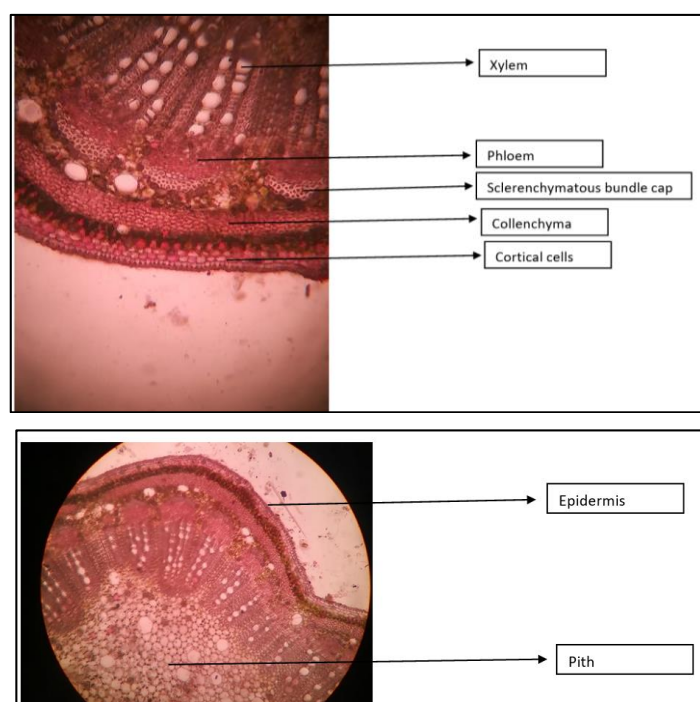


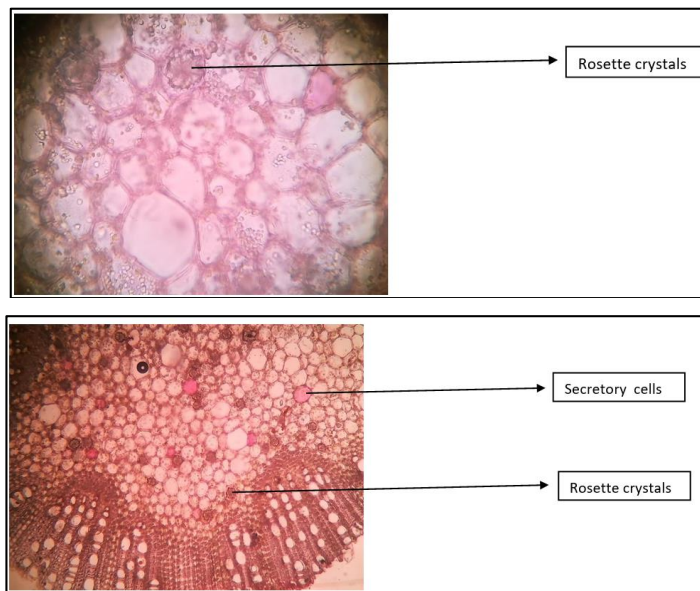


Stem

Transverse section of stem shows the single layered epidermis, cortex region which consist of parenchymatous cells, collenchymatous tissue, closed vascular bundle

surrounded by fiber layer, and secretory cells. sclerenchymatous bundle cap can be seen. Starch grains are absent. pith is wide and consist of polygonal closely arranged parenchymatous cells. Rosette crystals can be seen in the pith.

