Butea monosperma Lam.:-(Palas)

**Taxonomical classification**
- **Kingdom** - Plantae, Plants.
- **Phylum** - Magnoliophyta
- **Class** - Magnoliopsida
- **Order** - Fabales
- **Family** - Fabaceae
- **Tribe** - Phaseoleae
- **Genus** - Butea
- **Species** - monosperma

**Synonyms:-**
- *Butea braamania* DC; *Butea frondosa* Roxb; *Butea frondosa* Willd; *Butea frondosa* Willd. var. *lutea* (Witt.)Maheshw; *Plaso monosperma* (Lam.) Kuntze; *Plaso monosperma* (Lam.) Kuntze var. *flava* Kuntze; *Plaso monosperma* (Lam.) Kuntze var. *rubra* Kuntze.

**Local name of the plant:-**
- **Sanskrit** : RaktapuÀpaka
- **Bengali** : Palash Gachha, Palash, Palas
- **English** : Bastard peak
- **Gujrati** : Kesudo, Khakharo, Khakhapado
- **Hindi** : Dhak, Tesu
- **Kannada** : Muttug, Muttuga, Muttala
- **Malayalam** : Plasu, Camata, Plas, Chama Tha
- **Marathi** : Palas
- **Punjabi** : Palash, Dhak, Tesu
- **Tamil** : Purasu, Paras
- **Telugu** : Moduga, Modugu, Chettu
- **Urdu** : Dhak, Palaspapda
DESCRIPTION

An erect tree 12-15 m high with crooked trunk and irregular branches, bark rough, ash coloured, young parts downy. Leaves 3-foliate, petioles 10-15 cm long, stipules linear lanceolate. Leaflets coriaceous (the terminal 10-20 cm long, broadly ovate from a cuneate base, the lateral smaller, 10-15 by 7.5 – 10 cm, obliquely rounded at the base, equilateral, the lower side the larger), all obtuse, glabrous above when old, finely silky and conspicuously reticulately veined beneath; petioles 6 mm long, stout-stipels subulate, deciduous. Flowers large, in a rigid racemes 15 cm long, 3 flowers together form the tumid nodes of the dark olive-green velvety rhachis: pedicels about twice as long as the calyx, densely brown-velvety: bracts and bracteoles small, deciduous. Calyx 13 mm long, dark olive-green, densely velvety outside, clothed with silky hairs within: teeth short, the 2 upper connate, the 3 lower equal, deltoid. Corolla 3.8-5 cm long, clothed outside with silky, silvery hairs, orange or salmon coloured: standard 2.5 cm broad: keel semicircular, beaked, veined. Pods stalked 12.5-20 by 2.5-5 cm, thickened at the sutures, reticulately veined argenteo–canescent: stalked 2 cm long (. Kirtikar and Basu, 1935; Ambasta. 1994). Mature stem bark, 0.5 - 1 cm thick, grayish to pale brown, curved, rough due to presence of rhytidoma, and scattered dark brown spots of exudate; rhytidoma 0.2 cm thick usually peels off, exposing light brown surface, exfoliation of cork and presence of shallow longitudinal and transverse fissures; fracture, laminated in outer part and fibrous in inner part; internal surface rough, pale brown; taste, slightly astringent. Stem Bark -Mature bark shows rhytidoma consisting of alternating layers of cork, secondary cortex and phloem tissue; cork cells, thin-walled, 5-10 or more layered, rectangular, dark-brown; secondary cortical cells round and irregular in outline, dark brown, moderately thick-walled; tanniniferous cells, often in groups, having brown colour, sometimes containing mucilage and other materials found scattered in this zone; beneath this zone regular cork consisting of 4-12 rows of radically arranged, rectangular cells followed by a zone of 2 - 4 layers of sclereids; secondary phloem consisting of sieve tubes, companion cells, phloem parenchyma, phloem fibres, crystal fibres, traversed by phloem rays; in outer and middle phloem regions phloem tissues get crushed and form tangential bands of ceratenchyma; phloem fibres arranged in tangential bands alternating with sieve tubes and phloem parenchyma; most of fiber groups contain prismatic crystals of calcium oxalate forming crystal sheath; in macerated preparation phloem fibres appear thick-walled lignified elongated with tapering or bifurcated ends; crystal fibres divided into a number of chambers
containing a prismatic crystal of calcium oxalate in each chamber; phloem rays multiseriate 4 - 12 cells wide, 7 - 50 cells in height, straight; prismatic crystals of calcium oxalate found scattered in the secondary phloem tissues and phloem rays; starch grains simple or compound having 2 – 3 components, measuring 2.75 - 13.75 µ in dia., found scattered in phloem parenchyma and phloem ray cells abundantly; tanniniferous cells and secretory cavities also occur in secondary phloem. Powder - Reddish-brown; shows numerous prismatic crystals of calcium oxalate, starch grains simple and compound with 2 - 3 components measuring 3-14 µ in dia., dark brown coloured cells, sclereids mostly in groups, thin-walled cork cells, numerous crystal fibres in group or singles (Plate 1 and Plate 5)

