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Research Article

PHARMACOGNOSTIC AND PHYTOCHEMICAL INVESTIGATION OF *MARKHAMIA LUTEA* (BENTH.) K.SCHUM

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ABSTRACT

Markhamia lutea (Benth.).K.Schum synonym *Dolichondron lutea* is belonging to family BIGNONIACEAE. Plant is commonly known as Bell Bean Tree, Nile Tulip Tree, Siala. *Markhamia lutea* native to Malawi, Tanzania, South Africa, Namibia and India. It is found in bushveld, in riverine fringes, and many times on rocky ridges and on slopes of hill. It is also planted as ornamental plant in Gardens. It is an upright evergreen tree which grows upto 10-16 m high. Traditionally the root barks are used in the treatment of anemia, diarrhea and backache. *Marhamia lutea* is reported for potential antimicrobial activity, Anticancer activity, anti-inflammatory, antiparasitic, anthelmintic, analgesic, anti-viral, and anti-fungal activity. The present study reveals the pharmacognostic account and Phytochemical investigations of *Markhamia lutea* (BENTH.) K.SCHUM

Keywords: *Markhamia lutea*, Morphology, Microscopy, Terpenoids, Glycosides, Favonoids

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INTRODUCTION

Plants of the genus *Markhamia* are widely distributed in Africa and Malawi, Tanzania, Namibia and India. with a narrow, irregular crown and long taproot. The genus was named after Sir Clement Markham, who introduced the famous quinine-yielding cinchona into India. The specific name, 'lutea' is Latin word having meaning 'golden-yellow'. *Markhamia lutea* (Benth.).K.Schum synonym *Dolichondron lutea* is belonging to family BIGNONIACEAE.. Traditionally the root barks are used in the treatment of anemia, diarrhea and backache. *Marhamia lutea* is reported for different pharmacological activities and phytoconstituents.No detailed study was done on the plant. The present study reveals the pharmacognostic account and Phytochemical investigations of *Markhamia lutea* (Benth.).K.Schum.

MATERIALS AND METHODS

Plant material of *Markhamia lutea* (Benth.).K.Schum.was collected from the Nashik and Trimbakeshwar region and

was sent to BSI, Western Circle, Pune for authentication. The authentication was done with voucher specimen no.: NBA-1.

1. Preparation of Extracts

The leaves of *Markhamia lutea* were shade dried and powdered coarsely. The powder material were passed through sieve no.40. The powdered material was successively extracted with petroleum ether, chloroform, methanol and water by continuous hot extraction method (Soxhlet extraction) according to their increasing polarity order. The extracts were concentrated under rotary vacuum evaporator and dried in desiccator to obtain a dried residue. The dried extracts were weighed and the judicious quantity of the same was dissolved in appropriate solvents for further evaluations.

2. Morphological and microscopical Study

Morphological Study were done for determining the color, odour, taste, shape, size of Leaves and Stems Microscopical study was carried out by preparing of thin hand

section (longitudinal and transverse) of leaf and Stem. The sections were cleared with surface clearing agent-chloral hydrate and stained with concentrated hydrochloric acid-phloroglucinol (1:1). Powdered drug was studied for its organoleptic characteristics. Powdered drug of leaves was stained with concentrated hydrochloric acid-phloroglucinol, iodine solution, 60% sulphuric acid, Acetic acid for identification of lignified tissues, starch grains, calcium oxalate crystals by reported methods.

3. Physicochemical constant study

The Physicochemical parameters play an important role for checking the quality and purity of drug. The Physicochemical parameters of the powdered drug was studied for determining total ash, water-soluble ash, acid-insoluble ash and sulphated ash. Alcohol (Methanol and Ethanol) and water soluble extractives values were determined to find out amount of water and alcohol soluble components. The moisture content of Powdered drug was detected by loss on drying (LOD) method

4. Qualitative Phytochemical Investigation

The obtained extracts were dried and weighed. The presence of various phytoconstituents (Primary and secondary metabolites) viz. steroids and terpenoids (Liebermann Burchard test), alkaloids (Dragendorff's test), tannins and phenolics (Ferric chloride test), flavonoids (Shinoda test), Sugars (Fehling solution test), amino acids (Ninhydrin test), etc. was identified by usual methods prescribed in standard texts.

RESULTS AND DISCUSSION

Morphological and microscopical Study



Fig 1. Flowering Twig of *Markhamia lutea* (Benth.) K.Schum.

