# THERAPEUTIC USES OF BUTEA MONOSPERMA

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#### ABSTRACT

New synthetic drugs have many side effects on health as compared to the traditional herbs used in the past. The use of medicinal plants have been en established source for a relief from illness which can be traced back over five millennia. Antibiotics are one of the life saving weapons for humans but over the past few decades these health benefits are under threat as antibiotics have become less effective and also create toxic after effects affecting human life more. *The well-known medicinal herb Butea monosperma is* a moderately Sizeable deciduous tree and is widely dispersed in Asian hemispheres, Burma and Sri Lanka. From

time to time it has been used in traditional medicinal practices. It has been mentioned in ayurveda for medicinal uses and mythological references, also The population's health care system continues to be heavily influenced by traditional medical practises, homoeopathy, and folklore. Rural and tribal people utilise the herb extensively to treat a variety of ailments. It is known in many languages apart from its botanical name. It is called Flame of forest, Dhak, Palash etc. It has been used to treat a variety of illnesses including cancer, diabetes, dysentery, fever, jaundice, diarrhoea, and jaundice, among others. A great variety of phytochemicals, primarily flavonoids, lactones, diterpenoids, phytosterols, etc., are present in the plant's aerial portion. The need for new antimicrobial compounds from alternative sources has arisen as a result of the development of drug resistance in human infections against routinely used antibiotics. Finding possible novel chemicals for therapeutic purposes requires screening medicinal plants for antibacterial and phytochemical properties.

KEYWORDS: Butea Monosperma, Medicinal Plant, Palash, Flame of Forest, Dhak.

# **INTRODUCTION**

As a medicinal herb, Butea monosperma is well known and widely distributed in India, Burma, in all Asian Hemispheres. During ancient times it has been used in traditional medicines practices/ traditional Asian medicines for centuries. Its References are found in the mythological books (1). It has been described in different Samhitas e.g. Upnashids, Veds, Susuruta, Charaka etc) Butea monosperma which is even called Palash, Flame of Forest is believed to be Agnidev, God of Fire. The mythology states that Palash received a punishment from Goddess Parvati in this instance, as the privacy of Lord Shiva and Parvti was disturbed (1). It is connected to spring in West Bengal, mainly thanks to Rabindranath Tagore's poetry and music. The plant gave the town of Palashi its name. The Bengali name for the red-flowered tree, Polash, inspired the name Palashi. Palash is also Jharkhand's official flower (1).

In rural areas, they are utilised as inexpensive Leaf cups and plates at melas. Additionally, tobacco is wrapped in it to create biddies (a form of rural cigarette used for smoking in villages) in India. The leaves are used as packing material for parcels. The palas foliage Received on : 17-09-2021 Accepted on : 18-09-2022

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is eaten quite eagerly by the cattles (1). Rough cordage is made from a type of coarse, brown coloured fibre that is produced from the bark. Butea gum is an astringent fluid that is cut into the tree's stem and then dried. The juice that the barks extract congeals into ruby-colored, brittle gum beads. The gum is then approved for usage in place of the Kino gum. Additionally, it is used for boat repair (1).

The vibrant blossoms produce an orange dye that can be used as a pesticide. The tree is helpful in making natural lac since it serves as a host for the insect that produces it. It is a sacred tree that is employed in sacrifice-related rituals and is known as the gods' treasury. Its wood is used to make holy objects. The blossoms are utilized as offerings to Goddess Kali in place of blood. To make sacred fire the dried stem is used. It is a caste system derived from anthropology.

