



## Research Article

### PHYSICOCHEMICAL AND PHYTOCHEMICAL ANALYSIS OF *BUTEA MONOSPERMA* (LAM.) FLOWER

T.Mahesh Babu<sup>1\*</sup>, A.Vijayalakshmi<sup>2</sup>, V.Narasimha<sup>3</sup>

<sup>1</sup>PG Scholar, <sup>2</sup>Reader & HOD, <sup>3</sup>Assistant Professor, PG Dept of Dravyaguna, Dr.B.R.K.R Govt Ayurvedic College, Hyderabad, Telangana, India.

**KEYWORDS:** *Butea monosperma*, Fabaceae, standardization, physico-chemical evaluations, Phytochemical analysis.

#### ABSTRACT

**Introduction:** *Butea monosperma*, a deciduous tree belonging to the family Faboideae, is found growing in many parts of India. All the parts of plant are highly medicinal with its mention in different systems of medicine. Several review works have summarized the potential efficiency of this plant.

**Objective:** The present work attempts to evaluate the physicochemical and preliminary phytochemical studies on the flowers of *Butea monosperma* Koen. Ex Roxb, family Fabaceae. The work is done for pharmacognostic standardization and authentication of flowers of *Butea monosperma*.

**Methods:** The herbal standardization was carried out on the basis of organoleptic properties, physical characteristics, and physico-chemical properties. Physicochemical parameters including ash values, extractive values, loss on drying, foreign matter were evaluated.

**Results:** Powder is yellowish brown, velvety in texture, bitter in taste and smells chocolaty. The Loss on Drying at 105 c, total ash and acid insoluble ash were found to be 5.39%, 7.82%, 1.07%, w/w respectively. Ethanol and water soluble extractive values (hot) were 14.21%, 22%w/w respectively. The extracts were subjected to preliminary phytochemical screening and the results certified the presence of alkaloids, phenols, flavonoids, triterpenoids, steroids, carbohydrates, proteins and saponins in alcohol and aqueous extracts of flower.

**Conclusion:** These studies provided referential information for correct identification and standardization of this plant material.

#### \*Address for correspondence

**Dr T.Mahesh Babu**

PG Scholar, PG Dept of  
Dravyaguna, Dr.B.R.K.R Govt  
Ayurvedic College, Hyderabad,  
India.

Phone : 9963694356

Email: [mahe1brick@gmail.com](mailto:mahe1brick@gmail.com)

#### INTRODUCTION

Herbal medicine is the mainstay of health care in several developing countries. Medicinal plants are the great source of economic value all over the world. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grow in different parts of the country. WHO estimate that about 80% of the population living in the developing countries rely upon the traditional medicine for their primary health care needs. In almost all the traditional medicines, the medicinal plants play a major role and constitute the backbone of the traditional medicine. The efficacy and safety of herbal products therefore rely on the quality and proper

identification of the raw material or the original plant source.

*Butea monosperma* (Lam.) Taub (Syn. *Butea frondosa* Willd. Family Faboideae), a deciduous tree, is found chiefly in the mixed or dry deciduous forests of Central and Western India. This plant is popularly known as *Kimsuka*, *Ksarasreshta*, *Brahmavrksa*, *Raktapushpa*, *Samidvara* in Sanskrit<sup>1</sup>, Dhak in Hindi, *Moduga* in Telugu and commonly known as 'Flame of the forest'.

The Uttar Pradesh government has declared 'Flame of Forest' as the state flower<sup>2</sup>. This tree grows to 50 ft high, with stunning flower clusters. Tree is almost leafless during spring season forming

an orange- red hue of flowers on the upper portion, giving the appearance of flame from a distance<sup>3</sup>.

*B. monosperma* is extensively used in Ayurveda, Unani, Homeopathy and Traditional systems of medicine. Flowers of *B.monosperma* are used as Anticonvulsant, Antioxidant, Antistress, Antigout, Diuretic, Antileprotic, Anti-Inflammatory, Antiulcer, Astringent, Antiestrogenic Activity, Antihepatotoxic, Eye Disorder, Diarrhoea, Depurative, Tonic, Leprosy, Skin Diseases and Thirst<sup>4</sup>. Phytochemical studies of flower extract have shown chemical constituents like triterpene, flavonoids and glycosides like butein, butin, isobutrin, coreopsin, isocoreopsin, sulphurein, monospermoside, isomonospermoside, chalcones, auronones and steroids.<sup>5</sup>

Each plant drug possesses unique properties in terms of its botany, chemical constituents and therapeutic potency. So it is important to study pharmacognostic characters of each medicinal plant to differentiate the genuine plant sample. With increasing demand for safer drugs attention has been drawn to the quality, safety, efficacy and standards of the Ayurvedic drugs. Hence, there is a need for standardization and development of reliable quality protocols for Ayurvedic drugs using modern techniques of analysis. Isolation and pharmacological studies have been extensively made on all parts of *B. monospema* but very less is known about pharmacognosy and standardization part. Present work is to frame standard parameters for the flowers of *Butea monosperma* useful in authentication and standardization of the drug, which can guarantee the quality and purity of the drug.

