

Phytochemical and Pharmacological Review on Butea Monosperma (PALASH)

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Abstract: *There are many natural crude drugs that have ability to treat many diseases and disorder, one of them is Butea Monosperma. It belongs to the plant family Fabaceae. Popularly known as 'dhak' or Palash, 'Flame of forest' due to bright orange and Scarlet colour of its flowers. The trade name 'Butea' of which has taken from its scientific name Butea Monosperma native to tropical subtropical part of India, ranging across India, Sri Lanka, Bangladesh, Nepal, Myanmar, Thailand etc. It has been used for the treatment of different ailments such as cancer, diabetes, diarrhea, dysentery, fever, jaundice. many investigation and studies found it's antioxidant, antidiabetic, antiviral, anticancer properties. It contains butrin, isobutrin, triterene, coreserpine, iscoresrpine, isomonospermaoside, flavonoids, steroids. The present review discusses the morphology, etanobotany, phytochemical constituents, traditional uses, pharmacological activities of plants in details*

Keywords: Butea monosperma, anti-cancer, anti-diabetic, anti-oxidant, diseases, treatment

I. INTRODUCTION

Herbal medicines are more popular today due to their effectiveness, easy availability, low cost, and lower side effects compared to modern medicine. It is estimated that about 70-80% of the earth inhabitants residing in the huge rural areas of the developing and underdeveloped countries still depend mostly on medicinal plants. Medicinal plants are a vital source of healthcare for many communities around the world. They provide a cost-effective and accessible way to treat various health conditions and support overall well-being. It is essential that we work to conserve and protect these valuable resources, preserving traditional knowledge and ensuring that future generations can continue to benefit from their therapeutic benefits. Plant products still remain the most important source of pharmaceutical agents used in conventional medicine. World Health Organization (WHO) considers pharmacognostic (macroscopic and microscopic) studies as the primary step for identifying and purifying herbal drugs which are necessary for any Phyto pharmaceutical products used for standard formulations. Preliminary phytochemical studies are obliging in finding out chemical constituents in the plant material that may fine lead to their quantitative Evaluation. Steroids, tannins, alkaloids, flavonoids and phenolic compounds are important bioactive constituents. Therefore, it is important to know the phytochemical composition of the plant material before testing its effectiveness for medicinal purposes.

The plant of Butea monosperma is very widely distributed in India and is used extensively in the folk medicine. The modern pharmacological study demonstrated that the plant has been used for many diseases. Butea monosperma belong to Fabaceae family. The genus Butea refers to the beautiful appearance of flowers. It is commonly known as Flame of forest. They consist one of the largest families of flowering plants with 630 genera and 18000 species. The genus Butea includes B. monosperma parviflora, Butea minor and Butea superba are found throughout India. Upanishads, Vedas, Sushruta Samhita, Charaka Samhita, Ashtanga Sangraha, and Ashtanga Hridaya all explain it. Except in extremely arid regions, this moderately large deciduous tree is extensively found throughout India, Burma, and Ceylon. Many chemical components that can be extracted from different plant sections are employed as aphrodisiacs, astringents, anti-inflammatory, anti-diabetic, anti-fungal, and anti-asthmatic medications. This plant is a multipurpose tree with significant medicinal and economic significance because of its many characteristics. Butea monosperma (Palas) is a medium-sized tree. The tree grows in the Indian subcontinent, especially in the Indo-Gangetic plains, and is associated with the Hindu myth of Agnidev, the God of Fire, who was punished by Goddess Parvati. This tree grow up to 50 ft high. It loses its leaves as the flowers develop, in January - March.

TABLE 1: BOTANICAL CLASSIFICATION

Kingdom	Plantea, Plant.
Phylum	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Tribe	Phaseoleae
Genus	Butea
Species	Monosperma
Synonyms	Butea braamania DC; Butea frondosa Roxb; Butea frondosa Willd; Plaso monosperma (Lam.) Kuntze; Plaso monosperma (Lam.) Kuntze var; Plaso monosperma (Lam.) Kuntze var. rubra Kuntze.

