

# Monograph on Champa (Micheliachampaca)

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**Abstract:** *To check out and evaluate the phytochemicals, antioxidant effects of diverse crude extracts from sparkling leaves of domestically to be had plant Michelia champaca belonging to family Magnoliaceae. Michelia champaca, local to Southeast Asia, is an evergreen tree attaining 25 toes tall. It is an appealing plant, with a clean grey trunk, wavy, smooth leaves up to 10 inches lengthy and light orange to yellow flora which fragrance the air, particularly at night. The showy culmination have crimson seeds. In champaca's local area, it's miles frequently planted close to temples and its wooden is carved via way of means of Hindus into statues of Buddha and into beads. In Malaya and different components of Asia, the vegetation of champaca are strung into necklaces, worn withinside the hair and made into fragrance. This species grows excellent in mild shade or wherein it has an japanese exposure, included from the recent afternoon sun. This paper offers quick statistics on standard distribution, habitat, phenology, morphology, wooden shape and properties, silviculture, germination, growth and yield, propagation, pest and illnesses and its significance and on the end of all, references are included. The conclusion and suggestions given withinside the paper as the ones taken into consideration appropriate on the time of its preparation. They can be changed withinside the light of in addition information received withinside the next tiers of this paper.*

**Keywords:** Michelia champaca, Phytochemicals, Total Phenol, Flavonoids, Antioxidant activity.

## I. INTRODUCTION

A tall, appealing evergreen tree referred to as a champa (Michelia champaca). From Myanmar eastward in Assam, Bengal, Nepal, etc., it's far pretty established in combined temperate woods. It clearly arises alongside the foothills, that are located among 500 and a thousand metres above imply sea level. Additionally, it grows withinside the Western Ghats from Kanara to Kerala in addition to some chilly, damp valleys in Bihar. The Magnoliaceae 6family consists of Michelia champaca. Local names encompass tita sopa, shimbu, sempagam, champakam, saga, and oulia champ. In a warm, humid place with rich, deep, damp however well-tired soil—ideally sandy loam—the species grows clearly. It is a reasonably rapid developing tree. It has a tendency to increase a cylindrical immediately bole with darkish gray and clean bark. When developing on a beneficial soil in a appropriate climactic zone, it attains a peak of approximately 20 to 30 m. and a girth approximately 2 m to three m in almost 70 to eighty years of age. The excellent heady fragrance may be felt from pretty a distance from the tree. The end result of champa seem in May-June and ripen in August-September. The species produces sufficient sheed for herbal regeneration in ordinary habitat, aleven though a bumper seed 12 months happens almost as soon as in 3 years. Michelia champaca timber has subtle pores. Structurally it's far gentle or even grained and has awesome annual increase rings — six to seven consistent with inch of diameter. The sapwood is white, whilst the heartwood is olive green.

### 1.1 Objectives of the Study

- To accumulate the available knowledge on champa for future use by the educationists, researchers, foresters and planners.
- To aggregate the available information to help others interested about champa.
- To find out the aspects of champa in the context of Bangladesh.
- To identify the lacking of information.



Fig:-1 Michelia champaca.

#### **Pharmacological Activities**

##### **Cytotoxic Activity of Michelia champaca:**

The ethanolic extract of bark of Michelia champaca showed activity against human epidermoid carcinoma of the nasopharynx 01.

##### **Anti-Inflammatory of Michelia champaca:**

The anti-inflammatory drug activity in methyl alcohol (95%) extract of Michelia champaca leaves by varied carrageenan-induced inflammation rat models was highlighted<sup>2</sup>. Results showed highly significant maximum inhibition concluding anti-inflammatory activity in pro-inflammatory conditions. This study put together disclosed the presence of some phytoconstituents like flavonoid 3 jointly showed anti-inflammatory drug property of methyl alcohol extract of Michelia champaca flowers.