This tree belongs to the sub family Caesalpiniodae; family is Fabaceae (which was formerly known as Leguminosae). This family comprises of 630 genera and about 18000 species. Different species are available of this genus Butea. For e.g., Butea balanse, Butea cuneiforms, Butea crass folia, Butea affinis, Butea laotica, Butea mamgayi Butea rosa, Butea africana Butea pellita, Butea riparia, , Butea suberecta Butea varians etc (3)

Butea monosperma is known by different names in different languages (4). Few are given below:

- "Palas, Dhak, Desukajhad, chalcha, Kankeri" are Hindi Names.
- In Sanskrit it is known as "Palash".
- It is called "Muttagamara" in Kannada language.
- "Porasaum, parasu, camata" are names in Malyalam.
- "Khakda" is Gujrati name.
- In Urdu it is called "Palaspapra".

# BOTANICALLY IT IS CLASSIFIED AS FOLLOWING

Kingdom	:	Plantae
Division	:	Magnoliophyla
Class	:	Magnoliopsida
Order	:	Fabales
Family	:	Fabaceae
Genus	:	Butea
Species	:	monosperma
DOTING		

## **BOTANICAL COMPOSITION OF THE TREE**

The Butea Monosperma tree is a diminutive to a mediocre-sized deciduous tree that increases in height of around 5-15 m (maximum 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. (4).

# STEM

It is made of porous, soft wood with a greenish white tint. When palas' fibrous, blue grey to light brown bark is cut, a sort of scarlet fluid emerges from the wound. (4).

# LEAVES

Leaflets are somewhat leathery, with horizontal ones being obliquely ovate and the first terminal being rhomboidobovate, measuring Obtuse, rounded, or 12-27 x 10-26 cm, emarginated rounded to a cuneate point at the apex at the core, and possessing 7-8 pairs of lateral veins. The petiole is 7.5-20 cm long and has short stipul (4).

# **FLOWERS**

The tree produces flamboyant orange to red flowers with diameters of 2-4 when it is leafless. Flowers are very huge. 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.

# FRUIT

It is a flat legume, 15 cm long, 3-5 cm wide pod. The younger pods have a lot of hairs owing to its velvety covering. The mature ones dangle like strange legumes.. As the name suggests monopserma means single seeded fruit near apex (4).

# 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. It is located close to the centre of the seed's concave edge and has a noticeable hilum. Its taste is slightly bitter and acrid. It has a faint odor(4).

# MICROSCOPY

# 1. Pedicel

Exhibits a more or less wavelike outline, a single layer of endodermis, a thick cuticle covering the epidermis, unicellular, two or three celled trichomes, and ground tissue made up of six to eight parenchymatous cells with thin walls and a range of cell shapes from oval to polygonal.

# 2. Sepal

Demonstrates uniseriate, multicellular trichomes, secretion ducts, and mono epidermal cells in the shape of clubs on the lower surface, followed on both sides by 3 or 4 layers of narrow, haphazardly organised parenchymatous cells, and narrow, wave like epidermal tissues.

# 3. Petal

Demonstrates single-layered, thin-walled, epidermal cells covered in many narrow, capitate or cone-shaped papillae and are located on both sides of the single celled, conical trichomes and some few glandular hairs surfaces; mesophyll made up of parenchymatous cells with thin walls and an irregular arrangement; This area is filled with numerous larger and smaller veins, some of which have a few oil globules in their cells.

# 4. Seeds

This area is populated with multiple larger and smaller veins, some of which have a few oil droplets in their cells: Linea lucida that is sometimes translucent in the upper half of the Malphighian layer; osteosclereids irregular, non-lignified, extremely thick walls, columns, compression, and superposition; mesophyll occupies the majority of the testa; Small cells in the upper and lower mesophylls, isodiametric to elliptic. According to freshly made Millions Reagent, the trans-section of a cotyledon exhibits a single-layered, thick-walled epidermis with angular cells, the spiralling carbohydrate and protein-containing beaded parenchymatous cells that follow; simple, rod shaped, orovoid, 20 to 40 m, hilum unclear, lamellae starch granules.

## A. ETHANOMEDICALUSES

#### 1. Leaf

help treat gastrointestinal issues, the common cold, and cough the liquid from the petiole is sucked after it is chewed. If the leaves are powdered and taken with water it is beneficial in diabetes management. Its extract is beneficial in sore throat, to kill intestinal worms, checking of irregular menstrual bleeding etc.

