

Butea monosperma (Lam.) Taub: a common medicinal tree of India

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ABSTRACT

Butea monosperma, popularly known as Palash, a moderate sized deciduous tree, widely distributed in India, Burma, and in all Asian Hemispheres. It is not only used in Ayurveda, Unani and Homeopathic medicine but also used in many pharmacological industries in various drug formulations. The plant also having economic values, providing livelihood to many tribal communities. Keeping this in mind, an attempt has been made to document its ethnomedicinal, pharmacological and economic values with the plant photographs for easy identification in the field.

Keywords: *Butea*, Ethno-medicinal values, Pharmacological values

INTRODUCTION

Butea monosperma is commonly known as Flame of forest, and locally called as Palas, Palash, Mutthuga, Bijasneha, Dhak, Khakara, Chichra, Bengal Kino, Nourouc etc. (Mishra et al. 2012). It is a moderate sized deciduous tree, widely distributed in India, Burma, in all Asian Hemispheres (Singh and Srivastava 2022). It grows haphazardly on open meadows, in degraded land and in patches throughout mixed forests. During the spring season, the leafless tree flowers abundantly and is very conspicuous in the forest. Bright orange-red coloured flowers give an impression of monochromatic length colour

that is the probable reason it is also called as “flame of the forest.” It grows on a wide variety of soils including shallow, gravelly sites, black cotton soil, clay loams, and even saline or waterlogged soils. Seedlings thrive best on a rich loamy soil with pH 6-7 under high temperature and relative humidity. It is significant due to its medical and other economically valuable uses (Gaikwad et al. 2022). Palash is extensively used in Ayurveda, Unani and Homeopathic medicine and has become a cynosure of modern medicine. This plant is well known for their colouring matters, due to the bright colour of its flower, used to yield orange dye (Sindhia and Bairwa 2012). Leaves are essential for various religious rituals in Hindu homes as plates and cups. Making of plates and donas (bowl) from the leaves of Palash has been going on for centuries providing a source of livelihood for tribals. It is also considered as a sacred tree: its dry stem pieces are used to make sacred fire or Homa. In different areas the leaves are used for wrapping tobacco to make biddies. The leaves are further used to pack parcel materials (Das et al. 2011).

DESCRIPTION

Butea Monosperma is a moderate-sized deciduous tree that increases in height of around 5–20 m and has a crooked trunk. It has uneven branches and tough, fibrous bark that is grayish-brown in colour and has crimson exudates (Saxena and Brahmam 1995; Singh and Srivastava 2022; Figure 1; Plate 1). **Stem:** It is made of porous, soft wood with a greenish white tint. Trunk usually crooked and tortuous, with rough greyish-brown, fibrous bark showing a reddish exudate; branchlets

densely pubescent (Saxena and Brahmam 1995; Singh and Srivastava 2022).

Leaves: Leaves trifoliate; petiole 7.5-20 cm long with small stipules; leaflets leathery, lateral ones obliquely ovate, terminal one rhomboid obovate, obtuse, rounded or emarginate rounded to a cuneate at apex, with 7-8 pairs of lateral veins, stipellate. The petiole is 7.5–20 cm long (Saxena and Brahmam 1995; Singh and Srivastava 2022).

Flowers: The tree produces flamboyant orange to red flowers more rarely yellow, very densely pubescent with diameters of 2-4 when it is leafless. Flowers are large, rigid racemes, 15 cm long, 3 flowers together form the tumid nodes of the dark olive-green velvety rhachis, near the top on usually leafless branchlets. It first appears in February and continues through the end of April. Corolla is normal, 5-7 cm long, with a recurved keel and wings that are all roughly the same length and heavily pubescent on the upper part of the tree, the flowers create a stunning canopy, which resembles to a flame from a distance giving it the name “Flame of Forest” (Saxena and Brahmam 1995; Singh and Srivastava 2022).

Fruit: Fruit is a flat legume or an indehiscent pod, about 15 cm long, 3-5 cm wide pod. The younger pods are covered with short brown hairs, pale yellowish-brown or grey when ripe. As the name suggests monopserma means, lower flat part, with a single seed near the apex (Saxena and Brahmam 1995; Singh and Srivastava 2022).

Seeds: Seeds are flat, 1.5- 2 mm thick, 25-40 mm long, 15-25 mm wide. The reddish-brown coat of the seeds is shiny and wrinkled. It encloses two sizable, leafy cotyledons that are yellow.