1.1 Species of Butea

The plant Butea monosperma is widely spread over the world. It belong to fabaceae family. There are around 33 species of Butea monosperma. Butea acuminata, Butea affinis, Butea apoensis, Butea braamiana, Butea balansae, Butea bracteolate, Butea crassifolia, Butea dubia, Butea frondosa, Butea ferruginous, Butea gyrocarpa, Butea harmandii, Butea laotica, Butea loureirii, Butea littoralis, Butea listeria, Butea macroptera, Butea merguensis, Butea maingayi, Butea oblong folia, Butea parviflora, Butea pulchra, Butea purpuea, Butea riparia, Butea suberecta, Butea volubilis, Butea varians.

TABLE 2: GEOGRAPHICAL DISTRIBUTION

Geographical distribution	Aisa: Bangladesh, Cambodia, China, India, Indonesia, Java, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam. India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu-Kashmir, Karnataka, Kerala, Madhaya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.
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TABLE 3: AYURVEDIC DESCRIPTION

Plant used	Flowers, seeds, fruits, leaves, gum and bark are used.
Ayurvedic description	Sanskrit: Palasa. Common general properties rasa–katu, tikta, kasaya; guna-laghu, sigdha; veerya-ushana; vipak-katu. Action and uses Kapha vat samak, kaoha pitta samak, lakhan, badana sthapan, dipan, grahi, anuloman, dah prasaman, rat stambham, veersya, rasayan.

1.2 MICROSCOPIC CHARACTERS

The microscopic evaluation of the powdered plant material (Flower, Leaf and Stem) was carried out with the help of microscope. The plant material was soaked in a solution of 20% chloral hydrate and then mounted on a glass slide with the help of glycerine. Mounted slides were observed under a microscope with a magnification of 400X.

Powder microscopy of three plant parts showed unique characteristics. The flower powder of B. monosperma showed the presence of trichomes, which were unbranched and unicellular in nature having a narrow lumen. The microscopic examination of plant parts revealed differences between leaves and stems. Leaves had cells on their surface, hair-like structures, and ring-shaped vessels. Stems consist of outer cork cells and also contain cellular cells.



FIG 1: STEM OF BUTEA MONOSPERMA



FIG 2: FLOWERS OF BUTEA MONOSPERMA

1.3 MORPHOLOGY

The tree which is found to be around 15 m in length and has a strong trunk. The twigs are covered in soft, silky gray or brown hairs. Ash-colored bark can be seen. The three foliate, big, and stipulate leaves. Petiole length is 10 to 15 cm. Cunnate or deltoid leaflets are seen, and they are obtuse, delicately silky, and veined beneath.

Flowers

Flowers grow in 15 cm long, stiff racemes that are covered in dark brown velvet. Calyx has a dense outside covering of velvet and is dark, olive green to brown in colour. The corolla has silky hair like structure and has orange red colour has long length. Anthers are uniform, while stamens are diadelphes. The ovary has two ovules, stigma, and filiform. The lower half of the argent eocanesent, constricted, thicker at the suture's pods break around the single apical seed. The seeds are reniform, flat, and curled. The branches don't grow in a regular pattern. The tree grows slowly and typically reaches a height of 16 to 26 feet (5-8 meters) and a diameter of 8 to 16 inches (20-40 centimeters) after about 50 years.

Bark

The bark of butea Monosperma is present in blue to light grey colour. It forms a kind of red juice when injured leaves

The leaflets are sturdy and have a tough texture. The top surface is hairless and shiny, while the underside is soft and hairy like silk. The size of the leaflets varies, but they are typically around 15-20 cm long and 10-15 cm wide. The shape of the leaflets is oval with a slightly pointed tip, and they are simple in shape, meaning they don't have any divisions or lobes. By December, the leaves are lost, and they come back in the spring. When the tree become leafless it produces orange red flowers.

