

Mahua: A Holy Tree Owing Diverse Benefits

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Abstract:- *Mahua* (*Madhuca longifolia*) occupies a significant place in the diet and economy of people belonging to the tribal community. It belongs to the Sapotaceae family. In India, it is majorly found in the state of Uttar Pradesh, Bihar, Chhattisgarh, Madhya Pradesh, Orissa, Jharkhand, Gujrat, Andhra Pradesh, Maharashtra, West Bengal & Karnataka. Every part of this holy tree is used by the tribal people for their livelihood. However, nowadays importance of *mahua* as food is reduced due to urbanization. At present, the most popular use of *mahua* is in liquor making, due to its significant taste, smell, and high sugar content. The leaves and the bark of trees are used in medication, by tribal communities for curing various types of diseases. *Mahua* flower is a rich source of nutrients like vitamins, carbohydrates, minerals, enzymes, and organic acids. Earlier, value-added technology related to the diversified use of *mahua* was unknown that resulting in distressed sales. Keeping this in view an attempt was made to publicize its miscellaneous use for food security as well as higher income.

Keywords:- *Mahua* Flowers, Tribal Peoples, Value-Added Technology, Food Security.

I. INTRODUCTION

Mahua occupies a significant place in the diet and economy of tribal people. *Mahua* is one of the known prime trees in Central India. Different states possess different common names Bengali (*Mahuya*), Assamese (*Mahua*), Kashmiri (*Mahwa*, *Mova*), Konkani (*Mohwa*), Malayalam (*Iipu*, *Irippa*, *Njannal*), Marathi (*Moha*, *Mhowva*), Gujrati (*Mahudo*), Hindi (*Gilaunda*, *Gur*, *Gulu*, *Mahua*, *Vanprasth*) Kannada (*Ippe*). *Mahua*, the Indian butter tree (Dhakar et al., 2015) is an important tree having dynamic, socio-economic value and growing all over the tropical and sub-tropical regions of the Indian sub-continent. It is a medium-sized, deciduous tree that grows up to 16-20 m high (Heuze.V.et., 2016) extensively under dry tropical and sub-tropical climatic conditions. Flowers are borne on green or pink, furry bunches, each bunch consists of 12 sweet-scented, cream-colored flowers. The flowers are having short life span, they live only one night and then fall on the ground. Pollinated flowers develop into fleshy, greenish ovoid fruit containing 1-4 shiny, oily brown seeds. The seeds are 3-5 cm long, elliptical, and flattened on one side (trees India, 2016). One single mature tree can hand over an income of about Rs. 1500 from its flowers and seeds, besides various other tangible and intangible benefits (Kulkarni et al., 2013). *Mahua* provides livelihood security to the poverty-stricken community who collect it, for both self-consumption as well as for sale, the income generated is used to purchase daily bread and essential household items. It is one of those

multipurpose forest tree species that provide an answer for the three major F's i.e. food, fodder, and fuel (Patel et al., 2011) Fruits are eaten raw or cooked. The fruit pulp may be utilized as a source of sugar, whereas the dry husk makes a good source of alcoholic fermentation. Seeds are a good source of oil (Singh et al., 2005). And, also contains Sapogenin and other basic acids. The leaves of the *Mahua* tree contain saponin, an alkaloid glucoside. *Mahua* flowers are edible and acclaimed for their high reducing sugar and nutrition profile. The corolla commonly called the *mahua* flower is a rich source of sugar, containing plenty of vitamins and minerals (Singh and Singh, 2005). The flowers are also used in the preparation of distilled liquor, portable spirits, vinegar, and feed for livestock (Bisht et al., 2018). *Mahua* flowers, fruits, and leaves are edible and used as vegetables in India and other South Asia countries. The sweet, fleshy flowers are eaten fresh or dried, powdered and cooked with flour, used as sweeteners or fermented to make alcohol (Fern, 2014).