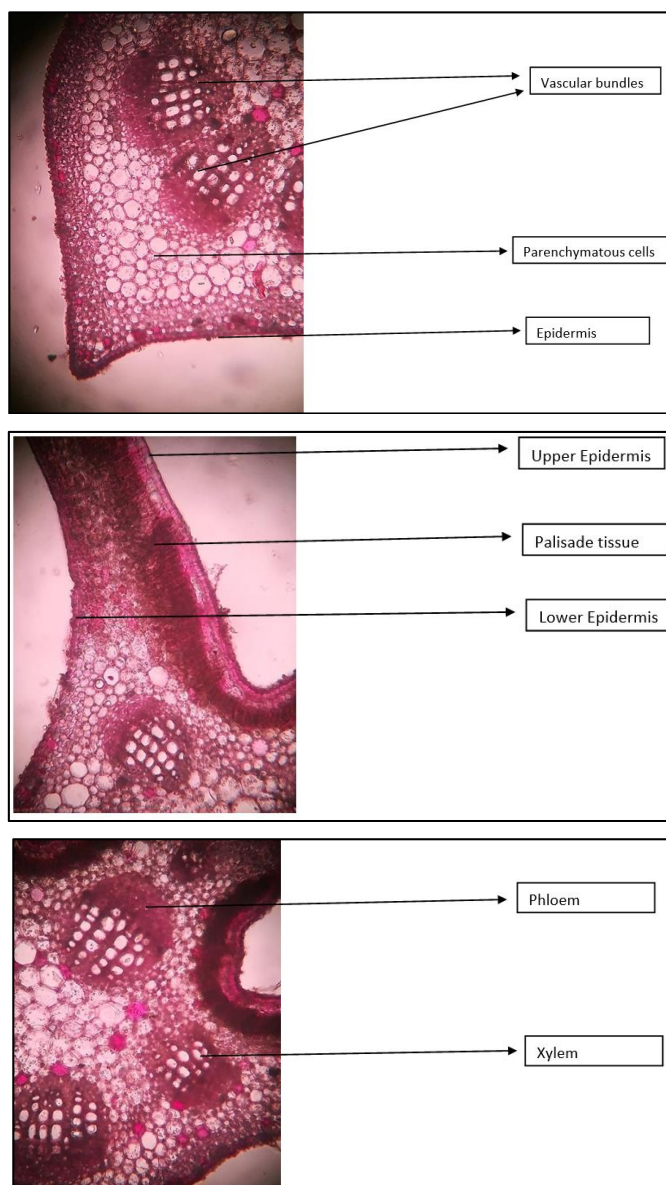


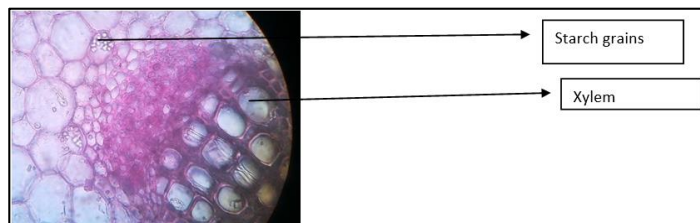


Leaf

Transverse section of midrib consists of open vascular bundle not surrounded by fiber layer, and secretory cells. Trichomes are absent. Transverse section of margin shows the presence

of secretory cells. Transverse section of lamina shows uniseriate and smooth epidermis with trichomes, palisade cells, calcium oxalate crystals and secretory cells.

