



Ethnobotany, Biochemistry and Pharmacology of Dhak Tree (*Butea Monosperma*)

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ABSTRACT

Butea monosperma is a species of *Butea* native to tropical and sub-tropical parts of South Asia and Southeast Asia. It is also known as flame of the forest, dhak, palash, and bastard teak.[2] Revered as sacred by Hindus, it is prized for producing an abundance of vivid blooms, and it is also cultivated elsewhere as an ornamental.[4]

The plant grows across Bangladesh, India, Nepal, Pakistan, Sri Lanka, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, and western Indonesia.[2]

Keywords: *Butea monosperma*, dhak, flame, forest, ornamental, palash

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INTRODUCTION

Butea monosperma is a small-sized dry-season deciduous tree, growing to 15 m (49 ft) tall. It is slow-growing: young trees have a growth rate of a few feet per year. The leaves are pinnate, with an 8–16 cm (3.1–6.3 in) petiole and three leaflets. Each leaflet is 10–20 cm (3.9–7.9 in) long. The flowers are 2.5 cm (0.98 in) long, bright orange-red, and produced in racemes up to 15 cm (5.9 in) long. The fruit is a pod 15–20 cm (5.9–7.9 in) long and 4–5 cm (1.6–2.0 in) broad.[5]

The flowers frequently have a spectacular late-winter bloom (February to April), although the trees do not flower every year.[6] Each flower features five petals, two wings, and a keel that resembles the curled beak of a parrot.[7] If the winter season is too cold, too dry, or too rainy, trees may not blossom.

The plant is used to make timber, resin, fodder, medicine, and dye. The wood is dirty white and soft. Being durable under water, it is used for well curbs and water scoops. Spoons and ladles made of its wood are used in various Hindu rituals to pour ghee into the fire. Good charcoal can be obtained from it. Farmers typically plant trees on field bunds and use them to reduce soil erosion. Young shoots are grazed by buffaloes as fodder. The

leaves were once used to serve food where plastic plates would be used today.[1,2,3]

Lac production

In India, the tree serves as a crucial host for the lac bug (*Laccifer lacca*), which creates shellac. It produces the most lac sticks per hectare of any lac tree.[9]

Leather production

The bark produces a crimson exudate that, when dried, hardens into a substance called "Butea gum" or "Bengal kino." The gum is considered valuable by druggists because of its astringent qualities and by leather workers because of its tannin.[10]

Culinary use

The gum from the tree, called kamarkas in Hindi, is used in certain food dishes.

In Maharashtra state of India it is prepared as a summer beverage out of tea of the flower which is considered to have medicinal benefits [11]

Patravali plate

In villages of many parts of India, for example in Maharashtra, this tree provides the leaves that are used either with many pieced together or singly (only in case of a banana leaf) to make a leaf-plate for serving a meal. Up until a century ago, a would-be-son-in-law was tested on his dexterity in making this plate and bowl (used to serve daal, gravy dishes) before being declared acceptable by the father-in-law-to-be.[12]

Dye

The flowers are used to prepare a traditional Holi colour called "Kesari". It is also used as a dye for fabric. Butein, a vibrant yellow to deep orange-red dye made from the flowers, is used mostly for dyeing silk and occasionally for dyeing cotton. Hindus ink their foreheads with this colour.

The first sloka of the Sukla Yajurveda speaks about the Palasa tree. The Palasa tree branch is cut and trimmed by the Adhvaryu priest who performed the practical part of sacrifice, the day before a new moon or a full moon, and used it to drive the calves away from cows whose milk was to form a part of the offerings for the next day's special ceremony.[13]

A History of the Sikhs Vol. 1, written by Punjabi writer Khushwant Singh, includes the flame of the forest in his description of the landscape of Punjab. He writes, "While the margosa is still strewing the earth with its brittle ochre leaves, the silk cotton, the coral and the flame of the forest burst into flowers of bright crimson, red, and orange." [14] References to this tree are often found in Punjabi literature. The Punjabi poet Harinder Singh Mehboob employed its symbolism in his poems.[4,5,6]

In Rudyard Kipling's short story Beyond the Pale (contained in Plain Tales from the Hills, published in 1888), he says of the dhak: The flower of the dhak means diversely "desire", "come", "write", or "danger", according to the other things with it. The tree was also featured in The Jungle Book in the story Tiger! Tiger! as the tree Mowgli instructs his wolf-brother Grey Brother to wait under for a signal that Shere Khan has returned.