Figure 1: Habit of *Butea monosperma* (Palash)

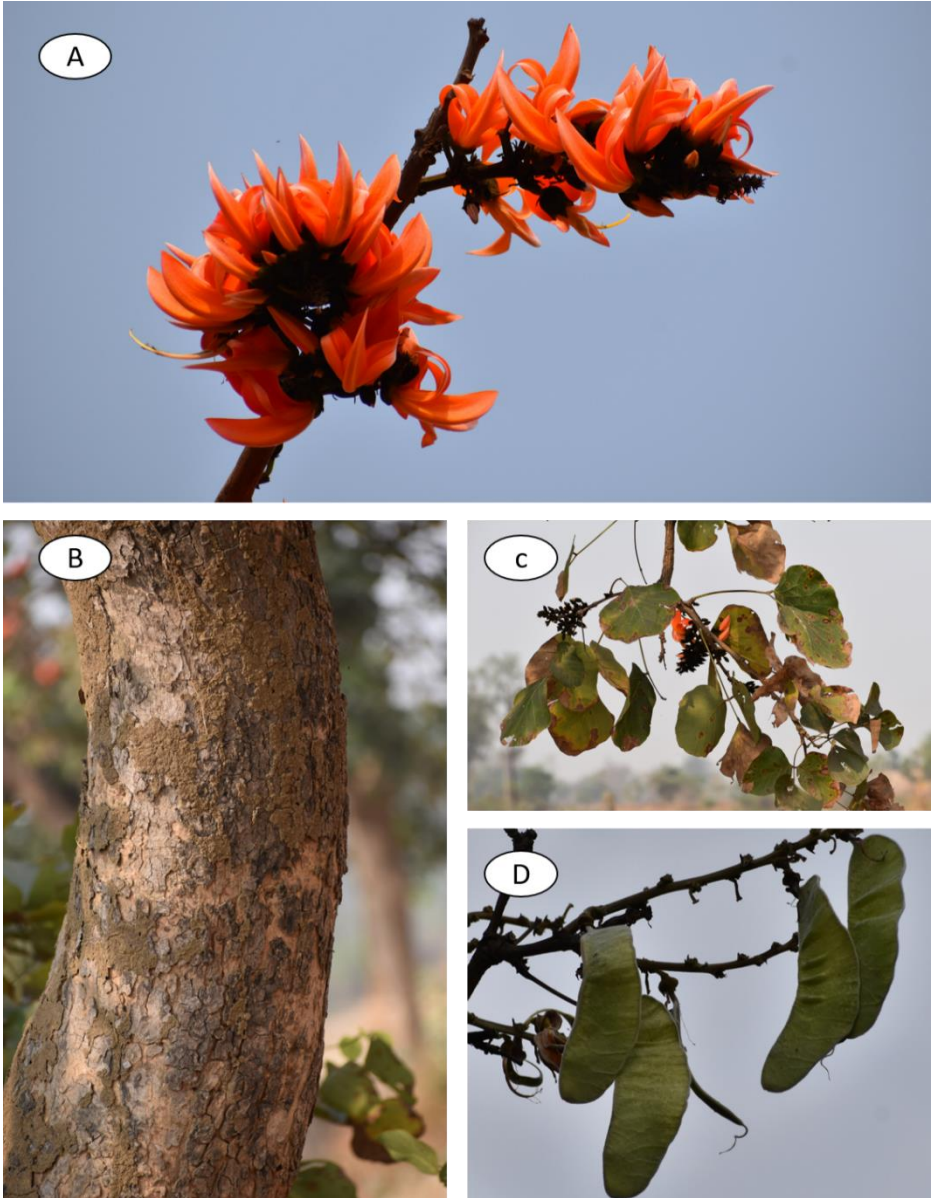


Plate 1: Vegetative parts of *Butea monosperma* A) Flowers, B) Bark, C) Leaves, D) Fruits

ETHNOMEDICINAL USES

Butea monosperma is used as timber, resin, fodder, medicine, and dye. All parts of this tree are used to prepare herbal remedies.

Leaves: The leaves have medicinal values against inflammation of the eye, energy drink, aphrodisiac, arthritis, acne, piles, and worms. The juice of the leaves is used to cure cold, cough and stomach disorders. Eye diseases are treated by putting leaf juice in the eye. 2 spoons of leaf powder combined with a cup of water are consumed daily for a month to reduce high blood glucose level. In the case of a sore throat, leaf extract is gargled (Lahori and Jain 2020).

