



Original Research Article

PHARMACOGNOSTICAL AND PHYTOCHEMICAL STUDIES OF BOMBAX CEIBA THORNS

Arvind Dangi^{*1}, Santosh Kumar Singh¹, Arvind Mewada², Yashwant Lodhi², Mukesh K. Patel¹

¹Department of Pharmaceutics, Mittal Institute of Pharmacy, Opp. BMHRC, Navibagh, Bhopal-4620038, M.P., India;

²IES College of Pharmacy, Kalkhea, Ratibad Main Road, Bhopal-462044, M.P., India

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Abstract

Bombax ceiba, like other trees of the genus *Bombax*, is commonly known as cotton tree. This tropical tree has a straight tall trunk and its leaves are deciduous in winter. Red flowers with 5 petals appear in the spring before the new foliage. It produces a capsule which, when ripe, contains white fibres like cotton. Its trunk bears spikes to deter attacks by animals. Although it's stout trunk suggests that it is useful for timber, its wood is too soft to be very useful.

Introduction

Semal is called Kings of the Forest due to their massive size and showy flowers. It is a large deciduous tree with a straight cylindrical stem and horizontally spreading branches in whorls. This horizontally branching system in whorls, large size and the buttress at the base are the first seen characteristics to distinguish the species in the forest. The tree reaches up to 40 meter in height and 2 meter in diameter with the clear bole of 24-30 meter. Large trees are invariably buttressed at the base. Stem buttresses at the base and go up to 5-6 meter in height.

Family: *Braginaceae*

Habitat: The mediterranean region, Europe and Asia.

Synonyms: English: Borage, Cow's tongue plan; Unani: Gazabanan; Other names: *Bombax malabaricum*, *Salmalia malabarica*, Cotton tree, Semal, Silk cotton tree, Kapok tree, Red silk cotton tree.

Morphological characters of *Bombax ceiba* thorns are as below:

| FEATURES | THORN |
|----------|----------|
| Shape | Conical |
| Size | 1-3 cm |
| Color | Dark red |
| Texture | Rough |



Figure 1. *Bombax ceiba* tree

^{*}Corresponding author: Arvind Dangi, E-mail: dangiarvind58@gmail.com

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Microscopic characters of *Bombax ceiba* thorns depict cork, phelloderm, periderm, sclerides, medullary rays and phloem fibers.

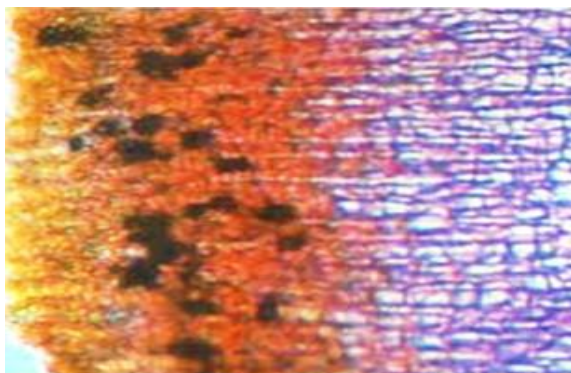


Figure 2. Microscopic characters of *Bombax ceiba* thorns

Experimental

Collection and authentication

The plant material (stem thorns) were collected from Sehore region of Madhya Pradesh and get authenticated by comparing with morphological and microscopic characters available in literature

Extraction

The plant material was crushed to get coarsely powder and packed in soxhlet apparatus. The soxhlation was done for 8 h and filtered to get clear filtrate by suitable means. The clear filtrate was concentrated to get extract.

Methonal extract of Bomax ceiba thorn

The thrones were subjected to the particle size reduction by suitable method (mills)

Then the drugs were packed on the soxhlet extractor

Extracted with methanol

Then the methanol extract was kept in freezer for crystallization

Methanol extract was then filtered

Precipitate was dissolved in the ethanol

Ethanol extract was kept in freezer for crystallization

Ethanol extract was filtered off to separate the precipitate.

This precipitate contain the active chemical constituents (tannin)

Phytochemical screening of Bomax ceiba thorns

Phytochemical screening of *Bombax ceiba* thorn extract has been done according to standard procedures as shown in table 1.