The plant possesses imparipinnate compound leaves which are thin and wavy, each leaflet up to 7-15 cm in length, leaflets wider at the tip, with rounded asymmetrical base. Color is faint green to dark green with no odor. Margin is fine serrate with reticulate venation. Flower of bright yellowish with throat striped with orange-red color. The shape of flower is trumpet having length 4 to 7 cm with 5 frilly lobes. Flower buds yellow-green and furry, splitting down one side as flower. Fruits are very long, thin, brown capsular shape. The pods having the length upto 75. Pods hanging in clusters and tending to spiral, splitting on the tree to release abundant seeds with transparent wings, 2.5 cm long and yellow-whitish upon maturity. Barks have light brown color with fine vertical lenticels.

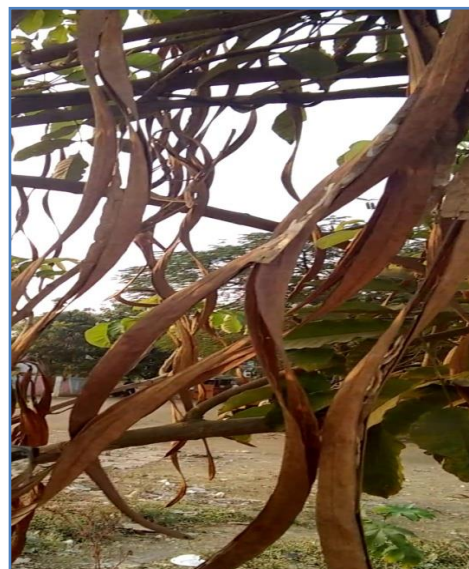


Fig 2. Pods (Fruits) of *Markhamia lutea* (Benth.) K.Schum

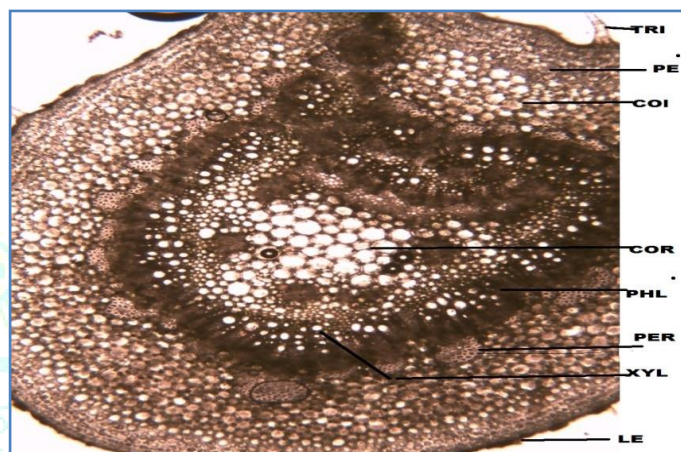


Fig 3 T.S of *Markhamia lutea* (Benth.) K.Schum leaf

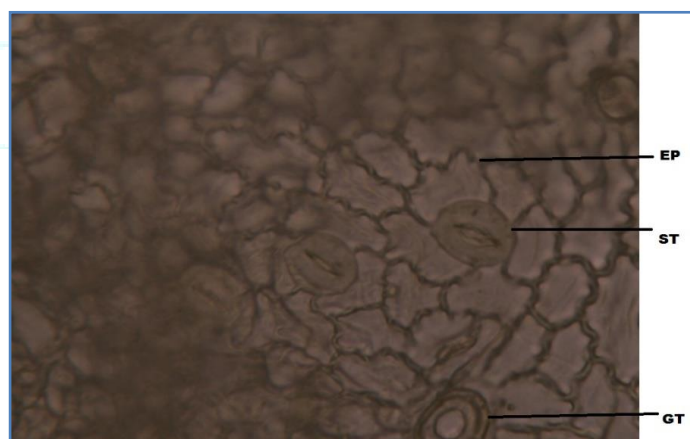


Fig 4 Lower epidermis of *Markhamia lutea* (Benth.) K.Schum leaf

In microscopical examination the Transverse section Shows typical characteristics of leaf (Fig. 1) upper epidermis, lower epidermis, spongy parenchyma, upper collenchyma, lower collenchyma, Xylem, Phloem

In T.S. it shows abundant acicular calcium oxalate crystals. Presence of unique pericyclic sheath around vascular bundle are observed. Surface preparation study shows (Fig. 2) Anomocytic stomata, unicellular sessile glandular trichome and multicellular blunted head unicellular trichomes. Wavy epidermal cells are present in the lower epidermis.

Physicochemical constant

Physicochemical parameters of leaf powdered drugs were studied to determine the ash values, extractive values and moisture content.