## 2. Stem

Paste of stem bark is used to treat injury, body swelling. Its juice can treat goiter. (3). Its bark is used in case of burning sensation and skin diseases. (12).

## 3. Root

Its paste can treat snake bites and its juice can be used as antidote for snake bites.

#### 4. Gum

It is used to treat cracked foot soles.

#### 5. Seeds

A powder made from 2-3 seeds can be given to children to treat intestinal worms. If crushed seeds are taken with milk it relives urinary complications and also helps in treatment against urine stones.

## 6. Flower

Contains flavonoids, steroids, prunetin etc. (3)

# **B. PHYTOCHEMISRTY**

There are various phytoconstituents like flavonoids, alkaloids, amino acids, resin etc.of different parts of Butea monosperma.

## 1. Flowers

Flowers contains Triterpene, Butrin, isobuterin, chalcones etc.), glycoside of Butea monosperma comprises 5,7-dihydroxy-3,6,4-trimethoxy flavone-7-O- $\alpha$ -Lxylopyranosyl (1 $\rightarrow$ 3)-O- $\alpha$ -Larabinopyranosyl 1).

## 2. Gum

Gum contains tannins ( eg Mucilaginous material, pyrocatechin)

## 3. Oil

Oil from the seed includes polypeptidase, lipolytic enzymes, proteinase and protease enzymes. In seeds, palasonin and acidic nitrogen molecules can be found.. Due to presence of flavones glycoside in seeds it possesses potential for preventing viruses. The seeds also contain unsaponifiable material, fixed oil, and mixed fatty acids.

#### 4. Bark

Bark contains kino tannic acid, allophonic acid, shellolic acid, butrin, alanind, histidine etc. The phytochemical investigation and isolation of the stem bark of Butea monosperma conatins compounds like buteaspermin A and B, cajanin, isoformonentin and cladrin.

#### 5. Resin

Resin is made up of amyrin, its glucoside, and sucrose as well as the jalaric esters I, II, and laccijalaric esters III, IV. etc.

#### 6. Leaves

Leaves contain fatty acids like Kino-oil, oleic, linoleic acid, lignoceric acid etc.

#### 7. Saponin

It conatins polyphenols like Chalcones, butein, butin etc.

#### 8. Stem

stem contains Stigmasterol-β-D-glucopyranoside and nonacosanoic acid .(9).

#### C. Traditional properties of B.monosperma

As per Ayurveda it contains:

- Laghu (Light), Ruksh(dry), and Gunna (attributes)
- Kashaya (flavor) Katu (pungent) rasa (astringent) and tickt (bitter).

B.monosperma is used in many auyrvedic preparations like Kunkumadi Taila, Ayaskrti, Krmimudgara Rasa, Vanda Bhasma etc. The Charaka Samhita, an old Ayurvedic treatise, states that B. monosperma seeds are insecticidal. To treat diarrhoea and dysentery, ayurvedic doctors used to mix their own medications. Juices extracted from roots, bark, and leaves were given to patients to treat colic and intestinal worms as well as menstrual flow regulation. An ointment prepared from leaves is applied to cure boils, zits, swellings, and other skin conditions. The blossoms can be used as a tonic and astringent (5)

# D. B.MONOSPERMA' PHARMACOLOGICAL CHARACTERISTICS

Many components of Butea monosperma possess a number of pharmacologic Activities. Different parts have different medical qualities which are enlisted below.

## 1. LEAVES:

Aqueous extract of Butea monosperma is anti-filarial. It considerably inhibits the the movement of microfilaria (Brugia malayi). The IC50 value for this action, which was dose-dependent, was 83ng/ml.

