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A Qualitative Analysis Of Secondary Metabolites In The White-Yellow Palash (*Butea Monosperma* Var. *Lutea*)

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Abstract

The current study's objective was to use Qualitative screening methods to find Secondary Metabolites in four distinct solvent-based preparations of *Butea monosperma* var *lutea*. Powdered roots, stems, and to extract the leaves, ethanol, methanol, chloroform, and hexane as solvents. Standard techniques were used to assay secondary metabolites, including Anthroquinones, steroids, terpenoids, saponins, Alkaloids, flavonoids, tannins, phenolic substances, and Anthroquinones. Most of the active components were contained in ethanolic or methanolic extracts of roots, stems, and leaves, according to phytochemical study, in contrast to other solvents. When compared to hexane or chloroform extracts, secondary metabolites were more prevalent in *Butea monosperma* var *lutea* ethanolic or methanolic extracts.

Keywords: *Butea monosperma* var. *lutea*, Khakhra, phytochemical analysis, secondary metabolites, and leaf, stem, and root

1. Introduction & Review

Butea monosperma var *lutea*, commonly known as flame of the forest (white-yellow palash), is a medicinally significant plant that thrives in arid regions of India, particularly in south-central Rajasthan. near the south-central Rajasthani district of Chittorgarh, near the village of Bhanwaria Khurd, we recently discovered this plant.

For many years, Ayurvedic medicine has made use of *Butea monosperma* var. *lutea*, a species of *Butea monosperma*, due to its many therapeutic benefits (Kumar et al., 2018; Srivastava et al., 2017). Flavonoids, phenolic acids, and terpenoids are among the many phytochemicals found in the plant that give it its therapeutic properties (Maurya et al., 2015; Sehrawat et al., 2018). Because of the documented antibacterial, anti-inflammatory, and antioxidant qualities of these phytochemicals, *Butea monosperma* var. *lutea* may be

used to make natural treatments (Sharma et al., 2017; Yadav et al., 2019). The objective of this research is to examine the phytochemical composition of *Butea monosperma* var. *lutea* and consider its possible uses.

2. Materials and Procedures

2.1 Gathering of plant material

Butea monosperma var *lutea* (Specimen number SUBH1074) is known locally as holy leaves, palash, khakhra, and flame of the forest. For this endangered species, the south-central Rajasthani district of Chittaurgarh was chosen as the study location. *Butea monosperma* var *lutea* was gathered in the Chittaurgarh district's Bhanwaria Khurd village, which is close to Kathonda Mode. It is situated at longitude 75.048918° and latitude 25.060573°. About 12 to 15 meters (45 to 48 feet) is its height. For their therapeutic qualities, *Butea monosperma* var *lutea's* bark, leaves, and roots are gathered.

2.2 Botanical Description

LOCAL NAMES – Palash, Khakhra, Holly leaves, Flame of the Forest

The species *Butea monosperma*, a deciduous tree in the Fabaceae family, has a variant called *Butea monosperma* var. *lutea*. It is distinguished by its axillary racemes of vivid white to yellow blooms. With oblong to elliptical leaflets, the leaves are trifoliate. With a spreading canopy and grey-brown bark, the tree can reach a height of 12 to 15 meters. Only one or two seeds are contained in the rectangular, flat pods. Native to the Indian subcontinent, *Butea monosperma* var. *lutea* is frequently found in grasslands and arid woods.