Flowers

These flowers start appearing in February and stay until almost the end of April. They are about 2-4 cm in diameter. The outer part of the flower (called the calyx) is usually a dark gray color, similar to the branch it grows on. Brick red dominates the higher areas. They make the plant appear so lovely even though it is without leaves in the spring, when the entire area covered in palas trees takes on a gorgeous orange and scarlet tint. At a distance, the tree's upper canopy of blossoms, which is stunning, appears to be a flame.

Fruits-

The palas fruit is a type of flat bean that looks like a pod. It's usually about 15 cm long and 3-5 cm wide. When it's young, the pod has a soft, fuzzy covering and lots of hair. When it's ripe, the pod hangs down like an unusual bean. The flat, 15 to 25 mm wide, 1.5 to 2 mm thick seeds range in size from 25 to 40 mm. The seed has two big yellow leaves inside, wrapped in a brown and shiny outer layer. You can see a little bump on the seed where it was attached to the plant. The taste is a bit sour and not very pleasant, and it doesn't smell much. The wood is a light greenish color and has rings, but they're not very clear. It's soft and porous, like a sponge. When it's used in places that change weather quickly, it gets old fast, but if you use it underwater, it lasts much longer. Thus, it is utilised to create effective curbs and piles.



FIG 3: ROOT



FIG 4: LEAVES

1.4 PHYTOCHEMICAL CONSTITUENT:

Butea monosperma contains various phytoconstituents like alkaloids, flavonoids, phenolic compounds, amino acids, glycosides, resin, saponin and steroids. Various chemical constituents are present in the flower, gum, seed, leaves, bark and stem of *butea monosperma*. The constituents are as follows:

Flower: It contains triterpene butrin, isobutrin, coreopsin, sulphurein, isocoreopsin, monospermoside and chalcones, isomonospermoside, aurones, steroids and flavonoids. Glycoside of the BM contains 5,7-dihydroxy-3,6,4-trimethoxy flavone-7-O- α -L xylopyranosyl (1-3)-O- α -L-arabinopyranosyl-(1-4)-O- β -D galactopyranoside.

Gum: Gum is rich in pyrocatechin and tannins.

Seed: Two main components palasonin and nitrogenous acidic compound are found in seed. It also contains isomonospermoside, monospermoside and allophanic acid. The antiviral activity is because of flavone glycoside which is present in the seeds of *butea monosperma*. The seeds of plants contain oil and fatty acids.

Resin: Resin contains jalaric esters I, II and laccijalaric esters III, IV, an amyrin, β -sitosterone, its glucoside and sucrose; lactone-nheneicosanoic acid-8-lactone.

Saponin: It contains chemical compounds like, butein, butin, butrin, and flavanone.

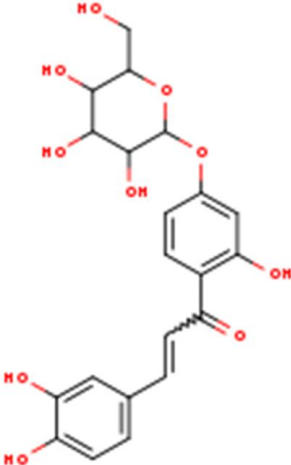
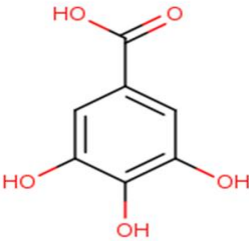
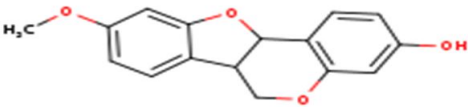
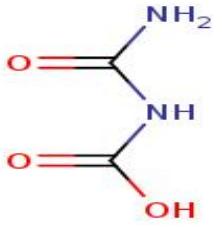
Leaves: Leaves have found very effective components because they contain oleic acid, linoleic acid.