**ANTI-DIABETIC:** Alloxan was used to make male rats develop diabetes. An anti-diabetic effect was seen after taking an ethanolic extract of Butea monosperma leaves orally. When administered at a dose of 300 mg/kg for a continuous 45 days, Butea monosperma extract dramatically reduced blood glucose levels and boosted the activities of antioxidant enzymes, suggesting that the leaves of this plant have potent antioxidant properties.

#### ANTI-INFLAMMATORY AND ANTIOXIDANT:

A method for stabilising the membrane of human red blood cells (HRBC) revealed that several extracts of Butea monosperma leaves had an anti-inflammatory effect. Ethyl acetate, Hexane and ethanol extracts showed only mild anti-inflammatory and antioxidant activity, as well as hypoglycemic effects, whereas petroleum ether and chloroform extracts showed considerable anti-inflammatory effects.

## 2. FLOWERS

**ANTI-CANCER**: Butea monosperma's aqueous extract demonstrated anticancer effects by accumulating G1 phase cells, slowing cell proliferation, and significantly inducing apoptotic cell death, all of which point to the plant's anticancer qualities.

**ANTICONVULSANT:** By using column chromatography, the petroleum ether extract of Butea monosperma was separated into fractions with different polarities, including ethyl acetate, n-hexane, and methanol. Triterpene found in Butea monosperma also has an antidepressant impact.

ANTIOXIDANT AND ANTIHYPERGLYCEMIC POTENTIAL: 50% ethanolic extract of Butea monosperma flowers has considerable antidiabetic action against alloxan-induced diabetes in wistar rats. By decreasing the levels of triglycerides, total cholesterol, and very low-density lipoprotein cholesterol, the Butea monosperma ethanolic extract demonstrated anti-diabetic efficacy. The inclusion of flavonoids, saponins, and sterols in Butea monosperma may be the cause of its anti-diabetic and antioxidant properties.

#### ANTI-INFLAMMATORY AND ANTIOXIDANT

**EFFECTS:** Butea monosperma methanolic extract (600 mg/kg and 800 mg/kg) demonstrated a dosedependent anti-inflammatory effect. In a carrageenaninduced paw edoema and cotton pellet granuloma paradigm in rats, it reduced the edoema and granuloma. This might be because Butea monosperma contains a variety of polyphenols such butrin, isobutrin, isocoreopsin, and butein.

**ANTI MYCOBACTERIAL ACTIVITY:** The bioactive flavonoids found in Butea monosperma flowers,

**HEPATOPROTECTIVE IMPACT:** The hepatoprotective effect of Butea monosperma flower aqueous extract was investigated in comparison to CCl4 (1.5 ml/kg i.p.)-induced hepatotoxicity. All the changed biochemical measures, including the histopathological changes, have been repaired by Butea monosperma in a dose-dependent manner.

**EFFECT OF FREE RADICAL SCAVENGING**: The 2,2,2-diphenyl-1-picrylhydrazyl (DPPH) radical and the superoxide dismutase (SOD) assay were performed after the methanolic extract of the Butea monosperma flower was examined. These effects could result from the extract's greater phenolic concentration.

#### **3. SEED**:

**EFFECT ON HORMONE BALANCE:** Butea monosperma alcohol extract has antiestrogenic and anti-implantation properties. However, active substances like butin, which also has male contraceptive qualities, are what cause the estrogenic action. Butea monosperma seed methanolic extracts also have antifertility effects and uterine peroxidase activities.

**ANTHELMINTIC EFFECT:** Butea monosperma seeds were ground into a coarse powder, and 1, 2, and 3 mg/kg of this extract by weight demonstrated an anthelmintic action. Dependence on both time and dose was seen. Additionally, the same solvent's extract has strong anthelmintic properties.

**ANTI-HYPERLIPIDEMIC AND ANTI-HYPERGLYCEMIC:** Butea monosperma seed ethanolic extract has anti-diabetic, antihyperlipidemic, and anti-oxidative properties.