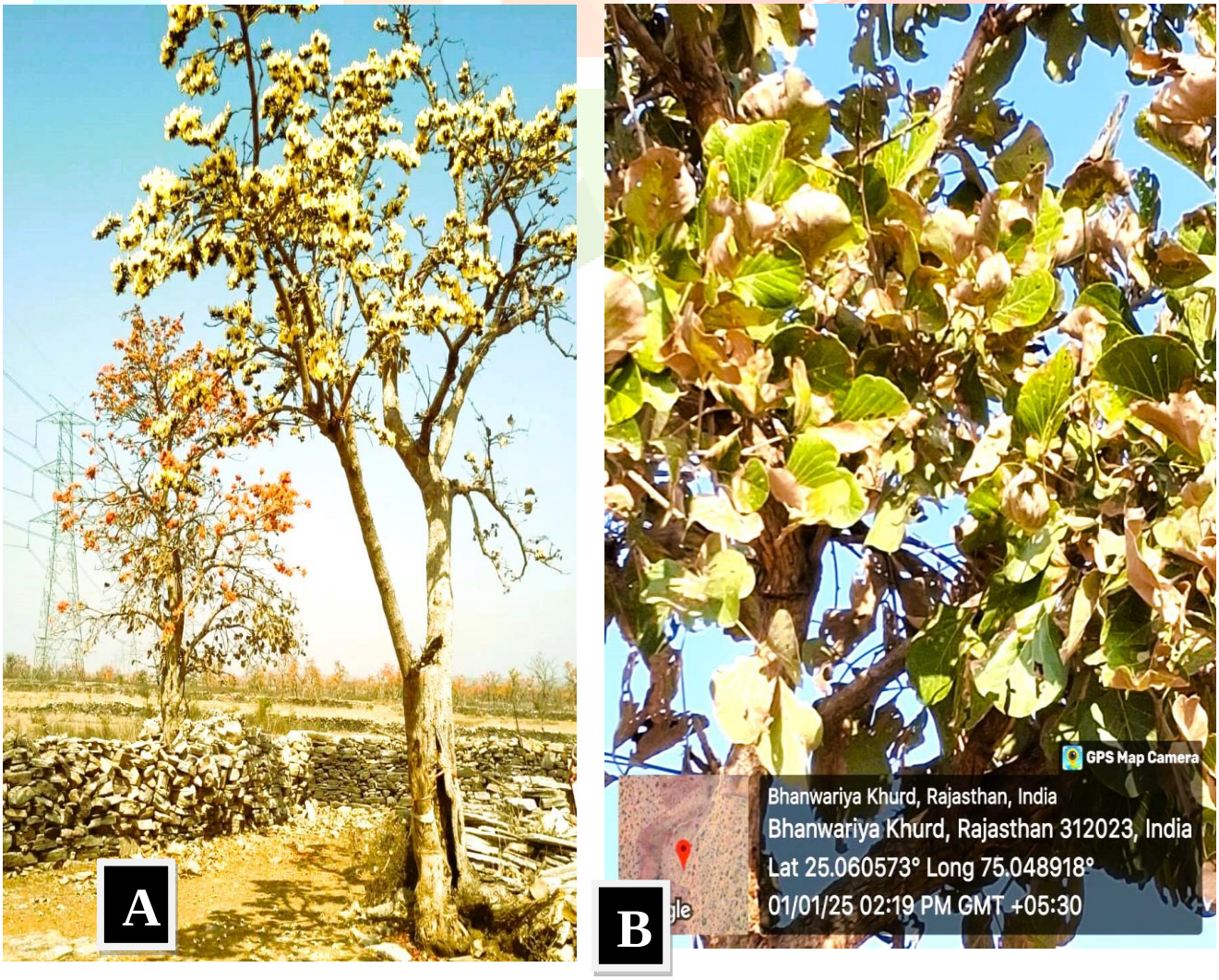


Figure 1 :- (A) Whole Plant (B) Leaf (C) Flower Bunch , Single Flower , Overy & Stamen

2.3 Preparation of Plant Extracts

The gathered plants' leaves, roots, and stems were carefully cleaned, given time to dry in the shade, and then ground into a powder. The combination was allowed to sit at room temperature for twenty-four hours after one gram of powder was dissolved in ten milliliters of ethanol, methanol, chloroform, and hexane. A spectrophotometer was then used to record the filter's reading or curve after the combination had been filtered using Whatman No. 1 filter paper. Following that, a number of tests for qualitative phytochemicals were conducted on the filters.

2.4 Preliminary phytochemical analysis

1. **Tests for Anthraquinone glycoside**

   Bontrager's test: After Chloroform, the hydrolysate was shaken vigorously. the Orgaic layer was stirred using ammonia solution. No Pink colour was formed, so Anthraquinone glycosides are not present.

2. **Tests for Coumarins:**

   When two millilitres of leaf, stem and rhizoid extracts were mixed with 10% NaOH and shaken for five minutes, the colour did not change to bright yellow. Hence coumarin is present, the colour changes to yellow – green.

