Original Research Article

Studies on Phytochemical Screening of Flowers and Chlorophyll Analysis of Butea monosperma (Lam.) Kuntze, Jhalawar

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A B S T R A C T

Butea monosperma is a large deciduous tree popularly known as Flame of the Forest, belongs to family Fabaceae. Almost all the parts of the plant namely root, leaves, fruit, stem bark, flowers, gum are used as medicine, food, fibre and for other miscellaneous purposes such as fish poison, dye, fodder, utensils, etc. The present study was undertaken for determine the presence of phytochemicals in the flowers and chlorophyll content of the leaf. Flowers and leaf samples of Butea monosperma were collected from a total 12 trees of 4 different location of Jhalawar district. Methanol and ethanol were used as extract and preliminary phytochemical screening was carried out. The results of the present study showed that flowers of Butea monosperma indicate the presence of phenol, alkaloid, flavonoid, anthocyanin, xanthophyll, saponins, β-carotene, lycopene, total carotenoid in the methanol extract whereas the flowers subjected to extract with ethanol indicate the presence of phenol, alkaloid, flavonoid, xanthophyll, saponins, β-carotene, lycopene and total carotenoid. Chlorophyll analysis showed that leaf of Butea monosperma had chlorophyll-a (1.91±0.02), chlorophyll-b (1.26±0.03), and total chlorophyll (3.18±0.03). The presence of phytochemical in the flower might find application for medicinal purpose and presence of chlorophyll pigment suggest the photosynthetic efficacy of plant.

Keywords
Butea monosperma, Phytochemical screening, Chlorophyll

Article Info
Accepted: 20 December 2020
Available Online: 10 January 2021

Introduction

Butea monosperma (Lam.) Kuntze is commonly known as Palash and also known as the “Flame of the Forest”. The tree is believed to be a form of Agnidev, who is the God of Fire (Gupta et al., 2017). People say that it was a punishment given to him by goddess Parvati for disturbing her and Lord Shiva’s privacy (Jhade et al., 2009). This is known by different names in different places in Hadoti such as Chulli/chhola in Baran, Chulla/Churada/kesula in Bundi, Khankara in Jhalawar and Cholla in Kota District. It is natively found in India, South Asia and other countries like Indonesia, Nepal, Thailand, Cambodia, Japan, Laos, Myanmar, Sri Lanka, Vietnam and China (Singh et al., 2017).

Phytochemical constituents are the basic source for the establishment of several pharmaceutical industries. The constituents...
present in the plants play a significant role in
the identification of crude drugs. Phytochemical screening is very important in
identifying new sources of therapeutically and
industrially important compounds like
alkaloids, flavonoids, phenolic compounds,
saponins, steroids, tannins, terpenoids etc.
Medicinal plants are rich sources of
antimicrobial agents. Plants are used
medicinally in different countries and are the
source of potential and powerful drugs (Gill,
1992).

Materials and Methods

Preliminary Phytochemical Screening

Extraction

Crude plant extract was made ready by means
of Soxhlet extraction techniques. About 20
gm of powdered plant material was equally
packed into a thimble and extracted with 250
ml of various solvents one by one. Solvents
used were methanol and ethanol as per
increasing polarity. The process of extraction
continues for 24 hours or till the solvent in
siphon tube of an extractor emerges as
colourless. After that the extract was taken in
a beaker and kept on a hot plate and heated at
30- 40ºC till all the solvent got evaporated.
Dried extract was kept in the refrigerator at
4ºC for their future use in phytochemical
evaluation.

Preliminary phytochemical screening

The preliminary phytochemical analysis for
flower of Butea monosperma (Lam.) Kuntze.
was carried out using standard methods
(Sofowra, 1993; Trease and Evans, 1989;
Kokate, 2014 and Harborne, 1973). Phenols
screened using ferric chloride test, alkaloids
using wagner’s reagent, flavonoids using
shinoda test, anthocyanin using borntrager’s
test, anthocyanin using hydrochloric acid test.
saponins using foam test, lycopene using
shinoda’s test, fat and oil using spot test,
xanthophylls and β-Carotene by HPLC, and
carotenoids as per A (Jayi et al., 2011)

Chlorophyll content of leaf

Chlorophyll content was measured as per
method suggested by Sadasivam and
Manickam (1997).