Qualitative Phytochemical Investigation

The crude drug extraction was investigated for identifying the presence of primary and secondary metabolites. with petroleum ether, chloroform, Methanol and water.

Table 1. Ash values and Extractive values of *Markhamia lutea* (Benth.) K.Schum (average values of three readings)

Physicochemical constants	Values (% w/w)
Total Ash	3.65
Acid insoluble Ash	1.5
Water soluble Ash	0.833
Acid soluble Ash	2.6
Alcohol soluble Extractive	9.4
Water soluble Extractive	4.6

Table no. 2 Preliminary Phytochemical Evaluation of Crude Drug

Sr. no.	Tests	petroleum ether Extract	Chloroform Extract	Methanol Extract	Water Extract
A	TESTS FOR CARBOHYDRATES	+	+	+	+
1	Reducing sugars	+	-	-	-
2	Monosaccharides	-	-	-	-
3	Pentose sugars	-	-	-	=
4	Hexose sugars	-	-	-	=
5	Non-reducing sugars	-	+	-	+
6	Starch	+	+	-	-
7	Gums	-	-	-	-
8	Mucilage	+	+	-	-
B	TESTS FOR PROTEINS	+	+	-	-
C	TEST FOR AMINO ACIDS	-	-	-	-
a	Tyrosine	-	-	-	-
b	Tryptophan	-	-	-	-
c	Cysteine	-	-	-	-
D	TEST FOR FATS AND OILS	+	+	-	-
E	TEST FOR STERIODS	-	+	+	-
F	TEST FOR VOLATILE OILS	+	+	-	-
G	TEST FOR GLYCOSIDES	+	+	+	-
1	Cardiac glycosides	-	-	-	-
2	Anthraquinones	-	-	+	-
3	Saponin glycosides	+	+	+	+
4	Cynogenetic glycosides	-	-	-	-
5	Coumarin glycosides	-	-	-	-
6	Flavonoids	-	-	+	+
H	TEST FOR ALKALOIDS	+	-	+	+
I	TEST FOR TANINS	-	-	+	+
J	TEST FOR ORGANIC ACIDS				
1	Oxalic acid	-	-	-	-
2	Tartaric acid	-	-	-	-
3	Citric acid	-	-	-	-
4	Malic acid	-	-	-	-
K	TEST FOR VITAMINS				
a	Ascorbic acid/Vitamin C	-	-	-	-

REFERENCES

- Ugbabe GE, Ayodele AE, Ajoku GA, Kunle OF, Kolo I, Okogun JI. Preliminary phytochemical and antimicrobial analyses of the leaves of Nigerian Bignoniaceae Juss. *Global Res J* 2010;1:1-5.
- The Wealth of India- 2001. A Dictionary of Indian Raw Material and Industrial Products. Vol. III, D-E, NISCAIR, CSIR, New Delhi, India,;100-101
- Mohammed I, Malik V, Pranita. *Markhamia zanzibarica* (Bojer ex DC.) K.Schum. A new exotic beauty for India. *Species* 2013;5:167
- Nadkarni, A. K., 2001. *Indian Materia Medica*. Vol. I, Popular Prakashan Private Limited, New delhi, 384.
- Kanchanapoom T, Kasai R, Yamasaki K. Phenolic glycosides from *Markhamia stipulata*. *Phytochemistry* 2002;59:557-563.
- Singh P, Singh A. Quinonoid constituents of the bark of *Markhamia stipulata* Wall. *Pharmazie*. 1980;35: 701-702.
- Brain KR, Turner TD. The practical evaluation of phytopharmaceuticals. Bristol: Wright-Scientifica; 1975: 4-9.
- Kirtikar K.R., Major Basu B.D., 2004. *Indian Medicinal Plants*, 2nd edition, Vol.-III, MIS PERIODICAL EXPERTS, Vivelt Vihar, Delhi-32:1844
- Iyengar MA. *Pharmacognosy of powdered crude drugs*. 9th Ed., Manipal Press, Manipal. 2009b.
- Iyengar MA. *Study of crude drugs*. 14th Ed., Manipal Press, Manipal. 2009a
- Khandelwal KR. *Practical pharmacognosy techniques and experiments*. 20th ed. Pune, India: Nirali Prakashan. 2010: 2.1-2.6, 20.1-20.5, 23.1-23.17.
- Mukherjee PK. *Quality Control of Herbal Drugs an Approach to Evaluation of Botanicals*. 1st ed. Business Horizons Pharmaceutical Publishers; New Delhi, India: 2008 : 379-412.
- WHO. *Quality control methods for medicinal plant material*. Geneva: WHO; 1998.