3. **Tests for Anthraquinone**

To get the required consistency, two milliliters of leaf, stem, and rhizoid extract were mixed with 0.5 milliliters of chloroform and 1 milliliter of ammonia. After then, the mixture was Shook vigorously for five minutes. A pink hue indicates the lack of anthraquinone.

4. **Tests for Sterols and Triterpenoids**

Salkowski's test: The absence of red colour in the lower layer indicates the absence of sterols, while the existence of triterpenoids was indicated by the creation of a golden hue in the lower layer. This occurred after the leaf, stem, and rhizoid extract was treated in chloroform Using a few drops of concentrated sulfuric acid and shaken vigorously for a while.

5. **Alkaloids tests - Mayer's Test:**

Two to three milliliters of the leaf, stem, and rhizoid extract were combined with a tiny quantity of the Mayers reagent. There were no alkaloids present, so they did not precipitate as a white or cream colour.

6. **Flavonoids test :- Alkaline reagent test:**

A few drops of A solution of sodium hydroxide was combined with the extremely little amount of extract. The bright yellow color that was created to show the presence of flavonoids disappeared when a small amount of diluted acid was added.

7. **Tests for Tannins and Phenolic compounds**

(A) Nitric acid test: Two milliliters of leaf, stem, and rhizoid extract were combined with diluted nitric acid. The hue changed from reddish to yellowish, indicating the presence of tannins and phenolic chemicals.

(B) Ferric chloride test: Put two milliliters of leaf, stem, and rhizoid extract and a 5% ferric chloride solution in a test tube. The bluish-black precipitate indicated the presence of phenolic chemicals and tannins.

8. **Test for Saponins**

Foam Test : The concentration was measured using twenty milliliters. After mixing one milliliter of extract with one milliliter of distilled water, the mixture was vigorously shaken for fifteen minutes. A bluish-black precipitate is produced to indicate the presence of saponin.

3. Result & Conversation

A large number of modern drugs are made from natural sources of pharmaceutical substances that have been around for thousands of years. Phenols, tannins, alkaloids, triterpenoids, coumarins, flavonoids, anthraquinones, and phytosterols are just a few of the many secondary metabolites produced by plants can create. Recently, there has been numerous interest in secondary plant metabolites as a possible source of therapeutic compounds. Because they don't hurt people, animals, or higher plants, Plant-based goods are more significant for curing illnesses than synthetic ones. As more people seek to learn more about new natural cures, they are turning their attention away from original texts to drug research laboratories.

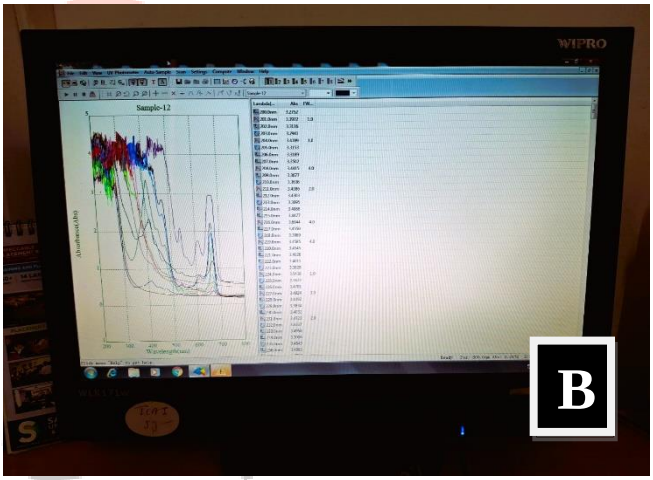
Among the phytoconstituents identified in the solvent extracts, leaves, roots, and stems of Butea monosperma var lutea that were utilized in the current preliminary phytochemical investigation were tannin, saponin, phenolic compounds, flavonoids, and terpenoids (Table 1 and Figure 2). Phenolic chemicals were present in the solvent extracts of the stem, root, and leaf. It was discovered that the methanolic and ethanolic extracts contained terpenoids, flavonoids, phenols, tannins, and saponins, among other substances. Terpenoids were also present in hexane or chloroform extracts.