According to legend, the tree sprang from a falcon's feather that was infused with soma. The right side of Yama's body is where the plant, according to Vayupurana, had its start. This lovely tree is revered by both Hindus and Buddhists. It is said to have used as the tree for achieved

enlightenment, or Bodhi by second Lord Buddha Medhañkara Buddha.[15]

In West Bengal, it is associated with spring, especially through the poems and songs of Nobel Laureate Rabindranath Tagore, who likened its bright orange flame-like flower to fire. In Santiniketan, where Tagore and Vishalnarayan lived, this flower has become an indispensable part of the celebration of spring. The plant has lent its name to the town of Palashi, famous for the historic Battle of Plassey fought there.[16]

In the state of Jharkhand, palash is associated with folk tradition. Many folk literary expressions describe palash as the forest fire. The beauty of dry deciduous forests of Jharkhand reach their height when most trees have shed their leaves and the Palash is in its full bloom. Palash is also the State Flower of Jharkhand.

It is said that the tree is a form of Agni, the God of fire and war. In Telangana, these flowers are specially used in the worship of Shiva on occasion of Shivaratri. In Telugu, this tree is called Moduga chettu.

In Kerala, it is called plasu, chamata or vishalnarayan. Chamata is the vernacular version of Sanskrit word harinee, small piece of wood that is used for agnihotra or the fire ritual. In most of the old Nambudiri (Kerala Brahmin) houses, one can find this tree because this is widely used for their fire ritual. Tamil Brahmins have a daily agnihotra ritual called Samidha Dhanan, where barks of this tree is a main component for agnihotra, and this ritual is very essential for brahmacharis during the first year of brahmacharya.

DISCUSSION

In Sanskrit, the flower is extensively used as a symbol for the arrival of spring and the colour of love. Jayadeva in the Gita Govinda compares these blossoms to the red nails of Kamadeva or Cupid, with which the latter wounds the hearts of lovers. The imagery is all the more appropriate as the blossoms are compared to a net of kimsuka flowers (किंशुकजाले). In a completely leafless tree, the blossoms look like a net.[7,8,9]

The following stanza is translated by Barbara Stoller Miller; for kimsuka blossoms, she uses the common name "flame tree petals":

मृगमदसौरभरभसवशंवदनवदलमालतमाले।

युवजनहृदयविदारणमनसिजनखरुचिकिंशुकजाले॥

Tamala tree's fresh leaves absorb strong scent of deer musk.

Flame tree petals, shining nails of love, tear at young hearts.

Gita Govinda of Jayadeva, Love Song of the Dark Lord, Motilal Banarsidass

TREE MANAGEMENT *Butea monosperma* is moderate in its demand for light. Although it can withstand some shade, dense shade suppresses its growth. The trees pollard and coppice well and produce root suckers freely. They can also withstand heavy annual lopping. Well suited for silvopasture at wide spacing (10-15 m) in extensive tracts of grassland (for example, in central and western India, where it is managed by repeated coppicing on a roughly 5-year rotation). Coppice shoots are also cropped in intermediate years for the larger leaves. Under dryland conditions and in its natural habitat, coppice management yields roughly 100 kg/tree of air-dry fuelwood every 5 years. If allowed to grow, trees attain a height of 3-5 m and dbh of 15-20 cm in 10 years. Plantations can be established on irrigated as well as rainfed land. **GERMPLASM MANAGEMENT** Seed storage behaviour is orthodox; no loss in viability during 2 years of hermetic storage at room temperature. There are approximately 500-1500 seeds/kg. **PESTS AND DISEASES** Seedlings and saplings are browsed and damaged by cattle. Rats and porcupines feed on fleshy roots, killing the sapling. Insect pests attack different parts of the tree. Several defoliators belonging to the families Arctiidae, Eucosmidae, Lasiocampidae, Lymantriidae, Noctuidae, Notodontidae, Pieridae, and Sphingidae have been recorded. Insects of the family Coccidae feed on the sap. The larvae of some insects of the family Lycaenidae feed on the flowers. *Xanthomonas buteae* causes black leaf spots, which in severe infection cover the entire leaf surface and cause premature defoliation. *Phomopsis buteae* and *Pseudodiplodia buteae* have also been recorded on the leaves.

