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Pharmacognostical and Phytochemical Evaluation of Leaves of *Mimusops elengi* L.

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Abstract*: Herbal drug attaining wide acceptance day by day because they are safe, very effective and less costly. The utilization of plant as a medicine is mentioned in Ayurveda, Siddha, Unani medicines etc. but the therapeutic properties of most of them have not be proven scientifically. Therefore, Pharmacognostic and Phytochemical evaluation of Mimusops elengi L. is carried out to know the complete information of crude drug. Mimusops elengi L. (Sapotaceae) is an important medicinal plant because each and every part is used in treatment of various ailments. Boiled leaves are applied to head as a cold compress for headache and juice of the leaves squeezed into the eye for sore eye. In folk medicine infusion of bark is prescribed internally in disease of bladder and urethra. Unripe fruit is used as masticatory. It is therefore recommended to be chewed for fixing loose teeth. Powder of dried flower is a brain tonic and is useful as a snuff to treat Cephalalgia. So it is important to standardized the plant materials to be used as medicine. In this context the present work has been undertaken to examine the physiochemical and pharmacognostic evaluation of plant.*

Keywords: *Herbal drugs, Physiochemical, Pharmacological, Sapotaceae.*

I. Introduction

Plants have always been the principal form of medicine in India and presently they are becoming popular throughout the world. The World health organization estimates that up to 80 % of peoples still rely mainly on traditional medicine [1]. 40 species of *Mimusops* have been reported throughout world [2]. *Mimusops elengi* L. is considered as one of the best medicinal plant because every parts of it is used in various way to cure a variety of human diseases.

In ayurveda the drug is mentioned as cooling cardiotonic, alexipharmic, stomachic, anthelmintic, astringent, cures biliousness, disease of gums and teeth [3]. In folk medicine bark infusion is prescribed internally in disease of bladder and urethra. Rinsing mouth with bark decoction is believed to strengthen the gums, reduce inflammation, and prevent bleeding of gums and stop bad breath caused by pyorrhea and dental caries. Decoction of bark is used to wash the wounds. Powder of dried flowers is a brain tonic and is useful as a snuff to treat cephalalgia. The flowers are also used as an expectorant, cures biliousness, liver complaints, diseases of the nose, headache. The smoke of the flower is used for treatment of asthma. The water distilled from the flowers is used as a stimulant medicine, calm anxiety, panic attacks and brain tonic [4, 5, 6].

II. Materials And Methods

2.1 Collection and Authentication of Plant

Fresh leaves of *Mimusops elengi* L. were collected from the campus of DDU Gorakhpur University and authenticated by Herbarium Department of Botany, DDU Gorakhpur University Gorakhpur. The leaves were washed and dried under shade. The dried leaves were then pulverized with the help of mechanical grinder and kept in sealed jar at 4^0C temperature in refrigerator.

2.2 Preparation of Plant extract

The dried leave powder was extracted with different Polar and Non Polar solvent (Methanol, Ethanol, Acetone, Chloroform, Water) using soxhlet apparatus (Fig. 1). After effective extraction solvent was concentrated using rotatory evaporator.

2.3 Pharmacognostic Studies

2.3.1 Physiochemical evaluation

The various physiochemical parameters such as total ash, acid insoluble ash, water soluble ash, extractive value and moisture content was determined as prescribed by Indian Pharmacopeia and WHO guideline.

2.3.2 Fluorescence analysis

Fluorescence analysis was carried out as per standard method described by Chase and Pratt (1949) [7], Kokoski (1958) [8] to determine the fluorescence properties of plant sample.

2.3.3 Organoleptic evaluation

Organoleptic evaluation can be done by examine the color, odor, taste and texture as standard method by Wallis (1989) [9].

2.3.4 Microscopic examination

Microscopic study was carried by examine thin hand section under microscope

2.3.5 Phytochemical Screening

Phytochemical screening were carried using standard procedure described by Harborne (1973) [10], Trease and Evans (1989) and Sofowara (1993).