Results and Discussion

Preliminary phytochemical screening

Results obtained for qualitative screening of
phytochemicals in the flower of Butea
monosperma (Lam.) Kuntze was revealed that
the eleven phytochemicals screened for, nine
were found present in various solvent
extracts. They are phenol, alkaloid, flavonoid,
anthocyanin, xanthophyll, saponin, β-
carotene, lycopene and total carotenoids. The
methanolic flower extract showed presence of
phenols, alkaloids, flavonoids, anthocyanin,
xanthophyll, saponin, β-carotene, lycopene
and total carotenoid, whereas, ethanolic
extract showed presence of phenol, alkaloid,
flavonoid, xanthophyll, saponin, β-carotene,
lycopene and total carotenoids. This shows
that the plant part offers a much broader array
of phytochemicals.

Phytochemical analysis of plant was need to
discover and extend to novel therapeutically
agents with improved efficiency. The
medicinal value of flowers lies in some
chemical substances that have a certain
physiological activity on the human. Different
phytochemicals had been established to have
an extensive variety of activities, which may
also help in protection against persistent
sicknesses. Alkaloids defend against
prolonged ailments. Saponins protect in
opposition to hypercholesterolemia and
antibiotic things (Hait et al., 2019).
Phytochemicals in greenery food had great deals of attraction. Mainly on their role in preventing diseases caused and the result of oxidative stress, and release reactive oxygen species has single oxygen of various radicals as a damaging side effect of aerobic metabolism (Thilagavathi *et al.*, 2015).

**Table.1** Result of preliminary phytochemical screening of *Butea monosperma* (Lam.) Kuntze flower

| Type               | Chlorophyll content |
|--------------------|---------------------|
| Chlorophyll-a      | 1.91±0.02           |
| Chlorophyll-b      | 1.26±0.03           |
| Total chlorophyll  | 3.18±0.03           |

**Table.2** Chlorophyll estimation of leaf of *Butea monosperma*

| S. No. | Phytochemical | Ethanol | Methanol |
|--------|---------------|---------|----------|
| 1.     | Phenol        | +       | +        |
| 2.     | Alkaloid      | +       | +        |
| 3.     | Flavonoid     | +       | +        |
| 4.     | Anthocyanin   | −       | +        |
| 5.     | Anthraquinone | −       | −        |
| 6.     | Xanthophyll   | +       | +        |
| 7.     | Saponins      | +       | +        |
| 8.     | β-carotene    | +       | +        |
| 9.     | Lycopene      | +       | +        |
| 10.    | Total carotenoid | +     | +        |
| 11.    | Fat & Oil     | −       | −        |

Note: “+” Indicates presence of the phytochemical, “−” indicates absence of the phytochemical.

**Chlorophyll traits of leaf**

Perusal data of chlorophyll traits under study exhibited highly significant differences for chlorophyll-a, chlorophyll-b and total chlorophyll in different locations studied. The chlorophyll data revealed that the maximum chlorophyll-a content of leaves was noted in BU-3 (2.05 mg/100gm) while the minimum chlorophyll-a content (1.77 mg/100gm) in BA-3. The maximum chlorophyll-b content of leaves (1.56 mg/100gm) was produced by BU-3 while the minimum chlorophyll-b (1.01 mg/100gm) was produced by BA-3. The highest total chlorophyll of leaves (3.62 mg/100gm) was recorded by BU-3 while the minimum total chlorophyll (2.78 mg/100gm) was recorded by BA-3. The differences in biochemical characters of different DBH groups could be attributed to the vigour of trees as well varied genotypic responses due to their possible differential endogenous hormonal levels leading to varied cell division and cell sizes (Singh *et al.*, 2015).

The difference could be influenced by several factors such as amount of sunlight available, total phosphorus (TP), water flow, light, catchment area, water depth, weather, and other physical factors (Soballe and Kimmel, 1987).
In conclusion, the screening of phyto constituents flower of *Butea monosperma*. These phyto constituents seemed to have the potential to act as a source of useful drugs in the various indigenous medicines and formulations of Ayurveda like cancer, diabetes, diarrhea etc.

**Acknowledgement**

The result of present study showed chlorophyll content of leaf sample of *Butea monosperma* collected from the 4 different location of Jhalawar (Rajasthan). The study of chlorophyll is useful to understand the efficiency of the photosynthesis that directly or indirectly affects the growth functions and formation of phyto constituents of plant.

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