**Origin and Distribution**


**Medicinal uses:-**

(The Promotion and Development of Traditional Medicine, 1978) Flowers, seeds, fruits, leaves, gum and bark are used.

Butea monosperma (Lam.) is an indispensable tree. Tribals use its flowers and young fruits. The plant is used in Ayurvedic, Unani and Siddha medicine for various ailments. Almost all the parts of the plant namely root, leaves, fruit, stem bark, flowers, gum young branches are used as medicine, food, fibre and for other miscellaneous purposes such as fish poison, dye, fodder, utensils, etc. About 45 medicinal uses are associated with the plant and out of these claims almost half the number of claims have been scientifically studied and reported. These observations are noteworthy for further studies on modern scientific lines. (Burli and Khade, 2007) *B. monosperma* is ascribed to have many medicinal properties. It has been used as tonic, astringent, aphrodisiac and diuretic. Its flowers are widely used in the treatment of hepatic disorders and viral hepatitis, diarrhoea and possess anti-implantation activity (Chopra RN, Nayar SL, Chopra IC., 1956)

Roots of *B. monosperma* are reported to be useful in the treatment of filariosis, night blindness, helminthiasis, piles, ulcers and tumors. Pippali rasayana, an Indian Ayurvedic
drug, employs *B. monosperma* and is used in the management of giardiasis (Agarwal AK et al 1957)

Leaves are good for the disease of the eye. Leaf is an appetizer, astringent, carminative, anthelmintic, aphrodisiac, tonic, lessens inflammation and lumbago, cures boils and piles. Petiole is chewed and the juice is sucked to cure cough, cold and stomach disorders.

The bark is reported to possess antitumor and antiulcer activities. The root bark is used as an aphrodisiac, analgesic and anthelmintic whereas the leaves possess antimicrobial properties. (Kasture, *et al.*, 2000)

*B. monosperma* flowers contain butin, butein, butrin, isobutrin, palasitrin, coreipsin, isocoreipsin, chalcones, and aurones (Gupta SR, Ravindranath B, Seshadr, 1970). Butrin (7, 30, 40- trihydroxy.avanone-7, 30-diglucoside) and isobutrin (3, 4, 20, 40-tetra-hydroxy-chalcone-3, 40-diglucoside) are the well-known antihepatotoxic principles of *B. monosperma* (Wagner H, Geyer B, 1986). Gum is useful as astringent, depurative and useful in diarrhoea, haemorrhoids, haemoptysis, haematemesis, leprosy, skin diseases (Agarwal AK, Tripathi DM., 1997, and Kasture VS, Chopde CT, 2000). In some tribes (Banjara) from Maharashtra (India), gum of *B. monosperma* is used to treat microbial and fungal infections (Vaidyaratnam P., 1995).

Stem bark powder is used to apply on injury caused due to axe. Stem juice is applied on goitre of human being. Paste of stem bark is applied in case of body swellings. Bark is acrid, bitter, appetiser, aphrodisiac, and laxative, anthelmintic, useful in fractures of the bones, diseases of the anus, dysentery, piles, hydrocele, cures ulcers and tumours. Bark is useful in biliousness, dysmenorrhea, liver disorder, gonorrhoea and it also purifies the blood. The ash of young branch is prescribed in combination with other drugs in case of scorpion sting. Gum is applied for cracks on foot sole. 2 spoons of diluted gum are advised for dysentery until cure. Gum is astringent to bowel, good in stomatitis, cough, pterygium, corneal opacities and cures excessive perspiration (M.V. Patil, S. Pawar and D.A. Patil, 2006)

Flowers are astringent to bowel, increase “Vata” cure “Kapha”, leprosy, strangury, gout, skin diseases, thirst, burning sensation; flower juice is useful in eye diseases. Flower is bitter, aphrodisiac, expectorant, tonic, emmenagogue, diuretic, and good in biliousness, inflammation and gonorrhoea. The dye is useful in enlargement of spleen. Flowers are depurative, as a poultice they are used to disperse swelling and to promote menstrual flow.

