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Pharmacognostic and Preliminary Phytochemical Evaluation of the leaves of Leucas zeylanica

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Abstract

Leucas zeylanica Linn belongs to the family Lamiaceae, the leaves of Leucas zeylanica are dried andpowdered. Extraction was done by using two solvents like acetone andethanol by soxhalation method. In this present study, the pharmacognostic andpreliminary phytochemical screening was performed for two extracts it indicates the presences of carbohydrates, flavonoids, alkaloids, glycosides.

Keywords: Leucas zeylanica, Phytochemistry.

Introduction

Leucas zeylanica, belong to the family Lamiaceae commonly called as ceylon slitwort [1], synonyms include *Leucas bancana* Miq, *Phlomis zeylanica* Linn, *Spermacoce denticulate* Walp [2,3]. It is a small, earthy, nonwoody, annual erect plant or sometimes tufted, hispid and aromatic plant growing to a height of up to 120 cm, stipules absent. Stem is green in color. Leaves are oval in shape and green in color, which occur opposite sides of stems and large in number. These are subsellile leaves which are liner lanceolate or elliptic lanceolate which is 2.5 to 7.5 cm long. Roots are mainly tap root and fibrous. Which is white or brown in colour. Whorls of many flowers are bisexual, sessile, subsessile, usually in terminal curls is 1 to 2 cm in diameter, grouped together in an axillary, coralla is white in colour and 2 cm long. Calyx is 5 to 7 mm long obliquely turbient, with minute teeth, apex, acute, base acute, pinnately veined, and erect or spreading horizontally, It is reproduced by seed or pollinated by bees, moths and flies [4,5].

Plants exist in various habitats, a weed of sunny dry localities, often on sandy soils, paddy dams, waste places, road-sides from the low land upto 1700 m altitude. Widely occurs throughout South East Asia [6]. The leaves are used as anti helminitic, diaphoretic, sedative, stimulant, vulnerarya. They are applied topically to heal wounds [7,8]. The leaves are used as apoultice to treat itch, head ache, vertigo, and scabies. The sap of the leaves is used for sores of eyes and nostrils [9]. Leaves and flowers are used for jaundice and used in treatment of burning and urination in the frame of traditional medicine [10].

Materials and Methods

Collection of plant material

The leaves of *Leucas zeylanica* were collected from local areas sainagar, Karimnagar and are authentified by the botanist and No is BSI/DRC/16-17/Tech./968. The collected plant material was made thoroughly free from any foreign organic matter.

Leaves were separated, shade dried and powdered with laboratory mixer and sieved. Pharmacognostic and phytochemical studies were conducted with fresh leaves and leaf powder and dfferent extracts.

Pharmacognostic evaluation

Organoleptic evaluation: It influences on the texture, odour, size, taste, color of the crude drug which depends on the sense organs also called sensory characters [11].

Microscopic evaluation: It is mostly done for the powder and the fresh leaves. For the powder the powder analysis is done to get the information about the, xylem, epidermis, calcium oxlate crystals, phloem, etc. and the fresh leaves are used for the study of leaf constants like stomatal index, stomatal number, palisade ratio, vein islet number, vein termination number, and transverse section of leaf and these helps for the identification of the genuine drug from adulteration.

Powder analysis of leaf

Small quantity of leaf powder placed on microscope slide and few drops of phloroglucinol and hydrochloric acid then a small drop of glycerol to the slide and observe under the microscope with 45X magnification, and the powder characters are observed like calcium oxalate crystals phloem, xylem, and starch grains by adding a drop of iodine the starch grains observed in blue color [12-16].

Measurement of leaf constants

Surface constants like stomata number, vein islet number, stomata index, vein termination number, palisade ratio can be measured. The stomata number, stomata index is present for both upper and lower epidermis and it is done by peeling the epidermal layer and then the transparent layer is slowly kept on the microscopic slide by cutting with the help of the blade, and then add a drop of chloral hydrate to remove if any chlorophyll is present and observe under the microscope at 45X, and the stomata is drawn with the help of camera lucida which is attached to the microscope and stomata number, stomata index is calculated by using the formulas. The vein islet, vein termination, palisade ratio is identified by boiling the leaf pieces in the chloral hydrate for 15-20 min and then place the leaf fragment on the microscopic slide and observe at 45X for vein islet, vein termination, and at 5X for palisade ratio.

Physical evaluation

It is for the determination of physical characters like moisture content ash values, extractive values [12-17].

Determination of total ash

Accurately 2 g of the drug is placed in the crucible and keep in incinerator and kept it for about 5-10 min at 450°C and the remained ash is cooled and weighed, and percentage of ash is calculated with dried drug.

Acid-insoluble ash: The ash remained in the total ash is taken in 25 ml of dil HCL and it is filtered, the residue remained on filter paper is Acid insoluble ash and the percentage is calculated with the dried crude drug.

