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# *Mahua (Madhuca longifolia L.) Tree - A lifeline for Tribes of Madhya Pradesh*

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## **ABSTRACT**

**Mahua is a multipurpose tree that furnishes the tribals with all-inclusive resources for livelihood sustenance. It bestows the rural inhabitants with basic requirements of food, fuel and timber as well as fodder, beverage, edible oil, traditional medicine, and farm applications. Mahua and its uses are embedded deep into the culture, customs, and traditions of ethnic communities in Madhya Pradesh. The spirit obtained from the distillation of its flowers is the predominant alcoholic beverage consumed by locals. The sale of Mahua, mainly flower and seed, and their derivative products, offers considerable income generation in addition to subsistence. The cultivation of mahua across various systems-whether in monoculture plantations, agroforestry frameworks, or ornamental horticulture exhibits significant potential for enhancing the socioeconomic conditions of tribal communities in Madhya Pradesh.**

## **INTRODUCTION**

*Mahua (Madhuca longifolia L.)* is a fast growing and multipurpose Indian tropical tree that is utilized in day-to-day activities of tribal communities (Yadav *et al.*, 2023a; Bhagmol and Joshi,

2002). It is a large deciduous tree growing extensively under dry tropical and subtropical climatic conditions distributed in Andhra Pradesh, Gujarat, Madhya Pradesh, Odisha, Chhattisgarh, Jharkhand, Bihar and Uttar Pradesh (Mishra *et al.*, 2021). *Mahua* is among the multi-purpose tree (MPT) species that can address the major three F's i.e., food, fodder and fuelwood (Yadav *et al.*, 2023b). Different parts of this tree are used as food, feed and medicine, consequently forming a part and parcel in the sustainability of livelihood of tribal inhabitants (Behera *et al.*, 2016). The flowers of *Mahua* are a rich source of sugar which are eaten raw or cooked, used in traditional liquor distillation and the remaining fermented stock is used as feed for livestock (Singh *et al.*, 2008). The seeds obtained from *Mahua* fruit are used to extract edible oil used in the preparation of vegetable oil, and contain even more oil than some oilseed crops and oil-bearing trees (Singh and Singh, 2017). The flower, fruit, root, bark, seed and leaf of the *Mahua* tree are traditionally well known for their capability to cure several diseases and inflections and that too has been proved medically (Das *et al.*, 2022). *Mahua* tree serves as a nurturing umbrella to the forest dwelling and forest fringe tribal communities of Madhya Pradesh furnishing them with numerous resources for livelihood sustenance.

**Common Name:** Indian Butter tree

**Other names:** Mahua, maul, mahwla (Bengali), mohwra (Marathi), madhuda (Gujrati), ippa (Telugu), illupeii (Tamil), tuppe (Kannad), poonam (Malayalam), moha (Oriya)

**Synonyms:** *Madhuca indica*, *Achras longifolia*, *Madhuca latifolia*, *Bassia latifolia*, *Illipe latifolia*

**Family:** Sapotaceae

**Order:** Ericales

### **HABIT DESCRIPTION**

It is a moderate-to-large-sized deciduous tree reaching up to a height of 20 meters or slightly more. The leaves are thick, leathery, lanceolate, narrowed at both ends, and the crown is rounded with multiple branches. The bark is yellowish grey to dark brown in colour, and the root is a deep, strong taproot system (Yadav *et al.*, 2023a). Flowers are fleshy, succulent, light grey in colour, and effuse an attractive sweet fragrance when the tree is in full bloom (Das, 2022). Fruits are berry-type, oblong, and yellowish in colour when ripe (Singh *et al.*, 2008).



**Figure 1.** A mature Mahua tree

### **DISTRIBUTION**

*Mahua* is a characteristic tree of arid landscapes and can be found throughout the greater part of India, commonly growing in Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Jharkhand, Bihar, Maharashtra, Orissa, Andhra Pradesh, and Gujarat. It is native to India, Sri Lanka, Nepal, and Myanmar. *Mahua* prefers subtropical and tropical dry climatic conditions, thrives well on rocky,

gravelly red soils, both saline and sodic soils, and can withstand drought conditions admirably (Singh *et al.*, 2008).

### **PHENOLOGY**

Most of the leaves start falling in February, and flowering starts consequently after that from March to April (Mishra *et al.*, 2021). Flowers fall on the ground usually in March, following the appearance of new leaves in March end. Fruits begin to ripen in June and July, and mature seeds are available from then on (Das, 2022). It is a fast-growing tree that starts flowering after ten years of planting (Sangeetha and Naggapan, 2016). One to two good seed years may be expected every three years (Anonymous, 2024).