They are given to pregnant women in case of diarrhoea. It is also useful to prevent pus from urinogenital tracts of males. Flowers are crushed in milk and sugar is added, 3-4 spoons
if drunk per day for a month helps to reduce body heat and chronic fever. Flowers are soaked in water overnight and a cup of this infusion is drunk every morning against leucorrhoea till cure. Powdered seeds are consumed by children as remedy against intestinal worms. Seeds are crushed in milk and this mixture about 2 spoons is taken orally to treat urinal complaints and also against urinary stones. Fruit and seed are digestible, aperient, cure ‘Vata’ and ‘Kapha’, skin diseases, tumours, and abdominal troubles and as per Ayurveda are given for Scorpion-sting. Fruit and seed are useful in piles, eye diseases and inflammation.
**Madhuca longifolia Gmel. -- (Mahua)**

**Taxonomical classification**
- Kingdom: Plantae – Plants
- Division: Angiosperm.
- Class: Dicotyledons
- Order: Ericales
- Family: Sapotaceae
- Genus: Madhuca
- Species: longifolia

*Madhuca indica or Brassica longifolia*

**Local name of the plant:**
- Sanskrit: Gu-apu
- Assamese: Mahua, Mahuwa
- Bengali: Mahuwa
- English: The Indian Butter tree, Mahawash tree.
- Gujarati: Mahudo, Mahuwa
- Hindi: Mahuwa
- Kannada: Hippegida, Halippe, Hippe, Hippenara, Madhuka, Ippa, Eppimara.
- Malayalam: Irippa, Ilippa, Iluppa, Eluppa
- Marathi: Mohda
- Oriya: Mahula
- Punjabi: Maua, Mahua
- Tamil: Katiluppai, Kattu Iluppai, Iluppi
- Telugu: lppa Puvvu
- Urdu: Mahuva
DESCRIPTION

The two major species of genus Madhuca found in India are Madhuca Indica (Syn. Bassia latifolia) and Madhuca longifolia (syn. Brassica longifolia). Mahua is the widely accepted as local name for the fat from both these species. This plant is common in deciduous forests.

M. Latifolia is a deciduous tree. Attains height upto 70 ft and the tree matures and starts bearing 8 to 15 years, and fruits upto 60 years. The two species are not differentiated in Trade. The kernels are 70% of seed by weight, are seed contains two kernels, having 2.5 cm x 1.75 cm size oil content in latifolia is 46% and 52% in longifolia. In seeds oil content is 35% and protein in 16%. The flowering season extends from February to April. The copious fall of succulent, corollas weave a cream coloured carpet on the ground. It is rich in sugar (73%) and next to cane molasses constitute the most important raw material for alcohol fermentation. The yield of 95% alcohol is 405 liters from one tonne of dried flowers.

The matured fruits fall on the ground in May and July in the North and August and September in the South. The orange brown ripe fleshy erry is 2.5 to 5 cm long and contains one to four shining seeds. The seeds can be separated from the fruit wall by pressing. Drying and decortications yield 70% kernels on the weight of seeds. (Plate2 and Plate 5)