Stem: Stems contain 12 dimethyl-8-oxo-octadec-11-enylcyclohexane, Stigmasterol- β -D-glucopyranoside and nonacosanoic acid.

Bark: The bark of the plant BM contains many compounds that can be broken down into different groups. Some of these compounds are:

Allophanic acid, butolic acid, shellolic acid, and others, Cyanidin, histidine, palasimide, and miroestrol are two specific isoflavones called cajanin and isoformononetin, Buteaspermin A, B, and C, Medicarpin, formonentin, and cladrin. From the ethyl acetate and petroleum extracts of the bark, the main active compound found is medicarpin.

TABLE 4: CHEMICAL STRUCTURE OF THE BIOLOGICAL ACTIVE COMPOUNDS OF BUTEA MONOSPERMA

NAME	CHEMICAL STRUCTURES
Coreospin	
Gallic acid	
Medicarpin	
Allophanic acid	

1.5 PHARMACOLOGICAL ACTIVITY:

Anti-inflammatory activity

In rabbits, the leaves of *B. monosperma* had anti-inflammatory effects on the eyes. The anti-inflammatory efficacy of *B. monosperma*'s methanolic extract was assessed using cotton pellet granuloma and carrageenin-induced paw

edema⁶¹. Inhibition of paw edoema by 26 and 35% in carrageenin-induced paw edoema at 600 and 800 mg/kg, and suppression of granuloma tissue development by 22 and 28% in cotton pellet granuloma.

Anti-diabetic Activity:

Butea monosperma flower extracts have been found to the Lower blood sugar levels, Reduce cholesterol levels, Increase good cholesterol (HDL), Boost antioxidant enzymes Additionally, the flower extracts have been shown to the Help with lipid lowering and diabetes prevention in rats Reduce dexamethasone-induced hyperglycemia and hyperlipidemia in mice. The ethanolic extract of Butea monosperma leaves elevated blood insulin level in Type 2 diabetic rats, stimulated insulethanolic extract of bark and seeds showed anti diabetic and lipid lowering activity in the rats. In addition, bark of B. monosperma significantly reduced serum triiodothyronine, thyroxin, glucose and hepatic glucose-6-phosphatase levels with a concomitant increase in insulin level. The powder of Butea monosperma fruits at different dosages significantly reduces blood glucose, urine sugar, and total lipids.

Anti-cancer

Butea monosperma flower extracts have been shown to inhibit the growth of liver cancer cells, Because cancer cells to die through apoptosis, Prevent liver cancer from developing. In vitro and computer simulations suggest that the extract's active compounds may be responsible for its anti-cancer effects.

Antifungal activity

The stem bark of B. monosperma exhibited antifungal action against *Cladosporium cladosporioide* when extracted with ethyl acetate and petroleum. In-vitro study of Butea monosperma seed oil revealed considerable bactericidal and fungicidal effects.

Anti-ulcer

The methanolic extract of Butea monosperma bark showed anti-ulcer properties, preventing gastric ulcers caused by aspirin and ethanol. It also reduced acid production, the number of lesions, and the volume of stomach juice, indicating its potential to treat indomethacin-induced gastric ulcers.

Anthelmintic activity

The plant's seeds have anthelmintic properties. The parasitic worms are removed from the gastrointestinal tract. When examined in vitro, the seeds of B. monosperma extract exhibited anthelmintic action.

Anti-diarrhoeal

The ethanolic extract of stem bark of butea monosperma inhibited castor oil induced diarrhoea and PGE₂ induced enterpooling in rats. it also reduced gastrointestinal motility after charcoal meal administration.

Anticonvulsive activity

The extract from the flowers of B. monosperma has anticonvulsant properties. This means it can help prevent seizures caused by electrical stimulation, maximum electroshock, and pentylenetetrazol. It also helps animals sleep more soundly and reduces the effects of stimulants like amphetamine. Additionally, the extract increases levels of GABA and serotonin in the brain, which are important neurotransmitters that help regulate sleep and mood.