Flowers: They are useful in diarrhoea, astringent, diuretic, depurative, tonic, leprosy, skin diseases, gout, thirst, burning sensation etc. Flower juice is beneficial in eye ailments. The flower is bitter, aphrodisiac, expectorant, tonic, emmenagogue, diuretic, and beneficial for biliousness, inflammation. The astringent quality of flower use as an expectorant and as an emulsifier. Regular treatment of the juice also helps in the treatment of “gonorrhoea” infection. Flowers are used for treating inflammation and pain. It enhances the menstrual cycle flow and in the resent cases found that it also beneficial for pregnant women in case of diarrhoea. Crushed flowers with sugar and milk are used to reduce body heat and persistent fever. Flowers are soaked in water overnight, and a cup of this infusion is administered every morning till the sickness is cured (Yadav et al. 2020; Gaikwad et al. 2022).

Seeds: Powdered seed is used in the treatment of worms in children, urinary disorders, and urinary stones. Fruit and seed are used in treating skin illnesses, tumours, gastrointestinal issues, piles, eye problems, and inflammation. The seeds mix with lemon-honey and taken to improve digestion. When seeds are pounded with lemon juice and applied to the

skin, they act as a rubefacient (Rana and Avijit 2012; Lahori and Jain 2020).

Gum: Gum is best use in the prevention of crack in the foot. For dysentery, 2 spoons of diluted gum are recommended till cure. Gum is astringent to the intestines, beneficial in stomatitis, cough, ocular opacities, and relieves excessive sweating (Gaikwad et al. 2022).

Roots: The root is used to cure night blindness and other loss of vision, treat filariasis. Roots are useful in, night blindness, helminthiasis, piles, ulcer, and tumours. It is reported to possess antifertility, aphrodisiac, and analgesic activities (Jhade et al. 2009; Rana and Avijit 2012).

Stem bark: Stem bark is applied externally for the treatment of any infection during any injury. The bark is slightly acidic, bitter in taste, works as an appetizer. Stem juice help in increasing the thyroid hormone. Regular intake of bark paste use for the treatment of liver disorder, gonorrhoea and it also cleans the blood. The bark is aphrodisiac, laxative, anthelmintic, and useful in bone fractures, dysentery, piles, hydrocele, ulcers, and tumours (Rohit et al. 2020; Gaikwad et al. 2022).

BIOACTIVE COMPOUNDS

There are various phytoconstituents like flavonoids, alkaloids, amino acids, resin etc. of different parts of *Butea monosperma* (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Flower: It contains triterpene, several flavonoids like butin, isobutrin, coreopsin, isocoreopsin, sulphurein, monospermoside (butein 3-e-D-glucoside) and isomonospermoside, chalcones, aurones, isobutyine. Glycoside like 5,7-dihydroxy-3,6,4-trimethoxy flavone-7-O- α -L-xylopyranosyl(1 \rightarrow 3)-O- α -L-arabinopyranosyl(1 \rightarrow 4)-O- β -D galactopyranoside. It also contains glucose, fructose, histidine, aspartic acid,

alanine, and phenylalanine (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Leaves: Leaves contain kino-oil containing oleic, linoleic acid, lignoceric acid and palmitic (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Stem Bark: It contains Kino-tannic acid, Gallic acid, pyrocatechin. Glucoside, Kino-oil containing oleic and linoleic acid, palmitic and lignoceric acid. It also contains gallic acid, butolic acid, palasitrin, butrin, alanind, allophanic acid, cyanidin, histidine, lupenone, lupeol, miroestrol, medicarpin, shellolic acid and palasimide (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Gum: Gum contains mucilaginous material, pyrocatechin and tannins (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Seed: Seed is rich in Allophanic acid, several flavonoids (5, 6, 7, 4'-tetrahydroxy-8-methoxyisoflavone 6-O-rhamnopyranoside. Butin (37) α -Amyrin, β - sitosterol, β -sitosterol- β -D-glucoside, sucrose, Fatty acids such asmyristic, palmitic, stearic, arachidic, behenic, lignoceric, oleic and linoleic. Palasonin and nitrogenous acidic compounds is present in seeds (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

Root: Root contains glucose, glycine, lupenone, lupeol and sitosterol. Two iso flavones 5-methoxygenistein and prunetin (Yadava and Tiwari 2005; Yadav et al. 2015; Tiwari et al. 2019).