Test for Alkaloids

Mayer's Reagent (KI + Hg_2Cl_2 solutions)**:** To the extract few drops of Mayer's reagent was added to produce cream colored precipitate which indicates the presence of alkaloids.

Dragondorff's reagent (excess of KI + BiNO3 solutions)**:** To the extract few drops of Dragondorff's reagent was added to produce reddish brown colored precipitate.

Hager's reagent (Picric acid)**:** To the extract few drops of Hager's reagent was added to produce yellow colored precipitate which indicates the presence of alkaloids.

Test for Glycosides

Keller–Killiani Test: To the extract, 1 ml of glacial acetic acid containing traces of ferric chloride and 1 ml of concentrated sulphuric acid were added. A reddish brown colour formed at the junction of the 2 layers and the upper layer turned bluish green indicating the presence of glycosides.

Borntrager's Test: To the extract 1 ml of benzene and 0.5 ml of dilute ammonia solution were added to produced a reddish pink color which indicate the presence of glycosides.

Test for Flavanoids

Alkaline Reagent Test: To the extract few drops of NaOH solution were added. Formation of intense yellow color which disappeared upon addition of concentrated HCl indicated the presence of flavonoids.

Test for Saponins

Foam Test: To the extract 2ml of distilled water was added and shaken vigorously for 15 minutes. If foam produced persists for ten minutes it indicates the presence of saponins.

Test for Tanins and Phenols

Ferric Chloride Test: To the extract 1 ml of ferric chloride solution was added. Appearance of bluish-black colour confirmed the presence of tannins.

Test for Steroids and Terpeneoids

Liebermann Burchard Test: To the extract 1 ml of anhydrous acetic acid and 1ml chloroform was added and cooled at 0^0C. Then 1 drop of concentrated sulphuric acid was added from the side of the test tube. A brown ring form at the junction of two layers. The upper layer turns green which show the presence of steroids and formation of deep red color indicates the presences of terpenoids.

Salkowski Test: To the extract 1ml of chloroform and 1ml of sulphuric acid was added. Yellow color upper layer indicate the presence of terpenoids while reddish brown color lower layer showed the presence of steroids.

Test for Proteins

Biuret Test: To the extract, 1ml of 40% NaOH solution and two drops of one percent $CuSO_4$ solution were added. Violet color appears indicates the presence of proteins.

Ninhydrin test: Two drops of ninhydrin solution (10 mg of ninhydrin in 200 ml of acetone) are added to 2 ml of aqueous filtrate. Appearance of purple colour indicate the presence of amino acids.

Test for Carbohydrate

Fehling's Test: To the extract, Fehling's solution was added and boiled in water bath. Brick red precipitate indicated the presence of carbohydrates

Benedict's reagent: To the extract, Benedict's solution was added and boiled in water bath. Formation of a red precipitate showed the presence of carbohydrates.

III. Result

The result revealed that the qualitative analysis of phytochemical showed the presence of saponin, glycosides, flavanoids, steroids, terpenoids, tanins, phenols, carbohydrates, protein and amino acid while alkaloids was absent in the extract (Table 1). The percentage yield of the methanol extract was higher 17.84 ±

0.57 compared to ethanol 24.85 ± 2.23 , chloroform 13.42 ± 0.63, acetone 6.97 ±0.25 and aqueous extract (Table2 and Fig. 2). The physiochemical analysis showed that the total ash was 5.43 ±0.02, acid insoluble ash 1.15±0.24, and water soluble ash 3.6±0.79. The moisture content of crude drug was found to be 4.7±0.6 while the swelling index was 15.4 ±0.25 and foaming index was not more than 100 (Table 3). The result of fluorescence analysis and organoleptic evaluation were shown in Table 4 &5 respectively.T ransverse section of leaves through midribs shows the presence of upper and lower epidermis covered by a thick layer cuticle. The stomata are of anomocytic type. The mesophyll cells are differentiated into palisade and spongy parenchyma. Below the epidermis radially elongated palisades tissues are present which is followed by spongy parenchyma. The vascular bundles are present in the midrib region (Fig. 3).Transverse section of petiole is almost circular in outline. Single layer of epidermis composed of oval cells covered by a thick cuticle layer. Epidermis is followed by hypodermis which is followed by wide zone of cortex. The vascular bundles are situated in the centre (Fig. 4).