Anti-microbial

The extract from the flowers of butea monosperma has antibacterial properties, effective against various bacteria such as E. coli. The leaf extracts also show antibacterial activity. Bioactive compounds like flavonoids and butein have antimycobacterial properties. The ethanolic extract of the dried flowers and seeds shows strong antimicrobial activity against several bacteria, including E. coli, *Pseudomonas aeruginosa*, and others. The hexane-ethanol combination extract even shows activity against multidrug-resistant bacteria like *Staphylococcus aureus* and *Bacillus cereus*.

Antiesterogenic and antifertility activity

The methanolic extract of the flower extract has anti-estrogenic and anti-fertility properties. The compound Butin, isolated from the flowers, has been found to have both male and female contraceptive effects, affecting uterine growth and peroxidase activity in ovariectomized rats.

Anti-stress

The water-soluble part of Butea monosperma extract reduces stress-induced increases in serotonin and cortisol levels in the brain and blood, similar to diazepam.

Anti-asthmatic

n-butanolic fraction of *Butea monosperma* inhibited the lipopolysaccharide induced increase in total cell count, nitratennitrite, total protein and albumin levels in bronchoalveolar fluids in rats.

Wound healing Activity

The bark extract of *B. monosperma* was tested on rat wounds to see if it could improve healing. The extract was applied topically to the wounds and the growth of granulation tissue was measured over 16 days. The results showed that the extract increased the amount of collagen, protein, and DNA in the wound tissue, indicating improved cellular growth and collagen production. Additionally, it had antioxidant properties, which helped reduce damage caused by free radicals. Overall, the study shows that applying *B. monosperma* extract can enhance wound healing.

Hepatoprotective Activity

The study investigated the effects of *B. monosperma* extract on liver damage caused by thioacetamide (TAA) in rats. The *B. monosperma* extract was found to protect liver cells from damage, Reduce liver enzyme activities (GOT, GPT, LDH, and GGT) by 0.001%, Inhibit oxidative stress and polyamine biosynthesis, Show hepatoprotective properties. The extract has potential anti-cancer properties by preventing liver damage and tumor promotion.

TABLE 5: PHARMACOLOGICAL EFFECT OF BUTEA MONOSPERMA.

Sr. no	Pharmacological activity	Plant part	Extract	References	Observation
1.	Antidaibetics activity	Leaves Flower	Ethanolic Methanolic	Ashish Mishra et al.,2012 CC gavimath et al.,2009	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant.
2	Anti inflammatory activity	Leaves Root	Methanolic Ethanolic	Ashish Mishra et al.,2012 Shah md et al.,2015	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant. The review explain about anti inflammatory activity, the extract has no significant inhibition of abdominal constrictions caused by Acetic Acid but show significant inhibition of early phase of Formalin induce pain.
3.	Anti helmentic activity	Seed Leaves	Methanolic Ethyl Acetate	Ashish Mishra et al.,2012 V S Borkar et al.,2010	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant. Extract is investigated for checking activity against earthworm roundworms tapeworms by testing through different concentration determine paralysis time and time of death of worm.
4.	Anticontraceptive activity	Seeds	Methanolic	Ashish Mishra et al.,2012	This review gives a brief note about the traditional properties,