PHARMACOLOGICAL ACTIVITIES

Various parts of *B. monosperma* possess several pharmacological actions. Important phytochemicals like flavonoids, alkaloids, terpenoids, protein, lipids, and steroids are present in *B. monosperma* (Kumari et al. 2022). Leaves shows anti-filarial, anti-inflammatory, anti-oxidant activities. Whereas the flowers having anticancer, hepatoprotective effect

antihyperglycemic, antioxidant, anti-inflammatory, anti-dopaminergic activity, and free radical scavenging effect. Seed possesses hormone balancing effect, antifertility effect, anthelmintic effect, anti-hyperglycaemic and anti-hyperlipidaemic effects. Barks show anti-diarrhoeal, wound healing activity, anti-stress, osteoprotective activity and anti-inflammatory activity. Fruits are having hypoglycaemic effect and anthelmintic effect (Sutariya and Saraf 2015; Tiwari et al. 2019).

CONCLUSION

The present review shows the potential bioactive compounds present in *B. monosperma* having excellent potential against various ailments. The review also shows the ethno-medicinal and pharmacological activities of *B. monosperma*. Present study has shown metabolites like isobutarin, butrin, cajanin, butein, etc., are present in this plant parts which possess potential pharmacological properties. Few studies shed light in the mechanism of actions in detail. Further relevant studies are necessary to confirm its utilization as therapeutic agents.

REFERENCES

- Das M.K., Mazumdar P.M., Das S. and Das S. (2011). *Butea monosperma* (LAM.) kuntze – A comprehensive review. International Research Journal of Plant Science. 2(7): 215—219.
- Gaikwad H.K., Kapare H.S. and Gadge S.K. (2022). *Butea spermatoca*: overview. Pharmaceutical Resonance. 4(2): 53-58.
- Jhade D., Ahirwar D. and Sharma N.K. (2009). *Butea monosperma* (Lam.) taubert: a review. Journal of Pharmacy research. 2(7):1181-1183.
- Kumari P., Raina K., Thakur S., et al. (2022). Ethnobotany, Phytochemistry and Pharmacology of Palash (*Butea monosperma* (Lam.) Taub.): a Systematic Review. Current Pharmacology Rep. 8: 188–204.
- Lahori P. and Jain S. (2020). *Butea monosperma* (Lam.) Taub: Review on its chemistry, morphology, ethnomedical uses, phytochemistry and pharmacological

- activities. *Journal of Innovation and invention in Pharmaceutical Sciences*. 1(2):26-36.
- Mishra A., Verma S., and Mishra A.P. (2012). A plant review: *Butea monosperma* (Lam.) Kuntze. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 3: 700–714.
- Rana F and Avijit M. (2012). Review on *Butea monosperma*. *International Journal of Research in Pharmacy And Chemistry*. 2(4): 1-35-1039.
- Rohit Y.S., Sonali S., Kumar P.A. and Shubham P. (2020). PS *Butea monosperma* (PALASH): Plant Review with Their Phytoconstituents and Pharmacological applications. *IOSR Journal of Pharmacy and Biological Sciences*. 15:18-23.
- Saxena H.O. and Bramham M. (1995). The Flora of Orissa, Orissa Forest Development Corporation Ltd & Regional Research laboratory, Bhubaneswar, Odisha.
- Sindhia V.R. and Bairwa R. (2010). Plant review: *Butea monosperma*. *International Journal of Pharmaceutical and Clinical Research*. 2(2):90-94.
- Singh K. and Srivastava A.K. (2022). Therapeutic uses of *Butea monosperma*. *Era's Journal of Medical Research*. 9(2): 218-223.
- Sutariya B.K. and Saraf M.N. (2015). A comprehensive review on pharmacological profile of *Butea monosperma* (Lam.) Taub. *Journal of Applied Pharmaceutical Science*. 5(9):159-66.
- Tiwari P., Jena S. and Sahu P.K. (2019). *Butea monosperma*: phytochemistry and pharmacology. *Acta Scietific Pharmaceutical Science*. 3(4):19-26.
- Yadav S. R., Sharma S., Pasi A. K., and Patel S. (2020). PS *Butea monosperma* (PALASH): Plant Review with Their Phytoconstituents and Pharmacological applications. *IOSR Journal of Pharmacy and Biological Sciences*. 15: 18-23.
- Yadava R.N. and Tiwari L. (2005). "Note: A potential antiviral flavoneglycoside from the seeds of *Butea monosperma* O. Kuntze". *Journal of Asian Natural Products Research*. 7(2): 185-188.