Table 1: Preliminary Phytochemical Screening of*Mimusops elengi* L. leaves

Chemical constituent	**Tests**	**Colour**	**Extracts**				
			MLE	**ELE**	**CLE**	**ALE**	**AqE**
Alkaloids	Mayer's	Cream	-	-	-	-	-
	Hager's	Reddish brown					
	Wagner's	Reddish brown					
Saponins	Foam	Yellow	++	+++	+	+	+++
Glycosides	Keller-killiani	Reddish brown	-	++	++	-	+++
	Borntragers	Reddish pink	-	+++	+++	-	+++
Flavanoids	Alkaline	Yellow	+++	+++	+++	+++	+++
Steroids /Terpeniods	Libermann-Burchard	Green/Red	+ + +	+ + +	+ + +	+ + +	+ + +
	Salkowski test	Red/Yellow	+ + +	+ + +	+ + +	+ + +	+ + +
Tanins&Phenols	Ferric chloride	Blue black	+++	+++	+++	-	+++
Carbohydrates	Benedict's	Red precipitate	++	++	++	++	++
	Fehling's test	Brick red	++	++	++	++	++
Proteins and amino acids	Ninhydrin test	Violet color	+	+	+	+	+
	Biuret test	Purple	+	+	+	+	+

MLE-Methanol leaf extract, ELE- Ethanol leaf extract, CLE- Chloroform leaf extract, ALE- Acetone leaf extract, AqE- Aqueous leaf extract

Table 2: Percentage Yield of different extract of *Mimusops elengi* L. leaves

Solvents	**Leaves**
Methanol	46.32 ± 1.05
Ethanol	32.29 ± 1.42
Chloroform	60.70 ± 1.38
Acetone	22.25 ± 1.48
Aqueous	22.17 ± 1.76
Ethyl Acetate	8.19 ± 1.43
Ethanol 80%	50.95 ± 1.73
Methanol 80%	41.82 ± 1.15

Table 3: Physiochemical parameters of *Mimusops elengi* L. leaves

Ash content	**Values**
Total ash	5.43 ±0.02
Acid insoluble ash	1.15±0.24
Water soluble ash	3.6±0.79
Moisture content	4.7±0.6
Foaming index	More than 1000
Swelling index	15.4 ±0.25

Table 4: Organoleptic characters of *Mimusops elengi* L. leaves

Solvents	**Color**	**Taste**	**Consistency**	**Odor**
Methanol	Dark green	Bitter	Semi Solid	Characteristic
Ethanol	Green	Bitter	Semi Solid	Characteristic
Chloroform	Olive green	Sweet	Solid	Characteristic
Acetone	Leafy green	Sweet	Semi Solid	Characteristic
Aqueous	Mustard yellow	Slight bitter	Semi Solid	Fruity

Table 5: Fluorescence analysis of leaves powder of*Mimusopselengi*L.