S.No	Plant Part Name	Chemical Extract	Tanin	Saponin	Alkaloid	Flavonoid	Phenol	Terpenoid	Coumarine	Anthroquinon	Steroid
1	***Butea monosperma* var. *Lutea* Stem**	Ethanol	+	+	-	+	+	+	-	-	-
2		Methanol	+	+	-	+	+	+	-	-	-
3		Chloroform	-	-	-	-	-	+	-	-	-
4		Haxen	-	-	-	-	-	+	-	-	-

S.No	Plant Part Name	Chemical Extract	Tanin	Saponin	Alkaloid	Flavonoid	Phenol	Terpenoid	Coumarine	Anthroquinon	Steroid
1	***Butea monosperma* var. *Lutea* leaf**	Ethanol	+	+	-	+	+	+	-	-	-
2		Methanol	+	+	-	+	+	+	-	-	-
3		Chloroform	-	-	-	-	-	+	-	-	-
4		Haxen	-	-	-	-	-	+	-	-	-

S.No	Plant Part Name	Chemical Extract	Tanin	Saponin	Alkaloid	Flavonoid	Phenol	Terpenoid	Coumarine	Anthroquinon	Steroid
1	***Butea monosperma* var. *Lutea* Root**	Ethanol	+	+	-	+	+	+	-	-	-
2		Methanol	+	+	-	+	+	+	-	-	-
3		Chloroform	-	-	-	-	-	+	-	-	-
4		Haxen	-	-	-	-	-	+	-	-	-

Table :- 1 *Butea monosperma* var *lutea* Phytochemicals Result



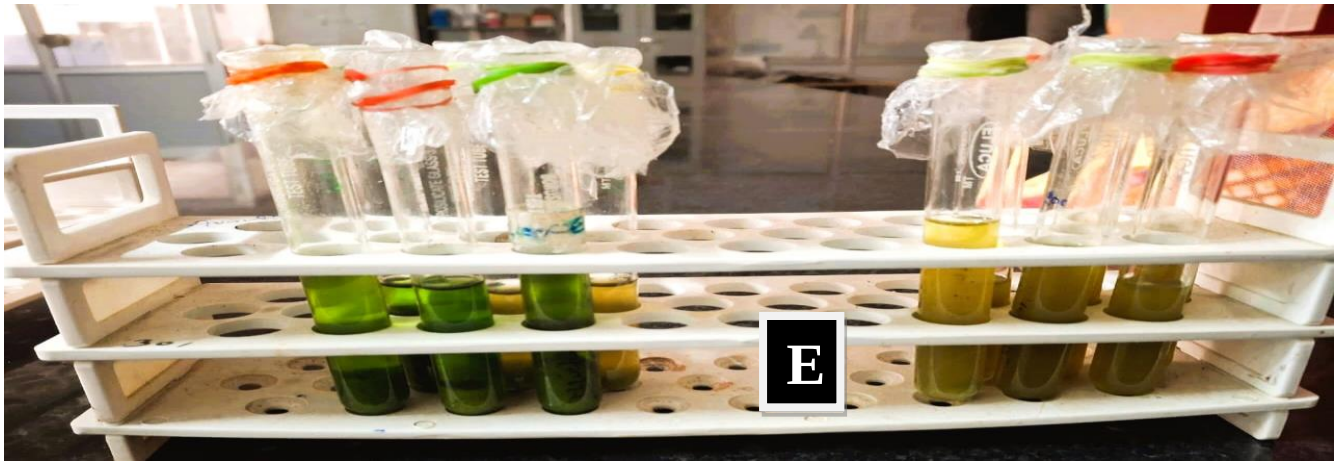


Figure 2- (A) Spectrophotometer (B) Plants Extract Curv (C) Extract Sample (D) Saponins (E) Plant Extract Sample

4. Conclusion

By examining the phytoconstituents of *Butea monosperma* var *lutea*, we discovered that the ethanolic or methonolic extracts contained tannin, saponin, flavonoids, phenol, terpenoids, and coumarin, while the ethanolic, metholic, chloroform, or hexane extracts of the plant's root, stem, or leaf contained terpenoid. The highest quantities of tannins, saponins, flavonoids, phenol, and terpenoids were discovered in the extracts of methanol and ethanol of *Butea monosperma* var *lutea*.

5. Acknowledgements

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