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A REVIEW ON MAGNOLIA CHAMPACA

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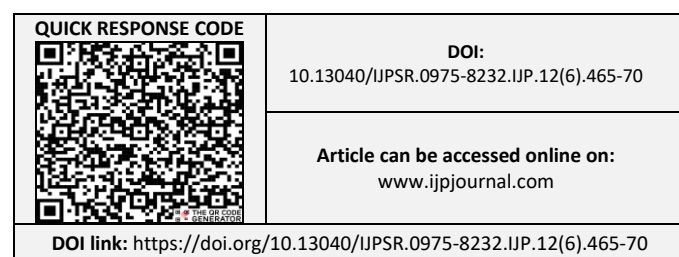
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ABSTRACT: *Magnolia champaca*, also known as *Michelia champaca*, is a member of the *Magnoliaceae* family, widely distributed across the sub-Himalayan region, West Bengal, Myanmar, South India, and apart from China. This plant is celebrated for its perfumery applications, earning the nickname "Joy Perfume Tree," with its fragrance featured in the world's second best-selling perfume, "Joy." The plant boasts a diverse array of phytochemicals, including alkaloids, tannins, sterols, flavonoids, phenols, and saponins, suggesting its potential as a rich source of medicinal compounds. *Michelia champaca* has demonstrated a broad spectrum of pharmacological activities, including anti-microbial, anti-pyretic, anti-inflammatory, antioxidant, insecticidal, anti-uretic, carminative, and anti-diabetic properties. In this review article express taxonomy, synonyms, vernacular names, distribution, ethnomedical uses, phytochemicals, and pharmacological activities of *Magnolia champaca* have been discussed.

INTRODUCTION: For centuries, medicinal plants have played a vital role in human health, providing a natural defense against various diseases. The use of phytomedicine and herbal drugs in healthcare dates back to ancient times, with diverse cultures and societies worldwide relying on these plants for therapeutic purposes. As a rich source of pharmacologically valuable substances, medicinal plants have immense potential to contribute to healthcare development. Notably, the practice of healing with medicinal plants has been an integral part of human history, with roots as ancient as humanity itself¹. The awareness and utilization of medicinal plants are a culmination of centuries-long struggles against diseases, driving humans to discover and harness the therapeutic properties of plants, from their barks and seeds to fruit bodies and other parts².

The genus *Michelia*, part of the *Magnoliaceae* family, includes around 50 species of evergreen trees and shrubs. The ancient *Magnoliaceae* family, known for its large, cup-shaped flowers without clearly defined petals or sepals, is uniquely exemplified by the genus *Michelia*. Although *Michelia*'s leaves, flowers, and form resemble those of *Magnolia*, its blossoms uniquely form clusters among the leaves³. Champa attar is highly sought after in the market for its captivating fragrance, making it a prized ingredient in the creation of exclusive and exotic perfumes. Additionally, its therapeutic benefits are harnessed in aromatherapy to treat patients and promote well-being⁴.

For centuries, *Magnolia champaca* has been a valued herb in both Ayurvedic and Siddha systems of medicine, traditionally used to treat a range of ailments, including fever, colic, leprosy, postpartum complications, and various eye disorders⁵. *Michelia champaca* Linn., a member of the *Magnoliaceae* family, is widely recognized as Champa, an evergreen plant prized for its fragrant blooms and attractive foliage, commonly cultivated in Indian gardens and temple grounds⁶.