Drug consists of mostly corolla and androecium; corolla fleshy, reddish-brown, tabular, lobes 7-14 (usually 8-9), ovate lanceolate, short, erect 0.5-2 cm long; stamen20-30 (usually 24-26), epipetalous and arranged in two series; anther sub-sessile, epipetalous, basifixed, lanceolate, pointed at tip and hairy at the back with prominent dark brown connective strand; taste, sweet. Corolla - Petal shows a single layered epidermis, followed by thin-walled, irregularly shaped parenchymatous cells; vascular bundles found scattered in parenchymatous tissues. Androecium - Anther shows 4 pollen chambers and prominent cells of connective tissue in the centre of the chambers; epidermis single layered covered with thin cuticle; a few unicellular hairs present on one side; endothecium composed of radially elongated, oval shaped, lignified cells; tapetum not distinct; pollen grains single or in groups, spherical, with clear exine and intine walls scattered in the pollen sac, a few cells of the vascular bundles are seen embedded in the connective tissues.
Origin and Distribution:-
The tree is indigenous to the Central India. It is common in sub-mountainous regions of the Himalayas, and is, at certain places, a chief constituent of the forest vegetation. Madhuca latifolia is a medium sized to large deciduous tree, distributed in Andhra pradesh, Gujarat, Madhya Pradesh, Orissa, Bihar and Uttar Pradesh, Madhuca longifolia, a large evergreen tree found in South India, and evergreen forests of the Western Ghats from Konkan Southwards. The tree is planted in most part of India, propagating either by itself or sown seeds.

Medicinal uses

Madhuca is useful in arresting secretions or bleeding because of its tannin content. The bark of the tree is an astringent and tonic. The flowers of the tree help the removal of catarrhal matter and phlegm from the bronchial tubes. They also exercise the soothing effect of the skin. A decoction of the bark can be given internally in rheumatic diseases. It is also being taken in diabetes mellitus with beneficial results. Madhuca oil extracted from the seeds has laxative properties. It helps cure piles by relieving chronic constipation. The leaves of Madhuca are effective in the treatment of eczema.

The Honey tree (English name) has many medicinal uses. Almost all parts of this tree are medicinally very important. Tribals in Central India worship this tree for its medicinal values and also for its relevance in their rituals. According to the local healers, flowers are used in the treatment of eye diseases. Bhumkas (local healer in Patalkot valley in Chhindwara district of Central India) use various parts of the plant in their day to day treatment methods. According to Chimmilal, a local healer (Bhumka), flowers mixed with milk are useful in impotency and general debility.

Roasted leaves of the tree are mixed with sesame oil and applied on swelling and inflammation. Patients suffering from piles are given with 12-15 drops of seed oil. It works as laxative. Bark decoction is good in diabetes. Topical application of seed oil is recommended for stiffness and arthritis. Seed oil provides soothing effect to the skin. A decoction of the bark can be given internally in rheumatic diseases. The leaves of Madhuca are effective in the treatment of eczema. Flowers are expectorants and used for curing bronchial asthma. Tribal healers prescribe dry flower for increasing milk in women. Seed oil cures skin problems too. In eczema, leaves are smeared with sesame oil and are used as a bandage on the affected region.
Madhuca indica flowers are known as energy rich material and used as animal as well as human feed. Flowers are used for making local wine. The distillation product of flowers gives a spirit which has healing, astringent, tonic, and appetizer properties. The fleshy petals are eaten as raw or cooked and country spirit is made from flowers which are a favorite drink of tribal people in India. The oil extracted from seeds is used in cooking, soap making and manufacture of margarine. Flowers are used as sweet, some ethnic food like chapati are prepared by tribal women. Mahua cake is used as manure; it has pesticidal properties.

The flowers of the tree are very effective medicine for Bronchitis and cough diseases. Flowers are very effective in increasing the secretion of milk in nursing mothers. The seeds also have similar property. A decoction of bark can be given internally in rheumatic pains. The oil extracted from seeds can also be applied externally on the affected areas. Madhuca oil extracted from the seeds has very good laxative properties. It helps to cure piles by relieving chronic constipation. A decoction of bark can be taken in diabetes for beneficial results. Vapours of boiling Madhuca is very useful in relieving the pain of orchitis or the inflammation of testicles. A lotion made from the liquid extract of the bark with water is an excellent gargle for bleeding and spongy gums and is used as a gargle for the treatment of acute and chronic tonsilitis and pharyngitis. The leaves of Madhuca are very effective in the treatment of eczema. The leaves smeared with sesame oil warmed over the fire and bandaged over the affected parts provide great relief. The ash of the leaves mixed with ghee can be used as a dressing for burns and scalds. For the cure of itching a paste of the bark should be applied locally. The oil extracted from the seeds can also be applied locally in skin diseases.