### **UTILIZATION PATTERN**

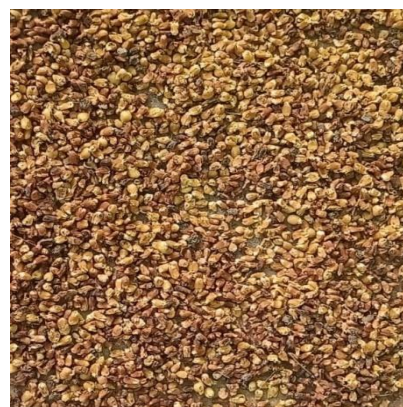
*Mahua* bestows the rural communities with their basic requirements of food, fuel, and fodder, as well as beverages, traditional medicine, and cultural and aesthetic values. All the parts of the *Mahua* tree are used by the local inhabitants in varied forms for diverse utility purposes.

### **FOOD**

The most edible part of *Mahua* is its flower, which is considered a delicacy among the rural inhabitants of the region when it is freshly picked. The collection of *Mahua* flowers has a peculiar feature, as it is never extracted from the tree. Flowers are collected from the ground after they fall naturally out of their senescence. It was observed that the major reason behind this was that in this way people are able to collect ripe flowers only. These ripe flowers are succulent and juicy, having a sugar content of up to 13 to 15% (Swain *et al.*, 2007). The other reason was that if the flowers are collected artificially using a pole or stick and beating the inflorescence with it, flowers would get damaged and lose the vigour and some natural extracts. *Mahua* flowers are eaten both raw and cooked. The raw, freshly picked flowers (Figure 2) are sweet and sour, juicy with a hint of earthy taste, which is liked by all age groups, especially children. It is also used to make refreshing drinks blended with lemon juice. As the fresh flowers are available for a short duration, just about a month or so, they are dried and stored for future use. Flowers, both fresh and dried (Figure 3), are cooked with grains and vegetables in a variety of dishes. Generally, it is cooked with grain wheat, rice, blackgram, jowar, ragi, or corn. Most commonly, it is cooked in a mixture of wheat grain and black gram, and that too just boiled, which serves as a kind of breakfast before leaving for work in the fields. In certain underprivileged communities of the region, it is still used as a major sweetening agent. The ground powder of dried flowers is sometimes mixed with wheat flour, and the dough is used to make indigenous pancakes. The *Mahua* fruit is also edible but not preferred usually. The whole family, especially women and children are extensively involved in collection of *Mahua* flowers during season in the month of March and April. Flowers are collected from various sources such as community plantations, personal holdings, homestead trees and ancestral plantations as well as forest lands.



**Figure 2.** Freshly picked flowers of Mahua



**Figure 3.** Dried flowers of Mahua

### **FUEL**

*Mahua* is one of the substantive sources of fuelwood for inhabitants residing in rural and forest fringe areas. The majority of fuel from *Mahua* trees is collected from community holdings, scrub patches, and forest lands where locals are allowed to collect fallen branches. Other sources account for little contribution in the total fuelwood collection from *Mahua*. Personal holdings are sometimes lopped for the purpose of small timber and fuelwood (Figure 8). When the leaves fall during February and March, some indigent and impoverished groups collect them as fuel or fire starters. Conventionally, when branches or whole trees fall amidst natural circumstances, instead of extracting useful timber out of it, people cut and shred it into piles of fuelwood.

### **FODDER**

The leaves of *Mahua* are nutritious in nature and fed to livestock. It is appreciably palatable to goats and sheep. In some localities where flowers are not much preferred as food or not in use of any kind, they are used as fodder with an admixture of leaves. In such cases, flowers are collected specifically for the purpose of livestock feed. Branches are lopped for the most part of a year for fodder. Cattle and goats are allowed to graze upon the fallen flowers and fruits during supervised grazing. The leftover seed cake after oil extraction is used as concentrate feed. It is soaked in water for 2-3 hours, and upon getting squashy, it is mixed with husk, which is staple feed for livestock. The leftover stock after fermentation and distillation of flowers is considered a good feed for livestock.



**Figure 4:** Long dried flowers of Mahua

## BEVERAGE

One of the most important utilities of *Mahua* is traditional alcohol distillation, locally called “*Mahua*” or “*jhuriya*,” from fermented flowers. For the purpose of distillation, the flowers need not be fresh; dried flowers are more common in use as they are available all year round. Fresh flowers have a sugar content of up to 13–15%, while dried ones develop a sugar content of up to 30–45% (Swain *et al.*, 2007). Dried flowers that have been stored for a long time are more preferred as they yield more ethanol by percentage, and sometimes a year-old stock is used (Figure 4). These flowers are then soaked in water in a steel, iron, or earthen pot and left aside for natural fermentation (Figure 5). After 3–