Michelia champaca is a majestic tree that can grow up to 30 meters tall. Its young branches are adorned with a covering of grey hairs. The leaves are ovate, measuring up to 30.5 cm in length and 10.2 cm in width, with a distinctive narrowing to a fine point at the apex ⁵. *Michelia champaca* is native to tropical Asia, specifically found in countries such as Bangladesh, India (Arunachal Pradesh, Assam, Bihar), Myanmar, Thailand, Vietnam, Sumatra, and Malaysia ⁷. *Michelia champaca* has been a traditional remedy for various ailments, including fever, colic, leprosy, coughs, rheumatism, and other disorders. This plant has demonstrated a

broad spectrum of pharmacological activities, including anti-microbial, anti-pyretic, anti-inflammatory, anti-oxidant, insecticidal, anti-uretic, carminative, and anti-diabetic properties, showcasing its potential as a versatile medicinal agent ⁸. *Michelia champaca* has been found to possess a diverse array of phytoconstituents, including alkaloids, tannins, sterols, flavonoids, phenols, and saponins. The presence of these bioactive compounds suggests that the whole plant of *Michelia champaca* has the potential to serve as a valuable source of medicinal compounds with various therapeutic applications ⁹.



FIG. 1: MAGNOLIA CHAMPACA FLOWER BUDS



FIG. 2: MAGNOLIA CHAMPACA SEEDS



FIG. 3: MAGNOLIA CHAMPACA BARK



FIG. 4: MAGNOLIA CHAMPACA FLOWER

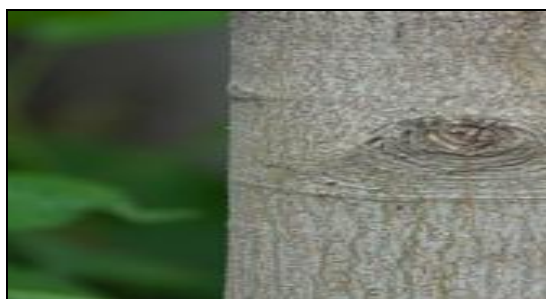


FIG. 5: MAGNOLIA CHAMPACA TREE

Plant Biograph ¹⁰:

Taxonomical Classification:

TABLE 1: TAXONOMY OF MAGNOLIA CHAMPACA

Kingdom	Plantae
Botanical names	<i>Magnolia champaca</i>
Class	Magnoliapsida
Order	Magnoliales
Family	Magnoliaceae
Genus	Michelia L.
Species	<i>Michelia champaca</i> L.

Synonyms ¹¹:

- ❖ *Champaca michelia* Noronha
- ❖ *Magnolia membranacea* P.Parm.
- ❖ *Michelia aurantiaca* Wall.
- ❖ *Michelia blumei* Steud.

- ❖ *Michelia champaca* L.
- ❖ *Michelia euonymoides* Burm.f.
- ❖ *Michelia rheedei* Wight
- ❖ *Michelia rufinervis* DC.
- ❖ *Michelia sericea* Pers.
- ❖ *Michelia suaveolens* Pers.
- ❖ *Sampaccaeuonymoides* (Burm.f.) Kuntze
- ❖ *Sampacca suaveolens* (Pers.) Kuntze

Vernacular Names ⁶:

TABLE 2: VERNACULAR NAMES OF MAGNOLIA CHAMPACA

Assam	Phulchopa, Phulsopa
Bengal	Champa, Champaka
Bombay	Champa
English	Golden champa, Yellow champa
Gujerati	Champa, Sonchampa;
Hindi	Champ, champa, champo
Kathiawar	Pilochampo, Sonchampo;
Konkani	Champa, chamoti
Marathi	Kudchampa, Sonchampa;
Panjabi	Champa, chamoti
Sanskrit	Anjana, Atigandhaka, Hempushpa, Kanchana;
Tamil	Amariyam, sambagam
Telugu	Champakmu
Uriya	Chamoka
Kannada	Sampige

Distribution: The genus *Magnolia*, formerly known as *Michelia*, belongs to the Magnoliaceae family of woody flowering plants ¹². It is native to Southeast Asian countries, including Nepal, India, China, Indonesia, Sri Lanka, Malaysia, Thailand, Vietnam, and Myanmar ¹³. The genus includes over 300 species of evergreen and deciduous trees and shrubs, which are scattered across the temperate, subtropical, and tropical regions of eastern and southeastern Asia, as well as eastern North America and parts of Central and South America ¹⁴. *Magnolia* species are readily identified by their unique morphological characteristics. They are tree-like or shrub-like plants, with either deciduous or evergreen leaves ¹⁵.