Taxonomy of Mahua (Source: Badukale et al., 2021)

Botanical name	<i>Madhuca longifolia</i>
Family	Sapotaceae
Sub-family	Caesalpinioideae
Genus	<i>Madhuca</i>
Species	<i>longifolia</i>
Order	Ericaleae

➤ Description

It is a deciduous tree, 10-15 m tall with a spreading, dense, round canopy. The bark of the tree is rough, brown in color, slightly cracked, and red inner bark (phloem) exudes a whitish milky sap when cut. Palmate leaves, 15-25 cm × 8-15 cm, pointed tip, pinnate venation, about 12 leaves arranged in a whorled fashion. Stalk 2-4 cm, reddish in color. The flowers (white, 2 cm long, sweet-smelling, fleshy) are in bunches at the end of the branches. The fruits are ovoid, fleshy, 2-4 cm in length, and green in color. Seeds are elongate, 2 cm long, brown, and shining (Sinha et al., 2017).

II. USE OF MAHUA AS HERBAL REMEDIES

➤ Flowers-

The flowers are used medicinally as a tonic, analgesic, and vasodilator. The flowers have traditionally been used as a coolant, aphrodisiac, astringent, and to treat helminths, acute and chronic sore throats, pharyngitis, and also bronchitis. It is also used as a laxative and stimulant. It is beneficial in impotence that occurs due to general frailty when taken with milk (Sinha et al., 2017), (Yadav. P. et al., 2012).

➤ *Fruits-*

The fruits have an astringent taste and are used in the medication of chronic diseases such as tonsillitis and pharyngitis (Sinha et al., 2017).

➤ *Seeds-*

Mahua seeds contain a higher amount of fat. The oil obtained from mahua seeds has various medicinal uses. The demulcent property of the fat is that it is used as an ointment for treating skin diseases, rheumatism, headache, laxative, piles, and sometimes used as a galactagogue. It is used as a laxative in habitual constipation and piles, and the gummy juice of seeds is used in rheumatism and in the treatment of skin infection. Seed oil is also used in the treatment of skin diseases (Sinha et al., 2017).

III. HEALTH BENEFITS OF MAHUA FLOWERS

- **Anti-helminthic activity:** Both methanolic and ethanolic extracts of flowers demonstrated the best anti-helminthic activity against Indian earthworms (Sinha et al., 2017).
- **Hepatoprotective activity:** Methanolic extract of flower showed potential protective effect by lowering the levels of ALP, SGPT, SGOT, and total bilirubin by increasing serum level of total proteins and albumins (Sinha et al., 2017).
- **Anti-bacterial activity:** Both aqueous and methanolic extract showed more anti-bacterial activity but the methanolic extract is used for *Bacillus subtilis* and *Klebsiella pneumonia* (Sinha et al., 2017).
- **Analgesic activity:** Both aqueous and alcoholic extract are used to study analgesic effects. It was studied through trail flick, hot plate and chemical graded dose on the mouse which shows the analgesic effect as per dose value (Sinha et al., 2017).
- **Antioxidant activity:** As the concentration of flower extract and ascorbic acid increases, the ferric reduces antioxidant power (Indu and Annika., 2014).
- **Anti-cancer activity:** Cell viability was found to decrease as the concentration of floral extract increased and the chemotherapeutic effect was found to increase (Indu and Annika.,2014).

IV. VALUE-ADDITION OF MAHUA FLOWERS

A diverse range of value-added food products like dried flower, ready-to-serve (RTS) beverage, squash, jam, bar, candied flower, glazed flower, laddu, and the cake was prepared from *mahua* flowers. About 10kg of *mahua* flower yields approximately 9kg of pulp for product preparation after removal of stamen, dirt, and dust. It is calculated by using 10kg of dried *mahua* flower, 200 lit. of RTS, 15 lit. of squash, 17.5 kg of jam, 13.5 kg of the bar, 11. Kg of candied flower, 13.5 kg of glazed flower, 27 kg laddu, and 35 kg of the cake could be procured separately (Lm-et al., 2016)