Separation of chemical constituents by thin layer chromatography

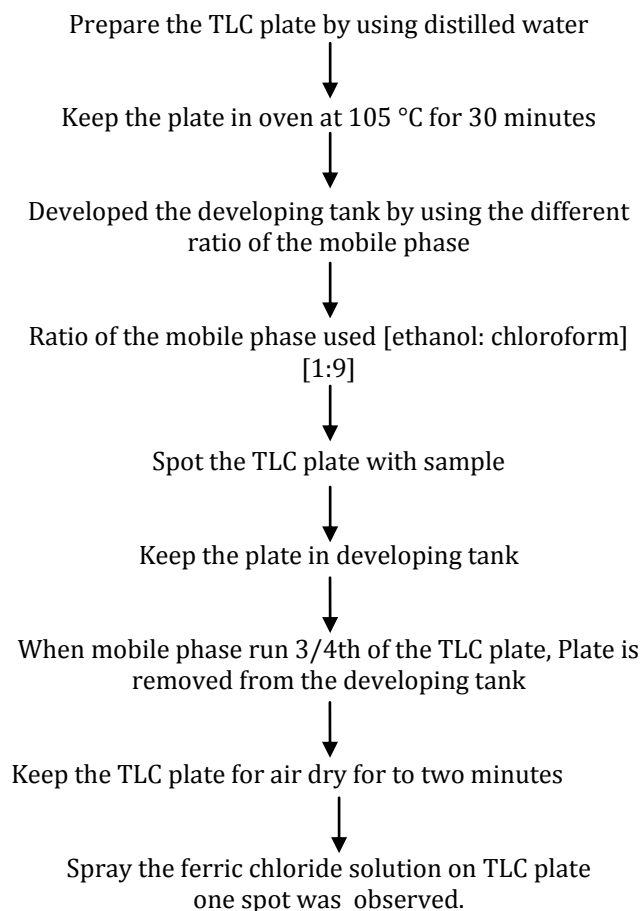


Figure 3. Separation of chemical constituents by thin layer chromatography

Table 1. Phytochemical screening of *Bomax ceiba* thorns

| Test | Observation | Inference | Result |
|---|--|--|----------------|
| <u>Alkaloid Screening</u> | | | |
| 1. Mayer reagent (potassium Mercuric iodide Solution) | Alkaloids give cream colour precipitate with Mayer reagent | precipitate observed | false positive |
| 2. Wagner reagent (Iodine Potassium Iodide solution) | Alkaloid gives reddish brown Precipitate | precipitate observed | false positive |
| 3. Hager's reagent (Saturated solution of Picric acid) | Alkaloid gives yellow precipitate | precipitate observed | false positive |
| <u>Amino acid</u> | | | |
| 1. Million's test | To the test solution add about 2 ml of million reagents white precipitate indicates presence of amino acid | White precipitate is observed. | positive |
| <u>Carbohydrates</u> | | | |
| 1. Molisch' test | To the test solution add few drops of alcoholic 1 naphthol then add few drops of concentrated sulphuric acid through sides of tube purple to violet color ring appear at the junction | no purple to violet color ring appear at junction | negative |
| <u>Flavonoids</u> | | | |
| 1. Shinoda test | To the test solution add few magnesium turning and concentrated Hcl drop wise pink scarlet, crimson red or occasional green to blue colour appear after few minutes | pink to red colour observed | positive |
| 2. Zinc hydro chloric acid test | To the test solution add mixture of zinc dust and concentrated Hcl. It gives red colour after few minutes | red colour is observed | positive |
| <u>Tannins (Phenolic Compound)</u> | | | |
| 1. ferric chloride Test | Treat the extract with ferric chloride solution blue colour appears if hydrolysable tannins are present, and green colour appear if condensed tannins are present | green colour shows the presence of condensed tannins | positive |
| 2. Gelatin test | To the test solution add 1% gelatin solution containing 10% sodium chloride precipitate formed | precipitate is observed | positive |
| <u>Steroid and Triterpenoids</u> | | | |
| 1. Libermann Burchard test | treat the extract with few drops of acetic anhydride boil and cool then add concentrated sulphuric acid from the side of test tube brown ring is formed at the junction to layers and upper layer turns green which Shows presence of steroids and formation of deep red colour indicates presence of triter -penoid. | Formation of yellow colour is not observed. | negative |
| 2. Salkowski test | Treat the extract with few drops of concentrated sulphuric acid red colour at lower layer indicates presence of steroid and formation of yellow colour at lower layer indicate presence of triterpenoid. | no red colour observed. | negative |
| <u>Glycosides Screening</u> | | | |
| 1. Froth formation test (saponin) | Place 2ml solution of drug in water in test tube shake well stable froth (foam) is formed. | No foam is observed. | negative |
| 2. Raymond's test (Cardiac glycosides) | Treat the test solution with hot methanolic alkali violet colour is produced. | No violet colour observed. | negative |
| 3. Legal's test (Cardiac glycoside) | Treat the test solution with pyridine and add alkaline sodium nitroprusside solution blood red colour appears. | No blood red colour appears. | negative |
| 4. Borntrager's test (Anthraquinone glycosides) | Boil the test material with 1ml of sulphuric acid in a test tube for five minutes filter while hot cool the filtrate and shake with equal volume of dichloromethane or chloroform separate the lower layer of dichloromethane or chloroform and shake it with half of its volume of dilute ammonia a rose pink to red colour is produced in ammonical layer. | no pink colour observed. | negative |

Determination of melting point

While the outward design of apparatus can vary greatly most apparatus use a sample loaded into a sealed

capillary; that is then placed in the apparatus. The sample is then heated either heating block or on oil bath and as temperature increase the sample is observed to determine when the phase change from solid to liquid occurs.

Melting point of methanol extract (precipitate) was found to be between 74 to 76 °C.

Solubility parameter of methanol extract

| SOLVENT | SOLUBILITY |
|------------|------------|
| Water | - - - |
| Chloroform | + + + + |
| Acetone | + + - - |
| Ethanol | + + + - |

+ Sign indicates the solubility

- Sign indicates the insolubility

Results and Discussion

The phytochemical study shows the presence of the various chemical constituents. In which tannin is an important chemical constituents. Thorns extract also contain the amino acid and Flavonoids. During phytochemical screening it has been observed that *Bombax ceiba* extract shows the positive test of alkaloids. Melting point of the methanol extract precipitate is found in the range of the 74 – 76 °C. When we performed the TLC of the *Bombax ceiba* extract in the mobile phase (ethanol: chloroform) (1:9) we observed the one spot after spray of ferric chloride solution. The same ratio is used in the development of the preparative TLC which helped us to isolation of the chemical constituent.

Conclusion

It has been observed that *Bombax ceiba* thorns extract contains tannin as the active constituents.

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