Habitat ¹⁰: The tree thrives in tropical forests up to 1,200 meters above sea level, typically found in regions where the maximum temperature ranges from 95°F to 105°F, the minimum from 38°F to

62°F, and the average rainfall is between 90 and 200 inches or more. *Michelia* grows well in a mix of sandy loam and leaf mold. It is propagated in the summer through cuttings of half-ripened shoots, which are placed in sand, under glass, and kept warm. *Michelia* grows quickly, providing ample shade, but may require trimming to maintain control. It blooms profusely in the spring, and trimming can be done after the flowers have faded, if needed.

Phytochemical Constituents ^{16, 17, 18}: The essential oil extracted from the flowers, leaves, and fruits contains both mono- and sesquiterpenes. The plant also contains sitosterol and its glucoside, parthanolide, dihydroparthenolide, micheliolide, germacranolide, constinolide, iriodenine, macheline, A, magnoflorine.

TABLE 3: PHYTOCHEMICAL CONSTITUENTS OF MAGNOLIA CHAMPACA

Root and Stem bark	Liriodenine Magnosprengerine Salicifoline 4-hydroxybenzoic acid p-Coumaric acid Cinnamic acid Chlorogenic acid Catechin Myricetin Luteolin
Leaves	Polysorprenoid β-sitosterol Liriodenine β-elemene Borneol Caryophyllene α-humulene spathulenol Quercetin p-Coumaric acid Caffeic acid Ellagic acid Catechin
Flower	Myristic Palmitic Hexadecadienoic Stearic Oleic Arachidic Eicosenoic Hexadecanoic acid
Seed oil	

Ethnomedical Uses ^{10, 19}: Since ancient times, all the parts of the *Magnolia champaca* plant have been traditionally used to cure diseases. Almost all parts of the plant have medicinal properties, being

used for fever, calming nerves, heart problems, colic, gout, healing wounds, menstrual problems, and childbirth and health tonic.

Different parts are used, as given below;

Bark: It is used as a febrifuge.

Root: The root bark of *Michelia champaca* is used as a purgative and emmenagogue, and is also employed in the treatment of various disorders such as abscesses, inflammation, constipation, amenorrhoea, and dysmenorrhoea

Leaves: Leaves solve problem on rheumatism, angina and pharyngitis.

Stem: Stem bark is reported as astringent, febrifuge, diuretic, stimulant and expectorant.

Flowers: Flowers are used in chronic gastritis, fever, strangury, cough, bronchitis and cardiac debility.

Fruits: Fruits are bitter, astringent, acrid, refrigerant, haemostatic, digestive, carminative, depurative, digestive, anthelmintic, diuretic, expectorant, cardiogenic, stimulant, stomachic and antipyretic.

Pharmacological Action:

Diuretics²⁰: Traditionally, *M. champaca* is utilized in ethnomedicine as a diuretic. In traditional medicine, the plant is applied in the form of an aqueous extract from the leaves and stem bark for its diuretic effects. The plant demonstrates diuretic activity at doses of 250 and 500 mg/kg in adult Swiss albino Wistar rats, with the higher dose showing more significant effects. The aqueous extract of the stem exhibits greater diuretic activity compared to the leaves. Additionally, it is used to treat other kidney-related diseases and dysuria.

Anti-Microbial Activity²¹: *M. champaca* exhibits antimicrobial activity, with methanolic extracts from the leaves, seeds, stem, root bark, stem, and root heartwood showing effectiveness. This activity is enhanced after fractionation using solvents like petroleum ether, dichloromethane, ethyl acetate, and butanol. Fractionation results in broad-spectrum antibacterial activity in all stem bark fractions and in the dichloromethane fraction of

root bark. The plant also demonstrates antifungal properties. Liriodenine, an active compound found in the plant, is responsible for its antimicrobial effects.

