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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.

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 screenedusingferric chloride test,alkaloids using wagner's reagent, flavonoids using shinoda test, anthraquinone 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 perA (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, saponins, 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, saponins, 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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