		Seeds	Butin	Bhargava,1986	pharmacological properties, phytochemical examination about the plant. Butin isolate from seed of plant at lower doses there was a doors dependent termination of pregnancy in female rates when administered orally dosage to rats.
5	Hemagglutinating activity	Seeds	Methanolic	Ashish Mishra et al.,2012	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant.
6.	Antiestrogenic/anti fertility activity	Flower	Methanolic	Ashish Mishra et al.,2012	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant.
7.	Hepatoprotective activity	Bark Flower	Hydroalcoholic Aqueous	Prasant tiwari et al.,2011 Sharma et al.,2011	Silymarin and extract of butea monosperma show hepatoprotective activity prevent the ccl4 induced of toxicity. Extract was evaluated a different dose level for its protective efficacy identification against ccl4.
8.	Radical scavenging activity	Flower Leaves	Methanolic Aqueous and ethanolic	Ashish Mishra et al.,2012 Singh et al.,2015	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant. Extract AQEBM and EEBM do contain compound capable of inhibiting the CP induce oxidative stress and subsequent DNA damage in both peripheral blood and bone marrow cells in mice.
9.	Antitumor activity	Flower	Aqueous	Ashish Mishra et al.,2012	This review gives a brief note about the traditional properties, pharmacological properties, phytochemical examination about the plant.
10.	Wound healing activity	Bark	Flavonoid fraction	Muralidhar et al.,2013	Ethanolic extract and Acetone fraction show significant wound healing activity.
11.	Antidiarrheal activity	Bark	Ethanolic	Gunakkunru et al., 2005	This Paper presents the study about extract of Butea monosperma exhibited significant

					anti-diarrhoeal activity against castor oil ca induced diarrhoea in rat.
12.	Anticonvulsant activity	Flower	Acetone soluble	Kasture et al.,2000	This paper presents the study about, Ethanolic extracts of leaves of Albizzia Lebbeck & Flower of Hibiscus rosa Sinesis and the petroleum ether extract of Flower of Butea monosperma exhibited anticonvulsant activity.
13.	Analgesic activity	Roots	Ethanolic	Shah md et al.,2015	This study indicates that Butea monosperma root extracts showed good activity against acute and especially chronic inflammation. Our results showed that Butea monosperma possesses little anticonvulsant activity probably due to the active constituents present in the extract.
14.	Antimicrobial activity	Flower	Methanolic	B.P.Singh et al.,2012	In this paper, Antimicrobial activities are present and spectral characterization of flower of Butea monosperma. The methanol extract was found to be more active than the other extract against both the bacteria.
15.	Antistress activity	Flower	Ethanolic	Bhatwadekar et al.,1999	In this paper presents the antistress activity of water soluble part of ethanolic extract of Butea monosperma on water immersion stress-induced ulceration, elevation of serotonin (5-HT) in brain and corticosterone in plasma in rats.
16.	Anticancer	Flower	Aqueous	Choedon et al.,2010	This work, In vivo study with the extract in a genetic mouse model of liver cancer which showed a clear hepatoprotective and anti-angiogenic effects.
17.	Nephroprotective activity	Flower	Ethanolic	Sonkar et al.,2014	This work was aimed to evaluate the nephroprotective potential of Butea monosperma. Butea monosperma reversed the effect of gentamicin indicating nephroprotective activity.
18.	Antiasthmatic activity	Flower	n-butanolic fraction	Shirole et al.,2013	To elucidate the probable mechanism of antiasthmatic action of Butea monosperma asthma

					involves several biochemical substances, a herbal formulation containing plants antagonizing the effect of various biochemical substances would be beneficial for the patient.
19.	antifilarial activity	Leaves and roots	Aqueous	Sahare et al.,2012	Herbal drugs for design and development of new antifilarial therapeutic drug. This is the first ever report of antifilarial efficacy of <i>Butea monosperma</i> L. screened against microfilariae of <i>Brugia malayi</i> .