Helmintholytic Activity²²: The methanolic and aqueous extracts of *M. champaca* Linn. leaves, at doses of 30 g/ml and 70 mg/ml, caused significant paralysis and increased death times in earthworms, which were notably higher compared to albendazole.

Anti-Diabetic Activity²³: The flower buds of *M. champaca* Linn. demonstrate anti-diabetic activity at doses of 200 and 400 mg/kg in Wistar rats, but do not induce hypoglycemic effects in fasted normal rats. Both aqueous and petroleum ether extracts show some hypoglycemic activity, though only after the first hour. The ethanolic extract is the only one effective in elevating biochemical parameters. Additionally, the leaves of this plant exhibit anti-hyperglycemic activity at a dose of 200 mg/kg in diabetic rats.

Antiulcer Activity²⁴: *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.

Burn Wound Healing Activity²⁵: The ethanolic extract of *M. champaca* Linn. flowers, administered at a dose of 100 mg/kg, exhibits significant burn wound healing effects in Wistar rats. This extract accelerates wound healing when applied both orally and topically, offering a promising therapeutic approach for burn wound treatment, particularly in immunocompromised patients.

Procognitive Activity²⁶: The hexane extract of *M. champaca* Linn. leaves, administered at doses of 100 and 200 mg/kg, demonstrated procognitive effects in memory-deficit mice, as assessed using the rectangular maze and Y maze (interoceptive behavioral models). The extract's activity increased with the dose, with the higher dose enhancing memory and consequently improving learning in the mice.

Anti-Inflammatory Activity²⁷: The increasing popularity of herbal therapy for treating various diseases has gained attention due to the efficacy of medicinal plants in alleviating symptoms comparable to conventional drugs. One such plant, *Michelia champaca*, has been studied for its anti-inflammatory effects. *In-vivo* experiments have demonstrated that this plant affects the lining of post-capillary venules, influencing the expression of adhesion molecules and the secretion of soluble mediators, which play a role in leukocyte-endothelial cell interactions.

Carrageenan, often used to induce experimental inflammation, has been shown to cause a biphasic edema. The first phase, lasting up to an hour, is triggered by chemical mediators like histamine and serotonin, while the second phase, starting at 1 hour and lasting for several hours, involves the metabolism of arachidonic acid via cyclooxygenase and lipoxygenase pathways.

Phytochemical screening of *Michelia champaca* extracts revealed compounds like michampanolide, parthenolide, and magnograndiolide, which showed inhibitory effects on inflammation. The ethanolic extract demonstrated significant anti-inflammatory properties, primarily by inhibiting cyclooxygenase, thereby reducing prostaglandin synthesis. Furthermore, the presence of polyphenols in the ethanolic extract enhanced its efficacy over other extracts, such as pet ether and chloroform. These findings suggest that flavonoids and other compounds from *Michelia champaca* could serve as valuable therapeutic agents for treating inflammation through multiple molecular pathways, including the inhibition of enzymes like cyclooxygenase and lipoxygenase.

CONCLUSION: Plants are rich sources of bioactive compounds that have been traditionally used for the treatment of a variety of life-threatening diseases. *Magnolia champaca*, known for its wide array of phytochemical constituents, has been shown to possess therapeutic properties that make it a valuable candidate for treating numerous health conditions. This review provides an overview of the pharmacological activities exhibited by different parts of the plant. Extracts and isolated phytoconstituents from *Magnolia champaca* have demonstrated a range of beneficial

effects, such as anti-diabetic, anti-inflammatory, diuretic, wound healing, anti-oxidant, analgesic, anti-ulcer, anti-microbial, anti-implantation, anti-cancer, helminthic, and procognitive activities. Given the diverse medicinal properties and promising results observed in various studies, *Magnolia champaca* holds great potential for further research and development. This review aims to encourage and support researchers in exploring the plant's therapeutic benefits and advancing scientific inquiry into its potential for novel pharmaceutical applications.

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