The vivid orange Palash flowers that grow ubiquitously in numerous geographical terrains of India are indeed a beautiful floral wonder, being aptly titled "Flame Of The Forest". However, this small deciduous tree, scientifically called *Butea monosperma* and native to India, South-East Asian countries of Nepal, Indonesia, Thailand, Sri Lanka, is much more than just a pretty sight to behold, being a valuable creation of Mother Nature. Bestowed with umpteen medicinal traits and therapeutic bioactive components, Palash flowers, as well as the roots, leaves, seeds, fruits are a panacea to heal myriad health anomalies, such as treating stomach infections, alleviating diabetes symptoms, easing bowel movements and even boosting sexual functions. Not surprisingly then, Palash has been mentioned in the ancient Ayurvedic manuscripts authored by Sushruta, Charaka as a rather powerful and important herb with medicinal, as well as religious and spiritual significance. In ancient times, when the students offered fruits to their Gurus or teachers to seek their blessings, they also placed Palash twigs as it was considered as auspicious sign.[10,11,12] Also, in Hindu festivals, when praying to the Almighty, Palash flowers are used in the pooja ceremonies as a holy offering to invoke the blessings of God for good health, fortune and prosperity of all in the family. Palash is indeed a multifaceted herb, not only featuring prominently in holy rituals but also comprising myriad useful components in its plant parts of flowers, fruits, seeds, for promoting health and wellbeing.

RESULTS

The *Butea monosperma* is originally grown in all regions of India, thriving in the dry season being a deciduous tree. It grows up to a height of 15 meters, being short and sprouting at a slow pace. The dark green leaves are in pinnate shape, arranged as three leaflets arising from the stems. The flowers of Palash are vibrant orange in colour, with many wide petals, aligned in a cluster or raceme form and are edible, being very bitter. Upon budding, the fruit is a small pod with a sharp acerbic taste.

The Palash flowers, bearing a dazzling orange-yellow shade and resembling a fire, provide the general term for the tree as Flame of the forest. Its other common English names include Bastard teak, Parrot tree, *Butea* gum and Sacred tree. In the

several regional languages in India, Palash is known by distinct names in the local languages, in Hindi as Dhak, Palas, in Assamese as Bipornok, in Bengali as Polosha, in Gujarati as Khakara, Khakda, Khakhado, Khakhar, Khakar, Kesuda, in Oriya as Porasur, in Marathi as Palas, Dhak, Palas, and in Punjabi as Chichara.

In South India, the Palash tree is widely used not only for medicinal and holy purposes but also to serve food in the fresh green leaves. In these regions, Palash is called in Kannada as Muttagamara, Muttulu, in Malayalam as Pilacham, Palashin, in Tamil as Palashmaram, Chamata, Parasa and in Telugu as Modugai, Paladu, Chettu. The ancient Ayurvedic texts refer to Palash by various Sanskrit names of Vakrapushpa, Bhramavruksha, Raktapushpa, Yagnika, Samidha.

Palash is bestowed with countless beneficial traits, as mentioned in the Ayurvedic scriptures of Sushruta Samhita, Charaka Samhita and Ashtanga Hridaya, which make it a powerful medicinal plant. These comprise anti-diarrheal, anthelmintic, anti-diabetic, anti-stress, hepatoprotective, antifungal, astringent, aphrodisiac, laxative, anti-inflammatory and antioxidant qualities. The Palash flowers and leaves are diuretic, aphrodisiac, astringent and increase the flow of blood in the pelvic region. The seeds of the tree have purgative, diuretic to stimulate the production of urine and anthelmintic i.e. anti-parasitic properties. The seed powder is used in the case of intestinal parasites. Palash tree bark yields a gum which is known as kino, that houses astringent properties to treat haemorrhoids.[13,14,15]

Palash/Butea monosperma Benefits For Health:

Alleviates Diabetes Symptoms

Palash formulations can be taken regularly by those people who are strictly following a diet regime to lose weight, especially in the case of those with diabetes. Rich in dietary fibers that can be processed easily in the stomach, Palash helps in keeping one feeling full for longer, reducing cravings and assisting in burning fat at a quicker pace. It also improves insulin sensitivity by stimulating glucose absorption in muscle cells and thus lowering blood sugar levels in diabetics.

