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Research Article

PHARMACOGNOSTICAL EVALUATION OF FRUITS OF *MALLOTUS PHILIPPENENSIS* (LAM). MUELL- ARG (EUPHORBIACEAE)

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ABSTRACT:
Correct identification of starting material is necessary to ensure the quality of herbal medicines. Pharmacognostic evaluation is first step towards establishing identity and purity of crude drug. With this aim the present paper deals with study of pharmacognostic and physicochemical characteristics of fruits of Mallotus *philippinensis* (lam) Muell. Arg. (Euphorbiaceae). The powder of *Mallotus philippinensis* was used for detection of various chemical constituents. The transverse section and the powder of fruit were studied for macroscopy, microscopy and physicochemical parameters. Fruit is globose, 3-lobed capsule with abundant orange or reddish glandular granules. The Microscopy showed the presence of epicarp, mesocarp endocarp. The cells also showed the presence of starch. From the pharmacognostical evaluation it was found that the fruit contains alkaloids, saponins, flavanoids etc. Physicochemical parameters were also within the limit. It can be concluded that Pharmacognostic evaluation can serve as tool for developing standards for identification, quality and purity of *M. philippinensis*.
Keywords: *Mallotus philippinensis*, Pharmacognostic evaluation, physicochemical characteristics, Standardization.

INTRODUCTION

Medicinal plants have always had an important place in the therapeutic armory of mankind. [1] According to WHO, 60% of world population rely on medicinal plants for their primary health care needs.[2] Over 50% of all modern clinical drugs are of natural product origin and natural products play an important role in drug development programs of the pharmaceutical industry[3] So, while developing an herbal drug formulation it is must to have all the related knowledge of all its organoleptic characters to phytoconstituents to pharmacological action to its standardization in respect to various parameters via various techniques. *Mallotus philippinensis* L. Locally known as kamala is a large woody multipurpose medicinal tree belongs to family Euphorbiaceae consisting of herbs, shrubs and trees[5] Hairs of fruits and seed oil are administered in various disease condition.[6] Various parts of the plant are used in the treatment of, cancer, diabetes, bronchitis, skin problem, antifungal tape worm eye-disease diarrhea, jaundice, malaria, urinogenital infection etc[7] Antioxidant property of *Mallotus Philipinesis* in extractives of fruits and bark. Extract of fruits of kamala from the glands and hairs yield the crystalline compound rottlerin. Its fruits contain Rottlerin (reddish-yellow resin) 47.80% fixed oil. 5.83-24% mallotoxin, kamalin. Oleic, lauric, myristic, palmitic acid, stearic acid, crotoxigenin, rhamnoside, , octa cosanol, iso rottlerin, rottlerin, homorottlerin, tannins , citric , oxalic acid.[1,5] Despite of modern techniques, identification and evaluation of plant drugs by pharmacognostical studies is still more reliable and inexpensive. According to WHO the pharmacognostical evaluation is first step towards establishing identity and purity, hence objective of this study is to provide reference information for identification and preparation of plant monograph that can be used to study the quality and purity of this drug.[8]

MATERIALS AND METHOD

The dried fruits and powder of *Mallotus philippinensis* were obtained from S.G. Phyto pharma, Kolhapur, India.

Macro morphology

The fruit of *Mallotus philippinensis* was evaluated for their morphological characteristics by observing their colour, odour and taste along with some extra macroscopical characters as per WHO guidelines.[9-12]

Microscopy: The transverse section of *M.philippinensis* were taken and stained with different staining reagent. The microscopical images were made by using Motic Image Plus microscopic unit. (MOTIC- B1)[8, 13]

Micro chemical Testing

The transverse section of fruit and powder were treated with specific staining reagent and observed under digital microscope (MOTIC-B1). The cell wall composition, cell contents and tissue detection was reported separately.[14, 12, 17]

Physicochemical Evaluation

The various physicochemical parameters were viz. loss on drying, ash values, extractive values. Determinations of these physicochemical parameters were done as per the procedures mentioned in accordance with the WHO guidelines.[14, 10]

Preliminary Phytochemical Screening

The chemical evaluation includes qualitative chemical tests which are used for identification of various phytoconstituents present in the crude drug.[15]

Fluorescence Analysis

Dried fruits powder were treated in different solvents and observed under visible light, short ultra violet light, and long ultra violet light. The solvents used were petroleum ether 60^0-80^0, Chloroform, Ethyl acetate, Methanol, 50% Sulphuric

acid, 50% Nitric acid, 50% Hydrochloric acid, 10% Sodium hydroxide, etc.[13,16]

RESULTS AND DISCUSSION

Macro morphological Description

Morphological evaluation plays determines the suitability of crude drug in the market. It is the simplest method for identification to start the correct identity.[13] Fruit a depressed-globose, 3-lobed capsule, 5-7 mm x 8-10-12mm, stellate-puberulous and with abundant orange or reddish glandular granules. Seeds are subglobous and black. The results of morphological characters are mentioned in Table 1.

