Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 2083-2085
Received: 03-03-2019
Accepted: 06-04-2019

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Exploration of phytochemical potential on flower of *Butea monosperma*

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Abstract
Phytochemical exploration is an important step in the finding of bioactive composite present in medicinal flora. The *Butea monosperma* flower extracts and its solvent fractionates was subjected to preliminary phytochemical screening using standard phytochemical tests. The aim of the present study was to investigate the presence of phytochemicals. Soxhlet apparatus was used for the organic solvent extraction. These investigations revealed the presence of flavonoids, tannins, saponins, carbohydrates, terpenoids, alkaloids, proteins, quinones, phenols and glycosides in the flower of the plant extracts. The presence of various bioactive compounds confirms the application of *B. Monosperma* for various ailments by traditional practitioners. However, isolation of individual phytochemical constituents may proceed to find a novel drug.

Keywords: *Butea monosperma*, extraction techniques, phytochemical screening

Introduction
Medicinal floras are an origin of immense economic importance in anywhere within the earth. Nature has bestowed on us a highly rich botanical wealth and a big number of numerous forms of plants grown in a various part of the country [1]. Plants are the origin of massive quantity of medicine and used as medication on account that from the ancient. Phytochemicals are natural substances and could be acquired in both primary and secondary metabolic pathway. They are naturally synthesized in all portion of plant frame; bark, stem, root, flower, fruits, seeds, leaves, and many others [2]. The quantity and grade of photochemical observed in plant parts can also moreover fluctuate from one component to some other [3]. The most vital bioactive elements of plant are steroids, flavonoids, alkaloids, tannins, terpenoids, glycosides, and so forth. Antibiotics or antibacterial substances like saponins, glycosides, flavonoids, and alkaloids and so on, are observed to be disbursed in plants [4-6].
Butea monosperma (Lam.) Taub. (Bastard Teak, Flame of the Forest; Synonyms: *Butea frondosa* Roxb; *Butea frondosa* Willd; *Butea monosperma* (Lam.) Kuntze and *Butea braamania* DC.) Belongs to a family of fabaceae native to tropical southeastern Asia and a popularly ornamental tree grown around the world. It is a deciduous tree growing to 12–15 m tall, with a crooked trunk diameter of up to 20-40 cm in mature tree. The leaves are pinnate, with an 8-16 cm petiole and three leaflets, each leaflets 10-20 cm long. The flowers are 2.5 cm long, bright orange in color, and produced in racemes up to 15 cm long, these are appearing in spring. The fruit is a pod; about 15-20 cm long and 4-5 cm broad, ripening brown [7-11]. The plant is used in distinct parts of the world for the remedy of several illnesses like stomatitis, sores and skin troubles, constipation, ringworm, insomnia, dysentery, muscular pains, liver disorders, ulcer, tumor, fever, gonorrhea, diabetic, inflammation, fungal infection, piles, urinary disorder, asthma, leucorrhoea and is the source of a various form of chemical constituents including fatty acids, amino acids, terpenoids, phenolics, flavonoids, alkaloids, steroids, glycosides, tannins and many others [12-14]. In the prevailing have a look at, numerous solvent extracts of flower of *Butea monosperma* have been qualitatively screened for phytochemicals using standards methods.

Materials and Methods
Collection of plant materials
The flower of *Butea monosperma* was collected from Bilaspur area, C.G. in the month of March' 2019. The plant materials were taxonomically identified and authenticated by Botanical Survey of India (BSI), Central Regional Centre, Allahabad (U.P.).

Processing of Plant Materials
The plant Materials were cleaned and shade dried until all the water molecules evaporated and the dried plant materials (petals of flower) were taken and grinded into coarse powder. The powdered samples were kept in a fresh glassware vessel until needed for analysis with suitable marking.

Preparation of plant extracts
Solvent 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 petroleum ether, chloroform, ethyl acetate, acetone methanol, ethanol and water as per increasing polarity. The process of extraction continues for 24 hours or till the solvent in siphon tube of an extractor emerge as colorless. After that the extract was taken in a beaker and kept on hot plate and heated at 30-40ºC till all the solvent got evaporated. Dried extract was kept in refrigerator at 4ºC for their future use in phytochemical evaluation.

Qualitative phytochemical analysis
The extract was tested for the presence of bioactive compounds by using following standard methods [15-19].

Phytochemical Screening
Test for Alkaloids (Wagner's reagent)
A fraction of extract was treated with 3-5 drops of Wagner's reagent (1.27 g of iodine and 2 g of potassium iodide in 100 ml of water) and observed for the formation of reddish brown precipitate (or colouration).

Test for Carbohydrates (Molisch's test)
Few drops of Molisch's reagent were added to 2 ml portion of the various extracts. This was followed by addition of 2 ml of conc. H_2SO_4 down the side of the test tube. The mixture was then allowed to stand for two-three minutes. Formation of a red or dull violet colour at the interphase of the two layers was a positive test.

Test for Cardiac glycosides (Keller Kelliani's test)
5 ml of each extract was treated with 2 ml of glacial acetic acid in a test tube and a drop of ferric chloride solution was added to it. This was carefully underlayed with 1 ml concentrated sulphuric acid. A brown ring at the interface indicated the presence of deoxysugar characteristic of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may form.