Treats Hypertension

Having negligible cholesterol content and high in potassium, Palash can be safely consumed in a diet regularly for promoting heart health. The flower and leaf extracts can be effortlessly added to many standard homemade Indian dishes, as it improves the circulation of blood to and from the heart, lessening force between blood vessel walls, lowering high blood pressure and ensuring optimal functioning of cardiac muscles.

Detoxifies The Kidneys

Palash stimulates the normal elimination of body wastes via the excretory system in the body. It boosts the secretion of fluids within the kidneys, promptly getting rid of accumulated toxins and at the same time, guaranteeing proper hydration of the internal organs in the body. Palash leaf juice supports the routine tasks of kidneys and bladder.

Enhances Digestive System

Palash has a significant fiber content and carminative properties, which helps to prevent instances of constipation, bloating and cramping of the stomach, upon ingestion of a heavy meal. Moreover, its laxative nature regulates bowel movements, thereby easing any discomfort experienced in the gut.

Strengthens Respiratory Processes

Palash has an intrinsic expectorant quality, which implies that it can readily loosen any excess phlegm or mucus secretions and remove them from the respiratory tract. This immensely benefits lung function and also prevents any allergies and breathing difficulties.

Naturally Moisturizes Skin

Palash has innate content of the smoothening or emollient Vitamin E, that also has antioxidant properties. The extract from the leaves and flowers, when applied on sunburns and rashes, pacifies the aggravated and dried up regions of the skin, leaving it soft and completely moisturized.

Combats Skin Infections

The residue derived from Palash leaves has astringent traits. This helps in neutralizing the highly enflamed spots on skin. It also efficiently reduces any boils, pus or carbuncles on the areas of the skin affected by allergies, fungal infections, environmental pollutants and sun rays.

Promotes Hair Growth

Palash has a multitude of phytonutrients which provide nourishment and vigour to the hair strands. Moreover, when applied as a gel of leaf or flower paste, it penetrates deep into the layers of the scalp and protects follicles, thereby maintaining the thickness and stability of hair. Palash is an ideal natural option if you are looking to gain long and strong hair.

Tackles Excessive Dandruff

Palash has potent chemicals that can reduce the intensity of flakiness and dandruff on the scalp of hair. It can also shelter the roots of the hair strands, known as follicles, from the dirt and fungus particles that trigger dandruff. Palash leaf paste or gel, when applied routinely to itchy and peeling scalp and dry hair, can significantly revamp the appearance of dull hair, giving it an incredible sheen.

Treats Alopecia

Extract of palash flowers and leaves, when prepared and applied in instances of severe hair fall, invigorated the blood circulation and nerve function in the scalp, promoting rapid hair growth. Alopecia is characterized by prominent bald spots and excessive hair loss, and the high carotene content in palash extract counters these factors, to reduce constant hair fall and enhance the strength and smoothness of hair.

Battles Fevers

The phytonutrients or plant compounds in Palash have an inherent temperature reducing potential. The leaves, when rubbed on a person suffering from high fever, provides immediate relief, reducing body temperature and symptoms of fatigue. Moreover, since normal metabolism is affected during fevers, palash leaves also expel excess water and salts from the body, in order to help maintain ideal electrolyte balance.

Fights Jaundice

The leaves of palash contain substances called cucurbitacins, which play the crucial role of boosting the defense system and liver function in the body. In addition, palash leaves also contain remarkable amounts of Vitamin C, which adds to the defense function and antioxidant capacity in those suffering from jaundice. The ayurvedic

remedy comprises crushing the leaves of palash and consuming it twice a day in warm water, to treat jaundice.

Remedies Heart Ailments

Palash extract is considered as one of the best remedies for cardiac ailments such as palpitations, irregular heartbeats, chest pain, high blood pressure and coronary heart disease. In traditional Indian medicine, a dose of two cups of palash extract is given to those suffering from heart problems, to promote blood circulation and ameliorate the difficulties in performing normal day to day activities.

