



A Review on *Michelia Champaca* and Flowers

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Abstract: *Michelia champaca* Linn. Known as *Champaca* is Belonging to family of *Magnoliaceae*. It Consists of 12 genera and 220 species of evergreen trees and shrubs. In recent times there are several reports of medical specialty roles and activities of *Michelia champaca* and its active principles on the circulatory system, antipyretic, diuretic. The Phytochemical analysis of the leaves and flowers of the plant showed the presence of alkaloids, tannins, glycosides, carbohydrates, amino acids, flavonoids and sterol in different solvent system. The petroleum ether extract of the dried flower contained n-alkane hydrocarbons, unsaturated aliphatic ketones, beta sitosterol and quercetin. The quercetin forms the first report of its occurrence in the genus *Michelia* (Shalini and Jaggi 2004) Lago et al (2009) reported that volatile oils contained six sesquiterpene hydrocarbons, four oxygenated sesquiterpenes and two aliphatic alcohols from water using dichloromethane solvent in leaves of *M. champaca* L. This article provides the collective information about the phytochemical constituents isolated from various parts of this plant used in a modern scenario for the treatment of various ailments like β -sitosterol, sesquiterpenes, parthenolide, dihydro parthenolide, gallic acid, quercetin, lirioidenine, essential oils, starch, etc. Traditional uses of the plant in the treatment of various disease like rheumatism, gout, diuretic, febrifuge, etc..

Keywords: *Michelia champaca*, Unsaturated ketones, Sesquiterpenes

I. INTRODUCTION

Michelia champaca belongs to family *Magnoliaceae* is commonly known as Champak or Goldenchampa. leaves are simple, alternate, petiole 1 to 3 cm long, lanceolate, spiral and reticulate. Flowers are solitary, dull yellow when fresh and orange when old and fragrant. The use of herbal medicines for the treatment of diseases is safe and traditional. Therefore medicinal plants have been receiving great attention because of their safety. In India this plant is cultivated in garden and near temples for its fragrant flowers. Its volatile oil is highly esteemed in perfumery and is useful in cephalgia, ophalagia, ophthalmia, gout and rheumatism.³ It is well known and widely used in traditional medicine such as fever, colic, leprosy, post partum protection, eye disorder and many more. This plant was claimed possesses various pharmacological properties such as antipyretic, anti-inflammatory, insecticidal and antimicrobial.⁴ This plant possesses various pharmacological activities like antidiuretic¹², anti-diabetic¹³, antimicrobial¹⁴, anti-ulcer¹⁵, etc. One of these 80 species, *M. champaca* which is commonly known as Champa in Hindi; Champaka in Bengali; Atigandhaka in Sanskrit. It is highly distributed in the Sub-Himalayan tract and Assam, Western Ghats, South India, Burma-Yunnan, Indo-China, Siam, Malaya.⁴ This plant possesses the yellow to orange color flowers with strong fragrance.⁵ Leaves and root bark contain parthenolide, and stem bark contain michampanolide, 8-acetoxy parthenolide, Magno grandiose, costunolide, dihydro parthenolide, β -sitosterol, lirioidenine, ushinsunine, magnoflorine and micheliolide from root bark⁶⁻¹¹.

1.1 Traditional Uses

M. champaca L. has traditionally been used to treat diarrhea, cough, bronchitis, hypertension, dyspepsia, fever, rheumatism, abscesses, dysmenorrhea and inflammation. It is also used as purgative, expectorant, cardiogenic, digestive, carminative, stomachic, stimulant, diuretic, diaphoretic, antipyretic and astringent. The plant is traditionally used for the treatment of cough, fever, colic, leprosy, and rheumatism and also helps in curing cephalgia and ophthalmia.⁵

1.2 Botanical Description

churches. These are used as a stimulant, Uses of Different Parts of the Plant: The plant has fragrant flowers; therefore, it is grown near the temples and expectorant, in rheumatism (Uuani), to treat the bilious condition. These are used for in India for the extraction of essential oil and as a hair adornment.