➤ *Ready-to-serve beverage*

RTS drink preparation procedure, first the flowers were cleaned and washed and then boiled in water for 10 minutes. Then, pulping and straining were done to obtain the juice. Then the juice was mixed with sugar syrup, and a small

amount of citric acid was added. The ingredients were properly mixed while stirring and boiling the solution. The scum and water vapors were separated from the prepared syrup mixture, and KMS (Potassium meta-bisulphite) was added and boiled. After the juice was prepared, the packaging was done. Clean and sterilized glass bottles were taken, then filled and sealed. After sealing, the bottles were again sterilized in boiling water (Lm-et al., 2016)

➤ *Squash*

For preparing the squash. Dried *mahua* flowers were cleaned and then mixed with water at a ratio of 1:1 (weight: volume), and boiled for 10 minutes. The cooked material was strained through a muslin cloth. The clarified *mahua* juice was obtained. Sugar syrup was prepared by mixing and boiling sugar, water, and citric acid. The scum and water-vapor were separated from the syrup mixture. The prepared sugar syrup was mixed with the boiled clarified juice along with KMS. The prepared mixture was filled into bottles with a volume of 500ml, which were properly cleaned and sterilized (Lm-et al., 2016).

➤ *Jam*

To make jam. Clean and dry *mahua* flowers were mixed with water and boiled for 10 minutes to extract the pulp. Sugar was added to the pulp and the mixture was thickened over low heat with constant stirring and the recommended amount of citric acid was added. Before the end point was obtained, pectin was added to obtain the desired jam texture. The jamming endpoint has been carefully investigated by checking the °Brix and performing various tests such as the sheet test, and the spoon test. The product was packed in glass containers and stored. Ingredients and process parameters were standardized based on sensory acceptance (Sarovar et al., 2021).

➤ *Bar*

For making a bar. Clean and dry *mahua* flower was thoroughly washed and cooked for 10 minutes. The pulp was prepared by grinding the cooked flower with little water. Sugar was added at the rate of 50% of the pulp and it was again cooked for a few minutes so that the sugar is completely dissolved with the pulp. The citric acid (0.4%) and pectin (1.55) were mixed with the pulp when hot. Cooking continued up to jelly consistency and then the material was spread on an aluminium tray around 10-15 mm thickness and dried in a tray dryer at 60°C (Lm-et al., 2016).

➤ *Candied mahua flower*

Clean and dry *mahua* flower was taken, thoroughly washed under tap water, and blanched in 0.25% citric acid. It was steeped in 40% sugar solution for a day. the next day concentration of the solution was increased to 60% by boiling the solution and the flower was again steeped in the same solution for a day. This process was repeated raising the strength of the solution by 5% per day up to 75% and kept for a week. Finally, the flowers were dried under shade and packed in air-tight polyethylene pouches for storage studies (Lm- et al.,2016).

➤ *Laddu*

For making laddu, dried and cleaned *mahua* flowers were roasted and ground to powder. Semolina along with some white sesame and fennel seeds were also roasted and added to *mahua* flower powder then mixed and roasted in ghee for 2-3 minutes, make small balls manually and laddu was prepared (Lm-et al., 2016).

➤ *Cake*

Mahua flower powder and refined white flour in the ratio of 1:1 were mixed. The amount of sugar mixed was 50% of the normal dose in the case of ordinary cake. Besides, other ingredients may be added as per personal preference (Lm-et al., 2016).