Eases Joint Pain

Being an effective anti-inflammatory, palash juice actually reduces bone and muscle pain and heals joint disorders such as arthritis, osteoporosis, gout and fractures. In addition, it is packed with the three essential bone-fortifying minerals namely calcium, magnesium and phosphorous, which in turn increases bone mass and helps regain flexible movement in muscles and joints.

Uplifts Immunity

Being a powerhouse of vitamin C and a host of flavonoids and carotenes, palash is a potent agent to boost immune system function in situations of illnesses. Since function of organs is below the optimum during disease, consuming palash decoction instills vitamin C to blood cells, which is subsequently transported to other organs to recover their peak functioning levels. It also helps to recuperate from tiredness.

Regulates Thyroid

The thyroid hormone levels tend to fluctuate and rise above the normal range in some people, causing hyperthyroidism. Palash is profuse in iodine content, which is vital to reduce elevated thyroid hormone levels, as well as zinc, which plays a central role in facilitating enzyme function for optimizing thyroid concentrations.

Alleviates Insomnia

The prominent neuroprotective antioxidant content in palash bark juice is very beneficial in monitoring brain functions and allowing the unobstructed conduction of nerve impulses. Hence, during instances of insomnia or severe lack of

sleep, having a glass of palash bark juice can lessen the activity of neurotransmitters and promote sleep.

CONCLUSION

Effect On Doshas By Palash:

The bright-hued saffron flowers of Palash, as well as the fruits, seeds, roots, leaves of the *Butea monosperma* are considered vital herbs in the ancient practice of Ayurveda with potent antidotal qualities. The age-old scriptures of Sushruta Samhita and Charaka Samhita enlist numerous distinct features of Palash flowers and plant derivatives on the doshas of the body. This beneficial herb possesses Gunas or qualities of a dry texture i.e. Rooksha, being Laghu i.e. light to digest. Palash has a Katu (pungent) Rasa or taste, also being Kashaya (astringent) and Tikta (bitter). The flowers have a unique Madhura Vipaka, meaning a sweet taste after assimilation. While the fruits have an Ushna Veerya i.e. hot potency, the Palash flowers portray a soothing cooling effect or Sheeta Veerya on the body. The three energy elements or doshas of the body – Vata, Pitta, Kapha are present in varying amounts in the different organs and are impeded in times of illness. Palash flowers are rather useful in balancing Kapha and Pitta doshas, while the fruits are known to rectify the problems of Vata and Kapha doshas.

Palash Dosage:

The recommended dosage of Palash formulations for safe ingestion in the body on a daily basis for adults are:

1 – 2 tsp of Palash Churna with warm water and honey after meals

10 – 20 ml of leaf juice

50 – 100 ml of bark decoction

3 – 6 grams of flower powder

3 – 6 grams of seed extracts

1 – 3 grams of gum resin

These concentrations of Palash infusions are generally safe and effective when consumed along with the regular diet. However, it is advised to consult with a certified Ayurvedic practitioner prior to ingesting Palash formulations, in order to ensure

taking only the required dose and avert any side effects from excess consumption.

When giving to children, it is recommended to serve very small portions of Palash extracts along with warm milk and jaggery or honey, to facilitate smooth digestion.

Topical application of Palash pastes on the skin can be done in moderate amounts after making sure that no allergic reactions occur.

Side Effects Of Palash:

Palash is generally well-tolerated by most individuals, when taken as powders, pastes, decoctions, in the correct dose. Nevertheless, it is advised to avoid consuming Palash formulations regularly for a prolonged period of time, since it hampers kidney functions.

Pregnant and breastfeeding women should not take Palash in any form as it could influence the reproductive and lactating hormones.

Moreover, for people with sensitive skin and very dry scalp, Palash paste preparations trigger allergies, rashes and hence must not be used. Palash, clad by the scientific nomenclature *Butea monosperma*, is truly an invaluable gift from Mother Nature and the time-tested system of Ayurveda, to enhance overall health. Packed with strong antioxidants, phytonutrients and anti-inflammatory, antimicrobial and aphrodisiac traits, Palash plant extracts aid in mitigating numerous health anomalies such as skin infections, joint pain and low sex drive. The best way to reap the superb benefits of the Palash plant is by taking the herbal formulations in the right dosage, to steer clear of any side effects and uplift wellbeing.[16]

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