1.3 Taxonomical Classification of *Michelia champaca*⁶

Table 1: Taxonomical Classification

Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Magnoliophyta
Class	Magnoliidae
Subclass	Magnoliales
Order	Magnoliales
Family	Magnoliaceae
Species	<i>Champaca</i> . L

1.4 Macroscopic Characteristics⁷

- **Root:** Branched taproot.
- **Stem:** Erect, aerial, branched, and woody.
- **Bark:** Bark thick, ashy-grey, rough, blaze light dun brown young shoots silky.
- **Leaves:** Simple, alternate, stipulate, stipule convolute; petiolate, ovate, entire, acute, uncostate reticulate. The ends of the twigs are hairy. The medium sized oval leaves are lance shaped and pointed at both ends, and green with fine hair on the lower surface.
- **Flowers:** bracteates, pedicellate, complete hermaphrodite, actinomorphic, hypogenous. Flowers large axillary, solitary, pale, yellow to deep yellow and very fragrant.



Fig.1 Michelia Champaka Tree & Flower

- **Fruits:** The fruit is shaped like an elongated ball. Slightly bent, green at first, then becoming pale grey and rough. The fruit is borne in chain. Fruits an aggregate of follicles, consist of long clusters of capsules, on a spike about 7.5-15 cm long; dark brown when mature with many prominent white lenticels outside, open at the back by two valves, woody, 7-15 cm long (bunch of follicles).



Fig. 2 Michelia champaka fruits

1.5 Chemical Constituents

The essential oil isolated from flower, leaf and fruit contain mono and sesquiterpenes. The plant also contain -sitosterol and its glucoside, parthanolide dihydroparthenolide, micheliolide, germacranolide, constinolide, iriodenine, macheline⁸

1.6 Microscopic Characters Powder

Dark-brown, shows fragments of parenchymatous cells, broken unicellular trichomes, vessels with spiral thickening, a few prismatic and cluster crystals of calcium oxalate, a few irregular shaped, elongated, lignified, stone cells with narrow lumen in singles or groups, fairly large circular to spherical, brown coloured, numerous smooth pollen grains measuring 67-82 μ in dia. 9

II. MATERIALS AND METHOD

2.1 Plant Material

Flowers of Michelia Champaca was collected from Pune (Mahalaxmi Temple, India. Plant was identified and authenticated by Samarth Institute of pharmacy belhe, Dr. Baba saheb ambedkar university ,Lonere Raigad. The flowers of the plant material were stored in herbarium at the college for further reference.

A. Extraction

The flowers were dried in shade and powdered. The Dried Powder (50gm) was Extracted by soxhlet extraction method with petroleum ether (65°) for 24hrs.¹⁰

B. Phytochemical Screening:

Preliminary phytochemical evaluation is the step after extraction in order to identify different classes of constituents that can be present in extracts i.e carbohydrate, proteins, lipids, flavonoids, tannins, glycosides, alkaloids or essential oils. Always choose a solvent of extraction by solubility and/or polarity of constituents to obtain polar components use polar solvents only. After detecting the particular class, one can perform specific chemical tests for whole crude drug or individual constituents to confirm any known drug or component. The present study elaborates maximum available tests that can be performed for preliminary phytochemical screening.¹¹

Table 2: Phytochemical Screening

Sr. No.	Phytochemical constituent	Aques extract	Petroleum ether
1.	Carbohydrates	+	+
2.	Alkaloid	+	+
3.	Amino Acids	+	+
4.	Saponin	-	-
5.	Steroids	+	+
6.	Glycosides	+	+

7.	Antraquinone Glycosides	+	+
9.	Flavonoids	+	+

III. PHARMACOLOGICAL ACTIVITIES

M. champaca possesses a large number of reported activities given as mentioned below:

3.1 Diuretic Activity

Traditionally, M. champaca is used in ethnomedicine as a diuretic agent. In the traditional system of medicine, this plant is used in the form of aq. extract of leaves and stem bark as a diuretic. This plant possesses diuretic activity at dose of 250 and 500 mg/kg in adult Swiss albino Wister rats with higher dose exhibit more promising responses. Aq. Extract of stem possesses much diuretic activity as compare to leaves. It is also used in other kidney disease and dysuria 12.