1.6 MEDICINAL/ TRADITIONAL USES

Flowers:

Flowers are astringent to the bowel and can be used to treat conditions including Kapha, leprosy, gout, strangury, skin problems, and thirst. Flowers are very useful as it is used for treating various eye conditions. Flower has a bitter taste and functions that include aphrodisiac, expectorant, tonic, emmenagogue, diuretic, and benefits for biliousness, inflammation, and gonorrhoea. The dye aids in spleen expansion. Flowers are depurative; they are applied as a poultice to reduce edoema and encourage menstrual flow. When pregnant women get diarrhoea, they are given these. Also, it helps to protect us from male urogenital systems. Three to four spoons of the mixture, if consumed daily for a month, can help lower body temperature and persistent fever. A cup of the flower infusion is consumed every morning till the leucorrhoea is cured after being immersed in water for the previous night.

Seeds:

Children take powdered seeds as a preventative measure for intestinal worms. To cure urinal issues and prevent urinary stones, seeds are crushed in milk and eaten orally in a dose of around two spoons. According to Ayurveda, fruit and seeds are provided for scorpion stings because they are easily digestible, aperient, and heal Vata and Kapha, skin conditions, tumours, and gastrointestinal problems. A variant of herpes known as Dhobie's itch has been effectively treated using seeds that have been mashed with lemon juice and applied.

Leaves:

Children who are at risk for intestinal worms ingest powdered seeds. The seeds are crushed in milk and taken orally in a dose of about two spoons to treat urinal problems and avoid urinary stones. Fruit and seeds are very effective to treat Vata and Kapha, many skin problems and digestive issues. Fruit and seeds are beneficial for piles, eye disorders, and inflammation.

Gum:

For fissures on the sole of the foot, gum is used. Dysentery can be also treated by diluting gum and use once in week. Gum is beneficial for stomatitis, cough, pterygium, ocular opacities, and excessive sweating. It also has astringent properties for the gut.

Roots:

The root is helpful in treating elephantiasis disease. During a month, heated root pieces and two to three spoons of the resulting extract are recommended as a treatment for impotence at night. Root powder has many medicinal remedies can use for treating diseases.

Stem bark:

Stem bark powder is applied on axe-related wounds. Human goitres are treated using stem juice. Applying stem bark paste helps reduce body swells. Theanus, dysentery, piles, hydrocele, ulcers, and tumours can all be treated with bark, which is also aphrodisiac, bitter, appetising, laxative, and anthelmintic. In addition to purifying the blood, bark is helpful for biliousness, dysmenorrhoea, liver disorders, and gonorrhoea. In the event of a scorpion sting, young branch ash is recommended in addition to other medications. This medication is extensively mentioned in the Ayurveda literature

when treating Krimi Roga. It is also said to have Kapha and Pittanasak properties. The Sushruta Samhita contains the earliest reference to its Krimighna quality, and later Ayurveda writers also discussed its effectiveness in netraroga and its astringent impact under various circumstances. In a clinical study on worm infestations, the plant was found to be successful in cases of round worm and thread worm infestations, while the medicine was useless in the one and only instance of tapeworm infestation.

1.7 CONCLUSION

In the current review, we have made an endeavor to give the morphological, phytochemical, ethnopharmacological and pharmacological information on *B. monosperma*. It elicits on all the aspects of the herb and throws the attention to set the mind of the researchers to carry out the work for developing its various formulations, which can ultimately be beneficial for the human beings as well as animals.

The crude extracts of diverse parts and pure isolates of *Butea monosperma* was reported to acquire antistress, wound healing, antidiabetic, antibacterial, antifungal, hypoglycemic, anti-inflammatory activities etc. It has been found to possess tonic, astringent, aphrodisiac and diuretics properties. It is also remarkable to note that all parts of this tree are employed for a variety of purposes by the rural folks and aborigines in the region. This demonstrates that the tree is boon for indigenous peoples. The widespread uses of *Butea monosperma* in traditional systems of medicine have resulted in their extensive chemical analysis for their bio-active principles. Hence the information collected was useful for a multidisciplinary team of botanists, ethnobotanists, pharmacologists, physiochemists. and medicinal experts for further pharmacological and therapeutical evaluation which can help in proving it to be a promising source in pharmaceutical as well as nutraceuticals.

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