**Figure 5: Fermentation of Mahua flowers**

4 days when it is fermented and starts to develop froth, it is then taken to the distillation unit. The time of fermentation depends on seasonal variation of temperature, because of which during winters it takes up to a week to ferment naturally. The distillation unit consists of two pots: the basal heating pot and another half-necked inverted pot on top of the first one, sealed off by mud (Figure 6). The function of an inverted pot is to accumulate the vapours arising out of the boiling pot. The apparatus is set up on clay chulha using wood primarily as fuel. The majority of the people who buy fuelwood from the market are mainly for this purpose only. A small round hole is made in the inverted pot, and a plastic pipe is inserted. The vapour accumulating passes through the pipe toward the condensation unit. There are two types of condensation apparatus. First, the pipe itself passes through water, where the vapour is condensed and collected in another pot. Another type of apparatus involves just an earthen pot dipped in water in which the vapour gets accumulated and condensed (Figure 7). The “*jhuriya*” made this way, is the chief alcoholic beverage consumed by the rural inhabitants. It is consumed in the household itself on various occasions and functions or sold. For some households, it is the main source of income.

## EDIBLE OIL

The seeds of *Mahua* are rich in oil content of up to 20–50% (Das, 2022) and have been used traditionally for a long time to extract edible oil. The seeds are locally called “*dori*” collected chiefly for the purpose of oil or vegetable butter/ghee. The *Mahua* seed oil is infrequently extracted in pure form in the region. It is usually mixed with other oil seeds while extracting cooking oil. When in pure form, the oil is yellow in colour (Behera *et al.*, 2016). Seeds are collected from the forest floor when it falls naturally after the fruit ripens. Some people harvest the fruits and then extract seeds. In some instances where birds feed on these seeds and drop them while carrying them, people pick them up, collect them, and add them to their stock of oilseeds.



**Figure 6: Distillation unit**

### TRADITIONAL MEDICINE

Flower, seed and bark of *Mahua* have long been used in our traditional medicines and have mentions in our folklore. The flower juice mixed with milk is used as a tonic and cures cough and cold. Flowers cooked in ghee is prescribed by elders for stomach ailments and good health. The flowers have also been reported to treat, throat and skin problems, stop bleeding, cure inflammation and impotency (Das *et al.*, 2022). Crushed leaves are used to heal wounds and its decoction can cure cold. The seeds of *Mahua* have various applications in ancestral cosmetics. It is also used as a massage oil and in treatment of burnt skin. The seed paste is used to cure bodily pain and enhance skin tone. The external application of seed oil provides relief from sore throat and is advised to use against insect bites. The bark is also sometimes applied on skin in case of eczema, rash, burns and abrasions. Ground roots, when applied externally, can cure skin ulcers (Yadav *et al.*, 2023b). *Mahua* is being used from the age-old tradition as different plant parts, like its bark and seed oil, have anticancer, anti-hyperglycemic, and antibacterial activity with antioxidant activity (Nayak *et al.*, 2023).



**Figure 7: Condensation unit**

### TIMBER

The wood of *Mahua* is used for varied purposes such as furniture, door and window frames, agricultural implements, construction timber, tool handles, field shade, etc. The heartwood is reddish brown, strong, and durable, having an average density of 929 kgm<sup>-3</sup> (Yadav *et al.*, 2023a). The timber is not extracted exactly for that purpose but only when the tree is over mature or deforms out of natural calamity (Figure 8). Branches are used for staking vegetable crops.



**Figure 8: Fallen trunk of Mahua and brush piles of branches**

### CULTURAL SIGNIFICANCE

*Mahua* holds substantial value in the culture and traditions of rural communities of Madhya Pradesh. The flowers are used as an offering to god in some factions and are considered a gift from god. Even the alcohol distilled from it holds religious values, where it is offered to gods and also used in customs and rituals in marriages and other such functions. The bark is crushed into a brown powder, which is used in Holi celebrations. The flowers are offered as a delicacy to the guests during celebrations. For some groups, the collection of flowers during the season is a festival itself.

### MISCELLANEOUS USES

The oilcake and seed pods are used as fertilizer. *Mahua* is sometimes planted for its ornamental and aesthetic value in the home compounds, where it provides shade and a soothing fruity fragrance during the flowering season. It is believed to enhance soil health naturally. Elders believe that its seed or extract can repel snakes and other poisonous animals.

### CONCLUSION

The utility of *Mahua* and its different parts is embedded unfathomably in the lives of rural inhabitants, be it for food, fuel, timber, fodder, medicine, or customs. It supports the sustenance of agrarian livelihoods of rural communities in addition to some extra income generation from the sale of *Mahua* and its products, especially the flowers and local spirit “jhuriya”. In 2021, the government of Madhya Pradesh declared “*Mahua/jhuriya*” as a heritage liquor, and as a result, in 2023 it was released in a legalized form by the name of “mond” which comes from indigenous distillers (Ail, 2023). More such initiatives are needed for other edible, non-edible, and medicinal products derived from *Mahua* for social and economic upliftment of the underprivileged groups among rural communities of Madhya Pradesh.

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