3.2 Anti-microbial Activity

M. champaca possess anti-microbial activity with methanolic extract of leaves, seed, stem, root bark, stem, root heart-wood, and activity is increased after fractionization (petrol, dichloromethane, ethyl acetate, butanol). Fractionation leads to broad-spectrum antibacterial activity in all fraction of stem bark and dichloromethane fraction of root bark. It also possesses antifungal activity. Liriodenine is the active constituent in plant responsible for antimicrobial activity 13.

3.3 Antiulcer Activity

M. champaca Linn. flower and leaves aq. and alcoholic extract shows the anti-ulcer activity at a dose of 300 g/kg in male albino rats. It causes a decrease in gastric juice, total acidity, ulcer index and an increase in pH. It decreases the acid and pepsin outputs which are required to maintain the gastric mucosal strength 14.

3.4 Anti-diabetic Activity

M. champaca Linn. flower buds possess the anti-diabetic activity at doses of 200 and 400 mg/kg in Wistar rats but unable to produce hypoglycemic activity in fasted normal rats. Aqueous and petroleum ether extracts also show some hypoglycemic activity but only at the end of the first hr. Only ethanolic extract is effective to elevate the biochemical parameters 47 Leaves of this plant also exhibited the anti-hyperglycemic activity at a dose of 200 mg/kg in diabetic rats 15.

3.5 Anti-inflammatory Activity

Flower methanolic extract at dose 100 mg/kg of M. champaca produces anti-inflammatory action against Cotton pellet granuloma rats 16.

3.6 Burn Wound Healing Activity

M. champaca Linn. flowers ethanol extract at a dose of 100 mg/kg possess the burn wound healing activity in Wistar rats. It shows improvement in wound healing either by oral and topical administration. It is useful in the treatment of burn wounds in immunocompromised patient 17.

3.7 Anti-oxidant Activity

M. champaca Linn. leaf methanol extract possess the DPPH free radical scavenging activity at a dose of 0.1 ml of plant extract in 3 ml of 0.004% methanol solution of DPPH. The activity of extract increases with increase in dose 18.

3.8 Analgesic Activity

M. champaca Linn. Leaves methanol extract at a dose of 200 and 400 mg/kg exhibited the analgesic activity in acetic acid induced writhing model. The action of extract increases with increase in dose 18.

3.9 Anti-Cancer

The compound liriodenine which have been isolated from the branches of *Michelia champaca* shows the anti-cancer activity. It shows the inhibition action on MDA-MB-231 human breast adenocarcinoma Cells and A549 human lung adenocarcinoma cell. It shows its maximum inhibition action with 20 μ m in 48 hrs 19

3.10 Other Activities

The plant *M. champaca* also exhibited some other activities helpful in the treatment of various diseases like Flowers of this plant have been taken through oral route in stomachache, as carminative and to treat the dyspepsia 56. In Siddha system of medicine, flower oil of *M. champaca* is used in the treatment of joint swelling 57. The seed of plant is eaten to improve the appetite and in liver disorders 20.

IV. CONCLUSION

Traditional natural remedies are used all over the world due to low cost, safety and due to lack of side effects. *M. champaca* is an ethnomedicine found to be the traditional healer in the treatment of various diseases in Ayurveda and Unani system of medicines. Traditionally, it is useful as anti-diabetic, anti-oxidant, anti-microbial, emmenagogue, and in menstrual disorders. The present review provides the composite information on this plant, and it seems that it acts as a curative tool for ailments due to various constituents.

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VI. CONFLICT OF INTEREST

The author declared no conflict of interest.

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