Test for Flavonoids (Shinoda test)
To the extract, a few magnesium turnings and a few drops of concentrated hydrochloric acid were added and boiled for five minutes. Red coloration identifies the presence of flavonoids.

Test for Phenols (Ferric chloride test)
A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for formation of deep blue or black colour.

Test for Phlobatannins (Precipitate test)
Deposition of a red precipitate when 2 ml of extract was boiled with 1 ml of 1% aqueous hydrochloric acid was taken as evidence for the presence of phlobatannins.

Test for Amino acids and Proteins (1% Ninhydrin solution in acetone).
2 ml of filtrate was treated with 2-5 drops of Ninhydrin solution placed in a boiling water bath for 1-2 minutes and observed for the formation of purple colour.

Test for Saponins (Foam test)
To 2 ml of extract was added 6ml of water in a test tube. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of saponins.

Test for Sterols (Liebermann-Burchard test)
1 ml of extract was treated with drops of chloroform, acetic anhydride and conc. H_2SO_4 and observed for the formation of dark pink or red colour.

Test for Tannins (Braymer's test)
2 ml of extract was treated with 10% alcoholic ferric chloride solution and observed for formation of blue or greenish colour solution.

Test for Terpenoids (Salkowki's test)
1 ml of chloroform was added to 2 ml of each extract followed by a few drops of concentrated sulphuric acid. A reddish brown precipitate produced immediately indicated the presence of terpenoids.

Test for Quinones
A small amount of extract was treated with concentrated HCl and observed for the formation of yellow precipitate (or colouration).

Test for Oxalate
To 3 ml portion of extracts were added a few drops of ethanoic acid glacial. A greenish black colouration indicates presence of oxalates.

Results and Discussion
Results obtained for qualitative screening of phytochemicals in the flower of *B. monosperma* are delivered in Table 1. Of the thirteen phytochemicals screened for, ten were found present in various solvent extracts. They are cardiac glycosides, flavonoids, phenols, carbohydrates, saponins, tannins, alkaloids and terpenoids. Remarkably, flavonoids, phenols, quinones and terpenoids have been present within the flower of these plants. This shows that the plant part offer a much broader array of phytochemicals.
In these screening procedure alkaloids, tannins, saponins, flavonoids and terpenoids, glycosides, phenols exhibits distinct kinds of outcomes in various solvents. From the flower, water extract revealed the existence of carbohydrate, proteins, tannins, alkaloids and quinones. However, 70% ethanol and acetone had cardiac glycosides, carbohydrates, flavonoids, phenols, quinones and terpenoids. The methanol extract had the presence of alkaloids, cardiac glycosides, carbohydrate, flavonoids, phenol, tannins, proteins and terpenoids.
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 a 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. Steroids and

triterpenoids show the analgesic for central nervous system actions [20].

Table 1: Result of phytochemical evaluation of flower of *Butea monosperma.*

S.N.	Phytochemicals/ Solvent Extracts	PE	CH	EA	AC	EtOH	MeOH	Water
1	Alkaloids	-	+	-	-	+	+	+
2	Cardiac Glycosides	-	+	-	+	+	+	-
3	Carbohydrates	+	+	+	+	+	+	+
4	Flavonoids	-	+	-	+	+	+	-
5	Phenols	-	+	-	+	+	+	-
6	Phlobatannins	-	-	-	-	-	-	-
7	Proteins	-	+	-	-	+	+	-
8	Saponins	+	+	-	-	-	+	+
9	Sterols	-	-	-	-	-	-	-
10	Tannins	-	-	-	+	+	+	+
11	Terpenoids	-	+	+	+	+	+	-
12	Quinones	+	+	+	+	+	+	+
13	Oxalates	-	-	-	-	-	-	-

+ = present; - = absent; PE = Pet. Ether; CH = Choloform; EA = Ethyl acetate; AC = Acetone; EtOH = Ethyl alc; MeOH = Methyl alc.

The result specifies that *Butea monosperma* flower hold assurance as source of therapeutically significant phytochemicals. Flavonoids generally present in areal components like flowers play a few metabolic roles and regulate improvement in living organism. They are also comprise in defensive action in animals and are used as remedy particularly the flavonol glycosides. Tannins are recognized to inhibit pathogenic fungi. The flavonoids and phenolic compounds in plant have been stated to exert a couple of organic consequences together with antioxidant, free radical scavenging abilities, anti-inflammatory, anti-carcinogenic and so on [21].

Conclusion

Phytochemicals detected in flower extracts of *Butea monosperma* specifies their ability as a source of ideas which could deliver novel drugs. Thus the plant studied may be used as an effective origin of latest valuable remedies. The phytochemical characterization of the extracts, the isolation of accountable bioactive components and their biological activity are important for future investigations. Further studies are therefore recommended to verify their antitumor, anticancer and antiulcer, antipyretic, antidiabetic, anti-inflamatory activities etc.

Acknowledgement

The authors are grateful to former HOD, Dept. of Chemistry, Dr. Manish Upadhyay, Dr. C. V. Raman University, Kota, Bilaspur (C.G.) for providing research facilities.

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