##### **Anti-hyperglycemic Activity of Michelia champaca:**

Various extracts of flower buds of Michelia champaca for anti-diabetic activity was reported<sup>4</sup>. Results advised that among all the extracts the ethanolic extract of Michelia champaca exhibited vital dose-dependent antihyperglycemic activity however didn't produce hypoglycemia in fasted normal rats.

##### **Leishmanicidal Activity of Michelia champaca:**

Timber extracts of Michelia champaca showed potent leishmanicidal activity

##### **Anti-infective Activity of Michelia champaca:**

Dichlormethane extract of Michelia champaca possess anti-infective activity. Dichlormethane extract of Michelia champaca and a madagascarienjse showed the most variety of growth inhibiting compounds against Cladosporium cucumerinum; the crude extracts showed activity against many phytopathogenic threadlike fungi .

**Antibacterial Activity of Michelia champaca:**

The bactericide activity in ester extract of Michelia champaca flowers was reported 8. The bactericide activity of Michelia champaca ester extract was studied against gram-positive organism (Staphylococcus aureus, Bacillus subtilis) and gram-negative bacteria (Escherichia coli, Pseudomonas aeruginosa). The ester extract was simpler against all microorganism strains tested.

**Wound Healing Activity of Michelia champaca:**

The wound healing activity in ethyl alcohol (95%) extract of Michelia champaca flowers by burn wound healing methodology was highlighted 9. Several parameters like incision wound, epithelization quantity, scar area, enduringness and amino acid (hydroxyl proline) measurements beside wound contraction, were accustomed assess the impact of Michelia champaca on wound healing. The results indicated that Michelia champaca hurries the wound healing methodology by declining the expanse of the wound and increasing the permanency<sup>10</sup>.

**Diuretic Activity of Michelia champaca:**

Aqueous extracts of stem bark and leaves of Michelia champaca was investigated for diuretic activity<sup>11</sup>. Results clearly advised that aqueous compound extracts of stem bark exhibited higher diuretic drug potential as compared to leaves extract, with the upper dose evoking pronounced symptom even larger than standard furosemide drug (Lasix) in terms of Na<sup>+</sup> and K<sup>+</sup> concentration, and approximating diuretic drug in terms of excretory product volume.

**Anti-ulcer Activity of Michelia champaca:**

Alcoholic and aqueous extracts of leaves and flowers were evaluated for anti-ulcerogenic property against NSAID-aspirin induced lesions<sup>12</sup>. Various parameters like reduction in internal organ volume, free acidity and lesion index were down upon administration of alcoholic and aqueous extract of Michelia champaca. Flower binary compound extract showed most effectiveness followed by leaf alcoholic, flower alcoholic, and leaf binary compound extracts.

**Antifertility Activity of Michelia champaca:**

The anti-fertility activity of a hydroalcoholic leaf extract of Michelia champaca in feminine rats was illustrated<sup>13</sup>. Results showed vital anti-fertility impact which can ensure to inhibition of implantation and steroid hormone impact due to presence of some phytoconstituents.

**Antihelmintic Activity of Michelia champaca:**

The methanolic and aqueous extracts of leaves of Michelia champaca showed robust antihelmintic activity against test worms Pheretima posthuma<sup>14</sup>. Parameters like dysfunction time (PT) and death time (DT) were increased upon administration of each extracts.

**Cardioprotective activity of Michelia champaca:**

The cardio protecting potential of methanolic extract of Michelia champaca flowers on isoproterenol-induced cardiac muscle anemia in male albino wistar rats was studied<sup>15</sup>. Results indicated that re-treatment with varied doses showed dose-dependent cardioprotective edges with restoration of biochemical parameters and histopathological confirmation of biochemical findings.

**II. MATERIALS AND METHOD**

1. **Chemicals:** Formalin, acetic acid, ethyl alcohol, chloral hydrate, toluidine blue, phloroglucinol, glycerin, hydrochloric acid and all other chemicals used in this study were of analytical grade.
2. **Collection of Specimens and authentication:** The leaves of the selected plant were collected from in and around Shevaroy hills, Salem and were identified and authenticated by Dr.P. Jayaraman, Director of Plant Anatomy Research Institute, Tambaram, Chennai, Tamil Nadu, India.
3. **Macroscopic analysis:** Macroscopic observation of the plant was done. The shape, size, surface characters, texture, colour, odour, taste etc was noted 20.