Water soluble ash: The total ash is dissolved in 25 ml of distilled water and filter the ash solution; the remained ash is subtracted from the total ash gives the water-soluble ash and percentage is calculated to the dried drug.

Determination of alcohol soluble extractive

Weigh 5 g of the drug and keep in contact with 100 ml of alcohol and kept for 24 h for maceration with intermittent shaking and it is filtered after 24 h and filtrate is evaporated to dryness a and percentage of alcohol soluble extractive is calculated with the dried drug.

Determination of water soluble extractive

It is same with the alcohol soluble extractive, but the alcohol is replaced with water with chloroform as preservative and percentage of alcohol soluble extractive is calculated with the dried drug.

Determination of ether soluble extractive

Weigh 75 g of the drug and prepare a thimble and the extracted with petroleum ether in soxhlet apparatus for 6 h and then the extract is allowed to evaporate the extract and calculate the percentage of drug.

Moisture content (loss on drying)

Weigh 5 g of the drug and place in the china dish and dried in the oven at 105°C for 5 h and weigh the drug continuously, with an interval of 1 hour until the two successive weights was not more than 0.01 g.

Preparation of plant extracts

Acetone and ethanolic extract

The dried powder of *Leucas zeylanica* leaves were subjected to soxhalation method at suitable temperature. 50 g of leaf powder was taken and prepared as a thimble and subjected to extraction with two solvents acetone and ethanol.

Soxhlation method was carried out for about 6 h for each solvent extract obtained were evaporated *and* dried in dessicator.

Phytochemical analysis

Extracts were tested for identification of chemical constituents like, carbohydrates with Molish, Fehling's, Benedicts, proteins and amino acids with Biuret, Millons, Xantoproteic, Ninhydrin, steroids with Salkowski, Liebermann-burchard, glycosides with Killer Killani and Brontrager flavonoids with Shinoda and Lead acetate, tannins, alkaloids with Mayars, Wagner, Hager, Dragondroffs [14].

Results

Pharmacognostic evaluation

In this evaluation, macroscopy and microscopy of leaves of *Leucas zeylanica* were studied. The leaf powder of the plant was studied for the organoleptic characters like color, odor and taste. The observations of the investigations are presented in the Table 1.

Table 1: Organoleptic characters of *Leucas zeylanica* leaves.

Color	Green
Odor	Characteristic
Taste	Bitter

Microscopic evaluation

The leaf powder of the plant has shown the presence of following plant tissue systems upon microscopic evaluation shown in the Tables 2 and 3.

Table 2: Microscopic characters of *Leucas zeylanica* leaves.

Trichomes	Multicellular, long lignified
Stomata	
Upper stomata	Anisocytic stomata
Lower stomata	Paracytic stomata
Starch grains	Absent
Vascular tissue	Xylem and phloem

Leaves

Figure 1: Leaves of *Leucas zeylanica*.