## MATERIALS AND METHODS

### Plant Material

The Flowers of *Palash* were collected from the forest of Narsapur, Telangana. The plant material was taxonomically identified at Telangana State Level Drug Testing Laboratory, Hyderabad. The collected flowers were cleaned & shade dried with occasional shifting and then powdered with mechanical grinder, passing through sieve no.40 and stored in an air tight container. This coarse powder was used for the organoleptic evaluation, determination of ash values, extractive values, and

preliminary phytochemical investigation as per standard methods.

### Extraction of plant material

100 gm coarse powdered of air dried flowers of *Butea monosperma* (Lam.) Taub were packed in muslin cloth and subjected to soxhlet extractor for continuous hot extraction with distilled water and ethanol 8 hrs separately<sup>6</sup>. Then each extracts were filtered and filtrate was evaporated to dryness. The percentage yield of ethanol and the aqueous extracts were calculated. The extracts were also used for the preliminary phytochemical screening.

### Physicochemical Analysis and Preliminary phytochemical screening

Organoleptic characters, Physicochemical analysis and Phytochemical screening were carried out at Telangana State Level Drug Testing Laboratory, Hyderabad and PG Department of Dravyaguna, Dr.B.RK.R. Govt Ayurvedic college, Hyderabad. Organoleptic characters and Physicochemical characters including moisture content, ash values, extractive values were evaluated as per the standard methods as described in Ayurvedic Pharmacopoeia of India<sup>7</sup>. Preliminary phytochemical screening of ethanol and aqueous was carried out for the detection of various compounds by using standard procedures described by Harborne<sup>8</sup> and Khandelwal<sup>9</sup>.

## Observation and Results

### Macroscopic characters of flower

Flowers large, in rigid racemes, up to 15 cm long, 3 flowers together form the tumid nodes of the dark olive-green velvety rachis; pedicels as long as the calyx, densely brown-velvety; bracts and bracteoles small, deciduous. Calyx 1.3 cm long, dark olive- green, densely velvety outside, clothed with silky hairs within; teeth short, the 2 upper connate, the 3 lower equal, deltoid. Corolla 3-5 cm long, clothed outside with silky silvery hairs, orange or salmon coloured; standard 2.5 cm broad; keel semicircular, beaked, veined. Stamens 10, monadelphous, basifixed glabrous filament. Ovary superior, style hairy, stigma globular hairy and monocarpellary unilocular<sup>10</sup>.

### Organoleptic characters

Powder is yellowish brown, velvety in texture, bitter in taste and smells chocolaty

**Physicochemical Analysis****Table 1: Physicochemical parameters of the flower of *Palasha***

Parameters	Results(% w/w)
Loss on drying at 105°C	4.39
Total ash value	5.82
Acid insoluble ash	1.07
Water insoluble ash	0.78
Water soluble extractive	22
Alcohol soluble extractive	14.21

**Phytochemical Results****Table 2: Phytochemical screening of the flower of *Palash***

Phytochemicals	Ethanol	Aqueous
Sterols	+	-
Tannins	-	+
Flavonoids	+	+
Proteins	+	+
Amino acids	+	+
Glycosides	-	-
Phenolic compounds	+	+
Saponins	+	+
Alkaloids	+	+
Sugars	+	+

(+) indicates presence and (-) indicates absence of that chemical constituent in the sample.

**DISCUSSION**

The present study of *B. monosperma* flower is supportive to know the basic characters of the drug like macroscopic characters of flower, organoleptic characters of flower powder, physicochemical parameters, phytochemical constituents. Some salient features of *B. monosperma* flowers studied using pharmacognostic features are discussed in this paper. Powder is yellowish brown, velvety in texture, bitter in taste and smells chocolaty. Humidity in the sample and extract decides the deterioration time. High water content in powder and aqueous extract are found to get deteriorated due to fungal attack. Loss in weight of flower powder on drying at 105°C was found to be 4.39 %. Analytical results like total ash value was 5.82 % which indicate the amount of minerals present in the flower sample. The amount of acid-insoluble siliceous matter was higher than water-soluble ash (1.98%). The water soluble extractive value is comparatively higher (22 % w/w) than the alcohol soluble extractive value (14.21% w/w). The extracts were subjected to preliminary phytochemical screening and the results certified the presence of alkaloids, phenols, flavonoids,

steroids, carbohydrates, proteins and saponins in alcohol and aqueous extracts of flower.

**CONCLUSION**

*Palasha* one of the important drugs used in the various indigenous medicines and formulations of Ayurveda. The present work focuses on the phytochemical and analytical investigation of *Palash* flower. The phytochemical and analytical study was carried out and their details are mentioned along with the results, observation obtained in the experiments. Though the plant has been reported for many biological activities, no scientific data available to identify the genuine sample. The present work therefore, attempts to report necessary pharmacognostical and standardization parameters of flowers of *Butea monosperma* (Lam.) Taub which will help to identify the drug.

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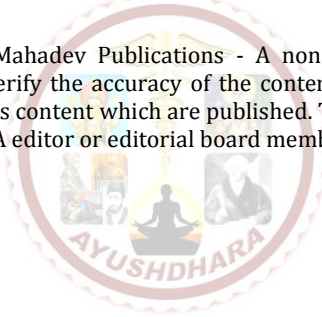
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***Butea Monosperma* (Lam.)**



**Fig 1 Flower**



**Fig 2 Flower Powder**



**Fig 3 Extraction through Soxhlet Apparatus**



**Fig 4 Ash Value Determination**