- 4. Microscopic analysis:** The leaves were fixed in FAA (Formalin - 5 ml + acetic acid - 5 ml + 70% ethyl alcohol - 90 ml). After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiary-butyl alcohol (TBA). Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-60°C), until TBA solution attained supersaturation. The specimens were cast into paraffin blocks.

### Sectioning

The paraffin embedded specimens were sectioned with the help of rotary microtome. The thickness of the sections was 10-12 µm. After de-waxing, the sections were stained with toluidine blue. Since toluidine blue is a polychromatic stain, the staining results were remarkably good and some cytochemical reactions were also obtained. The dye rendered pink color to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc.,

### Photomicrographs:

Photographs of different magnifications were taken with Nikon lab-photo 2 microscopic Unit. For normal observations, bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Since these structures have birefringent property, under polarized light they appear bright against dark background.

- 1. Powder microscopy:** Coarse powder of the leaf was used to study the microscopic characters<sup>23,24</sup>.
- 2. Physicochemical analysis:** Total ash, acid insoluble ash, water soluble ash, loss on drying and extractive values were determined<sup>25,26</sup>.
- 3. Preliminary phytochemical screening:** Preliminary phytochemical screening was carried out to find out the presence of various phyto constituents using standard procedure.



**Figure 2:** Leaves and flowers of *M. champaca*.

### 3.1. Macroscopic Personality

Tall, attractive, and evergreen, *M. champaca* has a trunk that is straight. The leaves measure 30.5 cm by 10.2 cm, are alternate, lanceolate, acute, entire, glabrous, and simple. Petioles measure 18 to 25 mm in length. Flowers are around 5-6 cm in diameter, extremely fragrant, and pubescent in a greyish yellow colour. Deep yellow or orange petals and sepals have 15 or more.



### 3.2 Microscopy of an *M. Champaca* Leaf

The midrib measures 1.5 mm in the vertical plane and 1.75 mm in the horizontal plane, according to the lamina. On the abaxial side, it bulges into a semicircular body and is flat on the adaxial side.

(La-Lamina, VC-Vascular Cylinder, GT-Ground Tissue)



Figure 2: Leaf T.S. with lamina through midrib

The midrib's epidermal layer is thin, and the cells have small, thick walls (Figure 2). The epidermis' inner two or three layers of cells are collenchymatous and smaller with thicker walls. Ground tissue still present is parenchymatous. The cells are tiny, varying in size and form. A semicircular cylinder with its adaxial surface flattened makes up the vascular system. There are a few light distinct vascular areas in the lower semicircular cylinder. Aba stands for the abaxial arc of vascular tissue, AdB for the adaxial vascular bundle, GT for ground tissue, Ep for epidermis, Ph for phloem, Sc for sclerenchyma, and X for xylem.