Powder Treatment	**Oridnary light**	**UV light**
Powder	Olive Green	Brown
Powder + concHCl 50%	Green	Brown

Powder + concHCl	Dark green	Brown
Powder + conc HNO_3	Brown	Red
Powder + conc HNO_3 50%	Leafy green	Purple
Powder + conc H_2SO_4 50%	Olive green	Brick red
Powder + conc H_2SO_4	Brown	Green
Powder + 1N NaOH in H_20	Leafy green	Brown
Powder + 1NNaOH in methanol	Green	Red
Powder + 5%$FeCl_3$	Black	Purple
Powder + glacial acetic acid	Leafy green	Blood red
Powder + benzene	Olive green	Pink
Powder + NH_3	Dark green	Brown
Powder +choroform	Olive Green	Pink
Powder + methanol	Olive Green	Pink
Powder +ethanol	Olive Green	Red

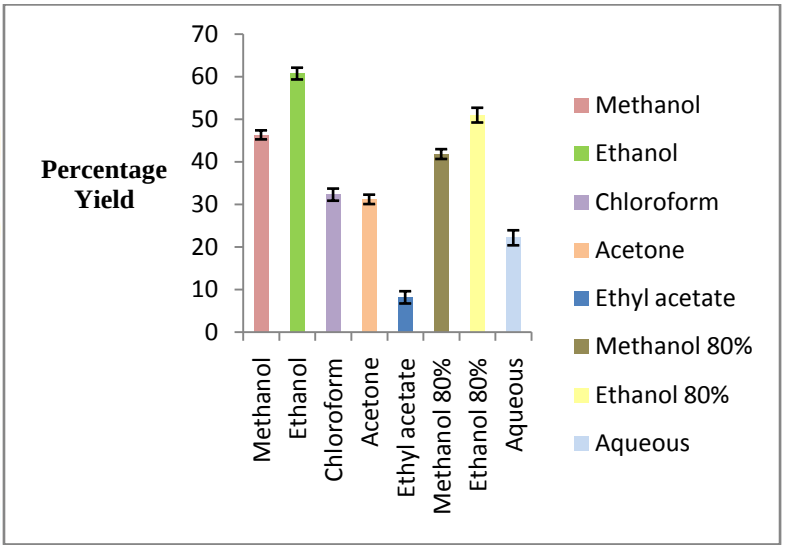
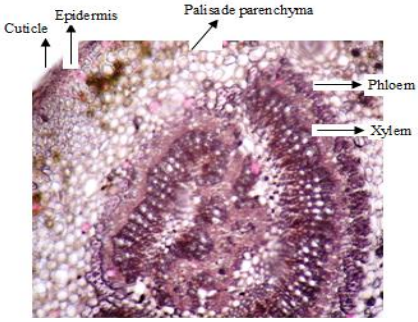
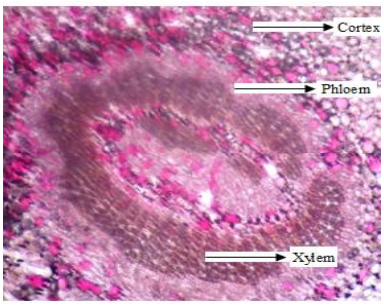


Fig 1: Extraction through Soxhelet **Fig 2:** Percentage yield of different extract of leaf





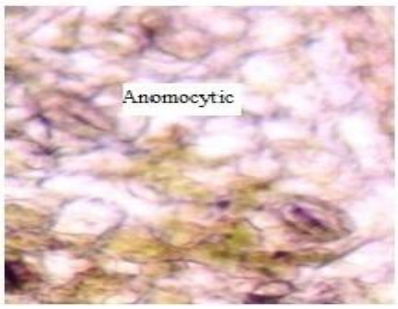


Fig.3: T.S. of Leaf **Fig. 4:** T.S. of Stem **Fig. 5**: Adaxial Surface of Leaf

IV. Discussion

The trust of people in the natural products of plant has made the use of plant an indispensable part in medicine. In recent years medicinal plants has been found to play a vital role in preparation of new and improved medicine. One of the most important aspects for the utilization of plant derived drug is to determine its microscopic, macroscopic, physicochemical, organoleptic and phytochemical parameters. These parameters are helpful for identifying purity and quality of crude drugs. Therefore the present study was undertaken to reveal the pharmacognostical and phytochemical parameters so it can be used for the profiling of drug as well as future monograph development and preparation of new herbal formulation.

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