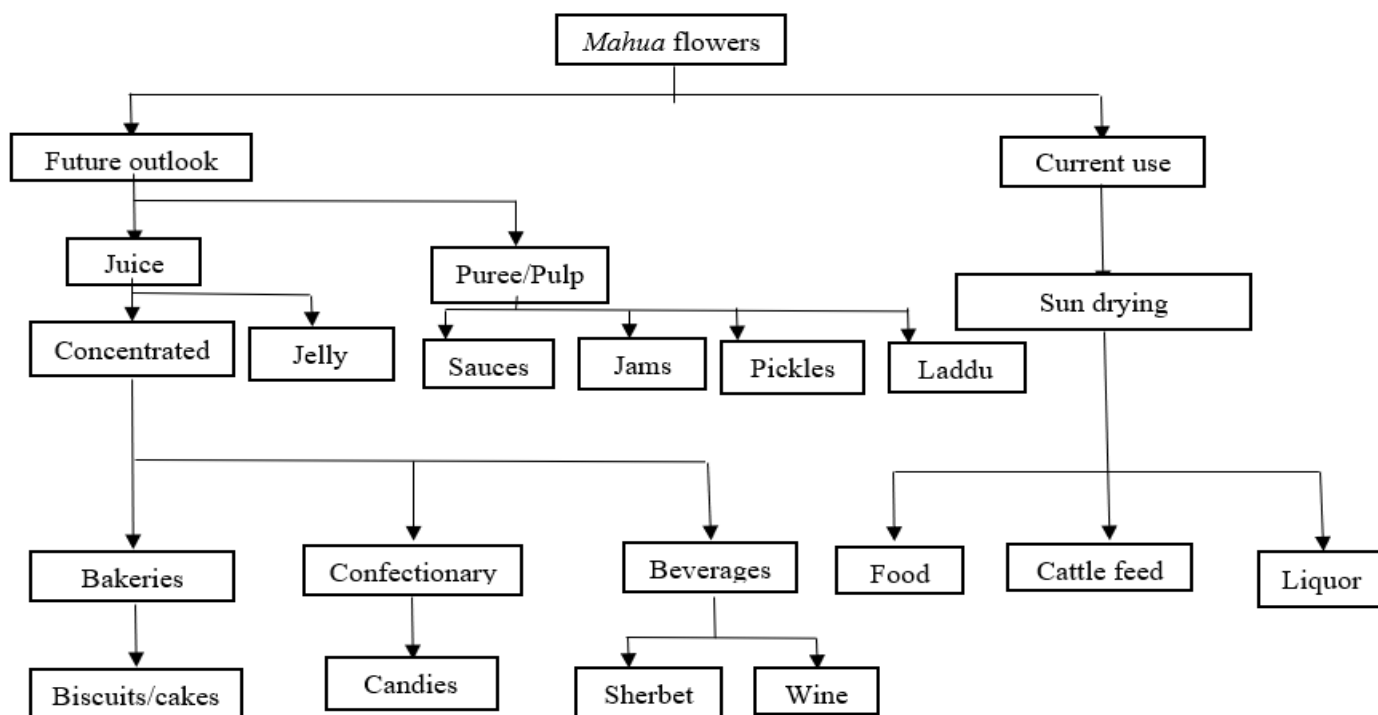


Fig: Future and current use of *mahua* flowers in different types of products. (Source: Patel & Naik, 2010)

V. AVENUES FOR FUTURE RESEARCH

Due to increased demand for traditional food and nutraceutical (nature-derived medicine), edible flowers are getting incorporated into a variety of food products like cakes, muffins, cookies, teas, jams, jellies, etc. due to the presence of a functional component in it. As *mahua* flowers are hygroscopic in nature, a modified post-harvesting technique could make them available easily to the local market and to the people in convenient forms like powders, paste, and purees, this will increase its demand for the preparation of different products, difficulty in cleaning and drying made its use limited. Proper harvesting, post-harvesting, processing methods, and value-added products could be studied for *mahua* flowers, seeds, and leaves-based products like laddu, jams, seed oil, and squash.

VI. CONCLUSION

Due to the diverse nature and uses of *mahua* flowers, the main task of *mahua* trees is to meet the basic needs (food, fodder, and fuel) of the tribal community due to their essential components and abundant availability in specific areas. But, in some areas due to the limited availability and recognition of *mahua*, the processors, researchers, and consumers are not aware of its benefits and unable to find and work on them. Based on reviews of the current knowledge of the *mahua* flower, the quality characteristics of the flowers are

deteriorating due to the lack of knowledge and practices used by indigenous people to preserve it. In addition, various marketable value-added products such as flower, candied flower, glazed flower, bar, RTS, squash, jam, laddu, and cake have been prepared from *mahua* flower which has been recognized by consumers.

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