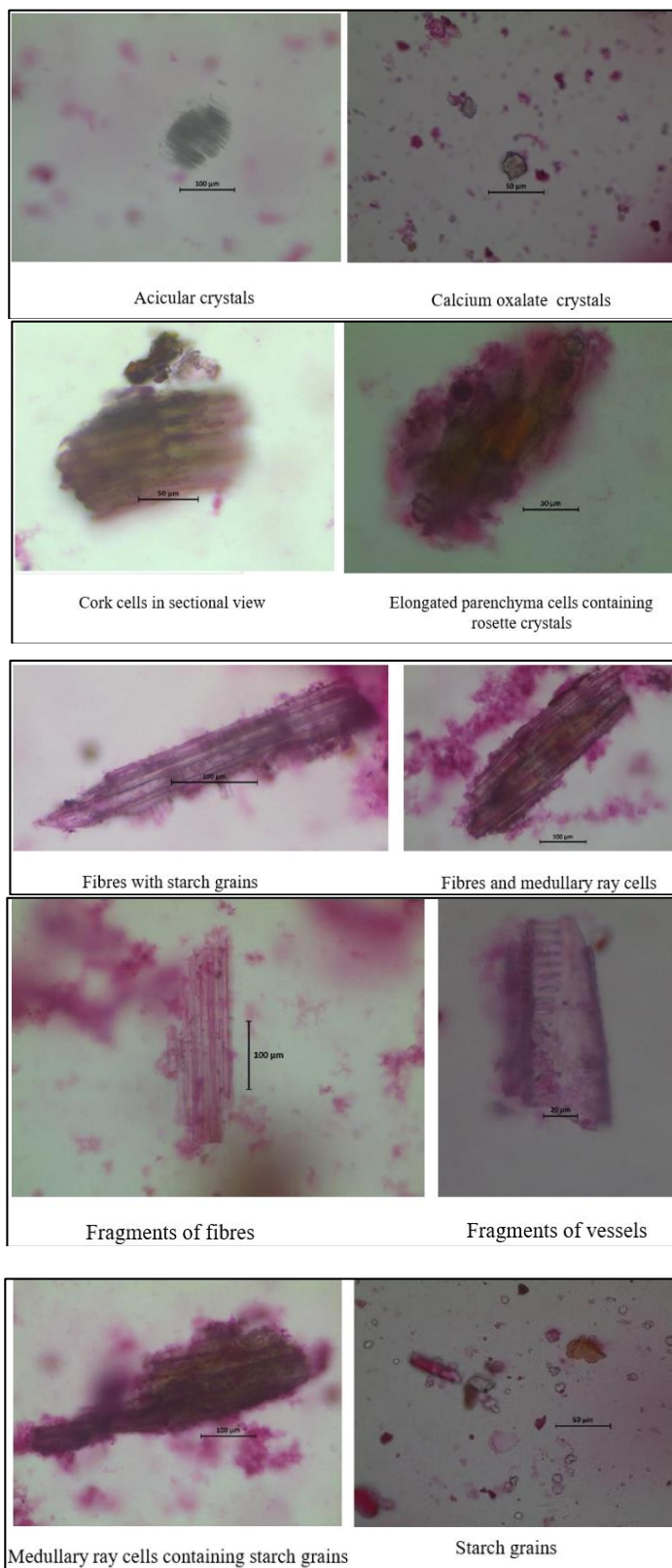




Powder microscopy of *Leea indica* (Burm. f.)Merr. root

Microscopic studies of powdered root of *Leea indica* (Burm. f.)Merr. Roots showed the presence of acicular crystals,

calcium oxalate crystals, elongated parenchyma cells containing rosette crystals, starch grains and fragments of fibres and vessels.



Phytochemical analysis

Table 2: Quantitative phytochemical analysis

Sl. no	Experiments	Percentage
1	Total ash	6%
2	Water insoluble ash	5.05%
3	Acid insoluble ash	0.5%
4	Moisture content	20%
5	Volatile oil content	2%
6	Sugar content	
	a. Total Sugar	23.35%
	b. Reducing Sugar	23.35%
7	Fibre content	44.59%

Table 3: Percentage of water soluble and alcohol soluble extractives

No.	Name of extract	Percentage of extract
1.	Hot water soluble	9.1%
2.	Cold alcohol soluble	4.92%
3.	Cold water soluble	5.47%

Table 4: Qualitative Phytochemical analysis of the extractives

	Alkaloids	Flava noids	Phenol	Tannin	Saponin	Steroids	Anthraqui nones	Glycosides
Hot water extract	—	—	+	+	—	—	—	+
Cold water extract	—	—	+	+	+	—	—	—
Cold alcohol extract	—	—	+	+	+	+	—	—

Discussion

Microscopy

Microscopy shows normal root structure with 2-5 layered parenchymatous cortex, xylem and phloem. Medullary rays are heterogenous.

Phytochemical analysis

Quantitative- Ash values were determined to evaluate quality and purity of the crude drug that contains inorganic radicals like phosphates, carbonates, potassium, magnesium and calcium. The residue after incineration is the ash content of the drug, which represents the inorganic salts naturally occurring in drug or deliberately added to it as a form of adulteration. It helps to detect adulteration with exhausted drug and to ensure the absence of an abnormal proportion of external mineral matter. Total ash of the drug was found to be 6%. The highest percentage of extract was obtained by the extraction with hot water(9.1%) and least with cold alcohol (4.92%).

Qualitative - Tannins and phenols were present in all the extracts. Saponins were present in all extracts except hot water extract. Steroids were present in cold alcohol extract. Glycosides were present in hot water extract. Alkaloids, flavanoids and anthraquinones were absent in all the extracts. Maximum number of secondary metabolites was obtained in cold alcohol extract.

Conclusion

Preliminary pharmacognostic and phytochemical analysis of *Leea indica* (Burm.f.) Merr. was conducted. Qualitative phytochemical analysis showed the presence of tannins, phenols, saponins, steroids and glycosides. Maximum phytoconstituents was obtained for cold alcohol extract.

Acknowledgement

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