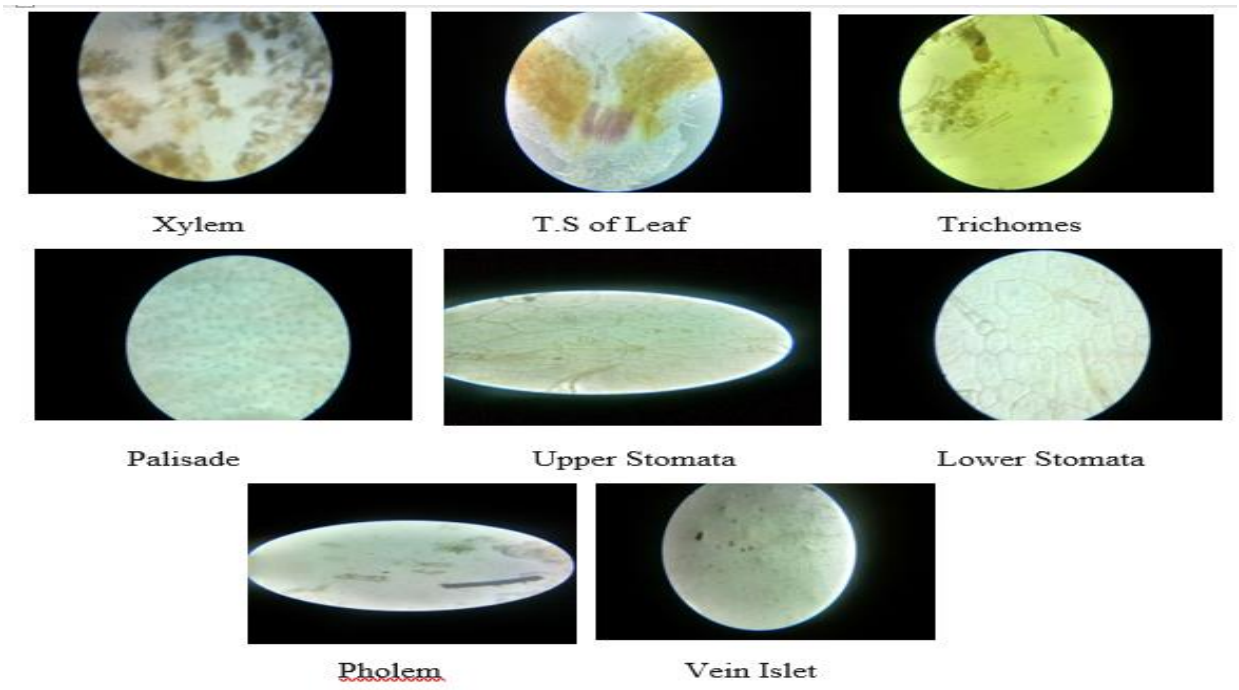

Figure 2: Microscopical Characters of *Leucas zeylanica*.

Physiochemical evaluation

The leaf powder of *Leucas zeylanica* was evaluated in terms of ash values, extractive values, and moisture content.

Table 4: Physicochemical parameters of leaves of *Leucas zeylanica.*

Parameters	Values
Total ash	35%
Acid insoluble ash	5%
Water soluble ash	10%
Moisture content	16%
Loss on drying	69.9%

The total ash, acid insoluble ash and water-soluble ash values of leaf powder of *Leucas zeylanica* were evaluated. The results were calculated with respect to the air-dried drug and the results obtained are shown in the Table 4. *Leucas zeylanica* contains about 35% of inorganic constituents of which about 5% is acid insoluble matter and 10% is water soluble matter. The amount of moisture presents in the leaf powder of *Leucas zeylanica* was about 16%.

Preparation of extracts

The colour, nature and percentage yields of all extracts were recorded. The extractive values are furnished in the Table 5.

Table 5: Extractive values of *Leucas zeylanica* leaves.

S. No	Extract	% Dry Weight (W/W)	Color	Consistency
1	Acetone	4%	Dark green	Resinous
2	Ethanol	3.6%	Dark Green	Resinous

The results presented in the table indicated that the leaf powder upon soxhlation produced highest percentage of acetone extract.

Whereas, a little percentage of ethanol extract was obtained. The results indicate that the leaf powder contains more quantity of acetone soluble constituents upon soxhlation.

Phytochemical screening

The curative property of medicinal plants is due to the presence of chemical constituents like alkaloids, glycosides, amino acids, flavonoids, steroids.

Table 6: Phytochemical screening of *Leucas zeylanica* leaves.

Chemical tests	Acetone	Ethanol
Alkaloids		
Mayer's test	-	+
Hager's test	+	-
Wagner's test	-	+
Dragondroff's test	-	-
Flavanoids		
Alkaline	+	+
Lead acetate	+	-
Glycosides		
Borntrager's test	-	-
Killer killani	+	+
Carbohydrates		
Molish test	+	+
Benedict test	+	+
Fehling's test	+	+
Proteins and Amino Acids		
Biuret test	-	-
Millon's test	-	-
Xanthoprotic's test	-	-
Ninhydrin test	-	-
Steroids		
Salkowski test	+	+
Lieberman Burchard test	+	-
Tannins and Phenolic Compounds		
Gelatin solution	+	+
Potassium dichromate	-	-
Iodine solution	+	+
$Fecl_3$	-	-
Dilute HNO_3	-	-
Acetic acid solution	+	-

In the present study, two different solvent extracts were subjected to phytochemical tests have revealed that presence of alkaloids, glycosides, flavonoids, tannins, carbohydrates, steroids, proteins and amino acids are absent in both acetone and ethanolic extract (Table 6).

Discussion

The evaluation and standardization of a plant is an important part of inaugurating its proper identity. Before any crude drug can be added in a herbal pharmacopoeia, pharmacognostic parameters and standards must be established. The results of the present study could stay as a basic for proper identification, collection and study of the plant. The pharmacognostical characters of the leaf described, separates it from other plants of the genus. Numerical values and quantitative leaf microscopy are unique to the plant and are required in its standardization. Secondary metabolites which exhibits physiological activity. In addition to carbohydrates *and* proteins utilized by human as food source. Phytochemical tests may be useful in the identification of active principle. These tests facilitate their quantitative estimation and qualitative of pharmacological active compounds. Phytochemical constituents in the plant extract are known to be biologically active compounds which are responsible for the antioxidant, antifungal, antimicrobial.

Conclusion

The pharmacognostic parameters, which are being announced for the introductory, could be useful in the standardization of a crude drug. The data given in the present investigation is also helpful in the preparation of the crude drug's monograph and inclusion in various pharmacopoeias. The phytoconstituents present in the plants is used for producing useful drugs for human use *and* useful for treating different diseases. In the investigation, we have found that most of the biologically active chemical constituents were present in the acetone *and* ethanolic extract of *Leucas zeylanica* leaves. It is beneficial for further investigation. A medicinal property of *Leucas zeylanica* is due to phytochemicals.

Conflict of Interest

None declared.

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