TABLE 1: MACRO MORPHOLOGICAL DESCRIPTION:

Sr. no	Characters	Observation
Organoleptic characters		
1	Colour	Red
2	Odour	Odourless
3	Taste	Tasteless
Quantitative macro morphology		
4	Size	7.5-10 x 3.2-4.2cm
5	Diameter	8-10 mm
6	Seed	subglobous and black, 3 lobed,

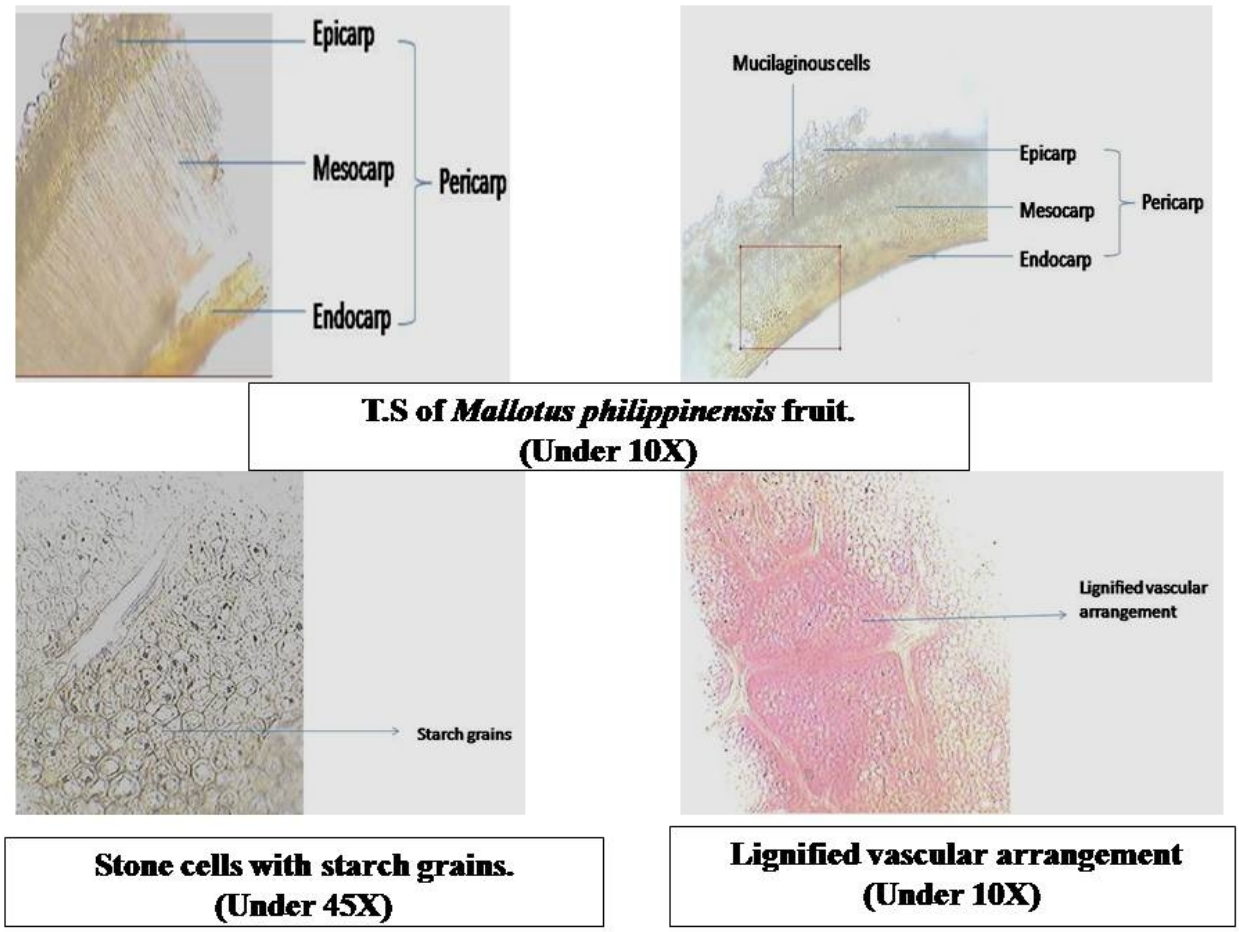

Figure 1: Microscopy of *M.philippinensis* fruit

Microscopical Description

Microscopical evaluation helps in the initial identification of herbs and in detection of adulterants as well as plant by characteristic tissue features.[8, 13] Microscopical evaluations showed the presence of epicarp which contained a compactly packed layer of mucilaginous cells. The mesocrap is composed of columnar cells which are closely arranged. The endocarp is smallest layer as compared to others. The cells are compactly arranged in 2-3 layers. The polygonal cell of the endocarp contains the starch grains. The transverse section also showed the presence of lignified vascular arrangements.

Micro chemical Testing

Characterization of cell wall components and cell contents were done with the help of micro chemical testing which revealed the presence of various types of cells along with their characterization. Micro chemical test showed the pink color in phloroglucinol and HCl solution which reveals the presence of lignified vascular arrangement. It also showed blue color with iodine which shows the presence of starch grains. The details of micro chemical testing were reported in Table 2.

Table 2: Micro chemical testing

Staining Reagents	Observations	Characteristics
Phloroglucinol + conc. HCL	Pink	Lignified fibbers
Ruthenium red	Red	Mucilage cells
Iodine solution	Blue	Starch

Physicochemical Evaluation

The physicochemical constants of dried fruit powder are moisture content, ash values and extractive values.[15] The limited moisture content signifies that the drug was properly dried and the rate of drying was good enough. The ash value represents inorganic salts, naturally occurring crude drug of the adulterant present[8, 13]. The percent of extractive in different solvents shows the nature and quantity of the constituents in the drug. Table.3 shows the results of the physicochemical constants of dried fruit powder which lies within the limit; this signifies that the quality and purity of raw material was within the limit.