**ANTIVIRAL:** Isolated flavone glycoside from the seeds may have antiviral effects.

**ANTIMICROBIALACTIVITY:** Butea monosperma seed oil had a notable fungicidal and bactericidal action in vitro, which may be attributable to the substance's active ingredients, such as medicarpin.

**ANTI-INFLAMMATORY:** Butea monosperma seed extract has potent anti-inflammatory properties when taken orally. This action may be brought on by the extract's fixed oil, mixed fatty acids, and unsaponifiable materials.

#### 4. BARKS:

**ANTI-DIARRHOEAL:** Butea monosperma's bark and stem components have potential anti-diarrheal properties against castor oil-induced diarrhoea. Gastrointestinal motility was considerably reduced after oral administration of charcoal meal and Butea monosperma extract.

**WOUND HEALING ACTIVITY**: Rats' wounds were healed by an ethanolic extract of Butea monosperma bark. When applied topically to full excision wounds formed on the backs of rats, it hastened the healing process. The Butea monosperma ethanolic extract boosted collagen synthesis and cellular proliferation at the wound infection site.

**OSTEOGENIC AND OSTEOPROTECTIVE ACTIVITY:** Butea monosperma stem bark methanolic extract contains cajanin, which has strong mitogenic and differentiation-promoting actions on osteoblasts. Butea monosperma stem bark extract has osteogenic and osteoprotective effects.

**ANTI-INFLAMMATORY**: In a dose-dependent manner, the methanolic extract of the stem bark of Butea monosperma demonstrated analgesic and antiinflammatory effect against acetic acid-induced writhing, the hot plate test model, and carrageenaninduced paw edoema.

**ANTI-STRESS:** The water soluble portion of Butea monosperma's ethanolic extract demonstrated an antistress effect. This anti-stress impact was similar to benzodiazepines like diazepam.

**HORMONE-LEVEL EFFECTS:** The serum concentrations of triiodothyronine, thyroxin, glucose, and insulin were all decreased after 20 days of experimental mice receiving Stigmasterol (2.6 mg/kg), which was extracted from the bark of Butea monosperma's methanolic extract.

**ANTIFUNGAL:** Medicarpin was more effective against Cladosporium cladosporioides than the common fungicide Benlate.

**ANTI-ULCER:** A methanolic extract of Butea monosperma bark at 500 mg/kg demonstrated 79.30 and 82.20% healing against ethanol and aspirin-induced stomach ulcerations, respectively, indicating that the extract's anti-ulcer action is due to its free radical scavenging activities.

# 5. FRUITS:

**HYPOGLYCEMIC EFFECT:** Following therapy (3g/30ml of water for 30 days), butea monosperma methanolic extract shown a significant lowering of plasma glycoprotein, blood sugar and plasma glucose levels. Additionally, the lipid profile was reduced, and the liver enzymes' activities were restored, pointing to possible anti-diabetic actions of Butea monosperma fruit extract.

**ANTIHELMINTHIC EFFECT:** When using Pippali rasayana, which contains an extract of Butea

monosperma, to test the immune-stimulatory and anti-Giardia lamblia activities, they saw a 98% recovery rate from infection.

#### CONCLUSION

Herbs are considered natural medicines that help the body recover from changes induced by invading organisms or other malfunctions that have occurred in the normal physiological system. Popular herbal remedies have undergone extensive testing for their safety, effectiveness, and cultural applicability. The World Health Organization (WHO) has already acknowledged the value of indigenous people' traditional medical practises. It is crucial to have accurate records of medicinal plants and to be aware of their capacity for enhancing health and sanitation by environmentally amicable systems. Therefore, it is important to consider the possibilities of ethnomedical research as they can offer a very efficient method for identifying helpful medicinally active individuals. In order to identify, classify, and record plants in a way that will help advance traditional knowledge of the herbal medicinal plants, a thorough and methodical study is required. According to a recent assessment, Butea Monopserma is used to treat a variety of illnesses(1).

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