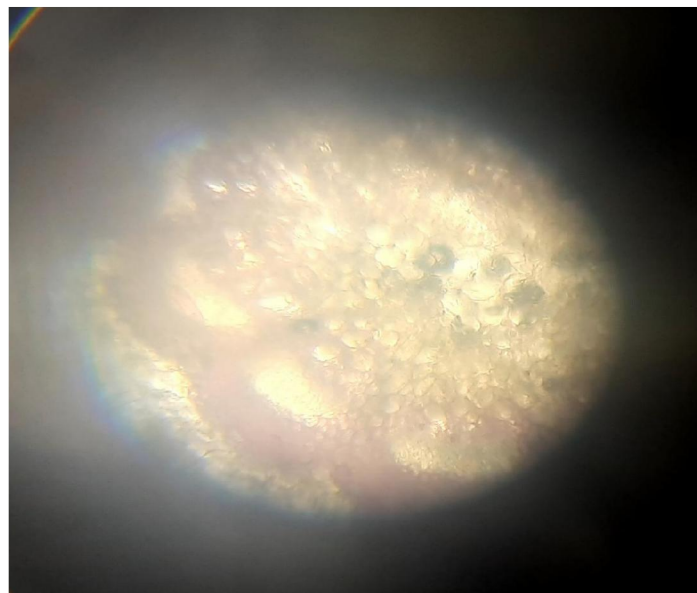


Figure 3: T.S. of Midrib

The lamina has a thickness of 150  $\mu$ m. It is made up of a thick layer of adaxial epidermis with cuticles that are clearly visible and wide, round to squarish cells. There are 20  $\mu$ m thick cells. A thin layer of spindle-shaped cells make up the



abaxial epidermis (Figure 4, 5). The mesophyll is divided into a large spongy parenchyma and a restricted palisade zone. The six or seven layers of tiny lobed cells that make up the palisade layers are joined together to form aerenchymatous tissue (Figure 3). Trichome, Palisade Mesophyll, Adaxial Epidermis, Spongy Mesophyll, and Abaxial Epidermis



T.S. of lamina in Figure 4.

Tests	Petroleum ether extract	Chloroform extract	Ethanol extract	Aqueous extract
<b>Alkaloids</b>				
Mayer's Reagent	-	-	-	-
Dragendorff's reagent	-	-	-	-
Hager's reagent	-	-	-	-
Wagner's reagent	-	-	-	-
<b>Carbohydrates</b>				
Molisch's Test	+	+	+	+
Fehling's Test	+	+	+	+
Benedict's Test	+	+	+	+
<b>Glycosides</b>				
General Test	-	-	-	-
Anthraquinone	-	-	-	-
Cardiac	-	-	-	-
Cyanogenetic	-	-	-	-
Coumarin	-	-	-	-
<b>Phytosterols</b>				
Salkowski Test	-	-	-	-
Liebermann-Burchard Test	-	-	-	-
<b>Saponins</b>	-	-	+	+
<b>Tannins</b>	-	-	+	+
<b>Proteins &amp; Free Amino Acid</b>				
Millon's test	-	-	+	+
Biuret test	-	-	+	+

<b>Gums&amp;Mucilage</b>	-	-	-	-
<b>Flavonoids</b>				
Shinodatest	-	-	+	+
AlkalineReagenttest	-	-	+	+
<b>Terpenoids</b>	+	+	+	-
<b>FixedOil</b>	-	-	-	-

#### Traditional uses of *Micheliachampaca*

Driedrootand bark	Abcesses,purgative	[16]
Flower andflowerbuds	Ulcers, skindiseasewounds	[17]
Flowerbuds	Herbal preparationfordiabetes	[18]
Floweroil	Cephalalgia, oetiophthalmia andgout	[19]
Flowers	Stimulant, antispasmodic, tonic, stomachic, bitter and cool remedies and are used in dyspepsia, nausea and fever.	[19]
Flowers	Anti-dote to snake and scorpionvenoms.	[16]
Flowers	Foetid dischargesfromthestrils.	[19]
Flowers	Vertigo, foetid discharges fromthestrils.	[20]
Fruits	Ulcers, skindiseasewounds.	[17]
Leaves	Colic.	[19]
Rootandbark	Purgativeandinthetreatmentofinflammation,constipation and dysmenorrhea.	[21]
Stembark	Stimulant, expectorant, astringent and febrifuge.	[22]

### III. CONCLUSION

The extensive literature survey exposed that *Michelia champaca* is important medicinal plant with diverse ethnomedical and pharmacological spectrum. The plant shows the occurrence of many natural constituents which are answerable for wide-ranging pharmacological and medicinal properties. The evaluation needs to be carried out on *Michelia champaca* in order to uses and preparation of the plant in their practical clinical applications, which can be recycled for the welfare of the mankind.

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