TABLE 3: PHYSICOCHEMICAL EVALUATION

Sr. No.	Test	Result (% w/w)
1	**Moisture content**	4.033 ± 0.066
2	**Ash Values**	
	Total ash	3.543± 0.037
	Water soluble ash	4.13± 0.087
	Acid insoluble ash	4.56± 0.041
	Sulphated ash	4.11± 0.062
3	**Extractive value**	
	Water soluble	20.08 ±0.14
	Alcohol soluble	60.2± 0.040

Results are expressed in Mean±SEM

Preliminary Phytochemical Screening

The powdered drug was subjected to preliminary phytochemical screening to check the presence of type of phytoconstituents. The powder contained carbohydrates revealed by the presence of molisch reagent, flavanoids were revealed by shinoda test which shows he pink color, and steroids were revealed by the Lieberman Burchard reaction which shows the green color, alkaloids, saponins and phenolic compounds. The results of the preliminary phytochemical screening are shown in Table 4.

TABLE 4: PRELIMINARY PHYTOCHEMICAL SCREENING

Phytoconstituent	Observations
Carbohydrate	+
Protein	+
Phenolic compounds	+
Tannins	+
Flavonoids	+
Alkaloids	+
Saponins	+
Steroids	+

Fluorescence Analysis

Fluorescence analysis of the powder treated with different solvents and reagents is exhibited in Table 5. The different fluorescence color shows the presence of different constituents present in the extract. The green fluorescence in solvents Ethyl acetate and Chloroform indicates that flavanoids might be present. Green color in pet ether shows that steroids and fatty acids might be present.

TABLE 5: FLUORESCENCE ANALYSIS

Reagent	Visible	Short Ultra Violet	Long Ultra Violet
Water	Green	Green	Green
Petroleum ether (60°- 80°)	Green	Green	Colorless
Ethyl acetate	Orange	Green	Green
Methanol	Reddish brown	Green	Green
Chloroform	Green	Reddish brown	Reddish brown
Acetone	Orange	Green	Brown
50 % Sulphuric acid	Pale yellow	Dark green	Black
50 % Nitric acid	Orange	Dark green	Black
50 % Hydrochloric acid	Light brown	Green	Brown
Picric Acid	Yellow	Green	Black
10 % Sodium Hydroxide	Red	Green	Grayish
10 % Ferric Chloride	Green	Green	Black
Dil. Ammonia	Brown	Dark green	Black

CONCLUSION:

This study would provide reference information for identification and preparation of plant monograph that can be used to study the quality and purity of this drug.

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