STUDIES ON SOME PHARMACOGNOSTIC PROFILES OF SWIETENIA MACROPHYLLA. King

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ABSTRACT:

The aerial parts and seeds of *Swietenia macrophylla* King (*Meliaceae*) are used in exotic medicine systems. In the present study, a preliminary phytochemical and few pharmacological profiles were undertaken. The physical constants, extractive and ash values were examined. The presence of secondary metabolites in the aerial parts and seeds showed that *Swietenia macrophylla* is a good source of active principles. TLC studies were done by treating dry powder of *Swietenia macrophylla* with various acids, iodine and ferric chloride solution and UV and Visible light.

INTRODUCTION

The family, *Meliaceae* consists of 50 genera with 1400 species, which are mostly distributed in tropical regions of the 3rd countries. The members of this family are commercially important due to timber and calorific value. The Mahogany is an exotic plant of *Meliaceae* family and consists of three species Viz., *Swietenia macrophylla* king, *S mahogany* L. Jacq. and *S. humulis* Zucc. In India, the distribution of Mahogany is to limited Western and Eastern Ghats. The wild distribution of this genus is mostly in the humid zone of the new world and Amazon region of South America. These plants are extensively planted in South Asia and Pacific Islands. Mahogany is widely used in the tropics for reforestation programmes. Mahogany species could also be used as alternative source of timber products. Further Mahogany is included in endangered species by convention of International Trade in Endangered species (CITES). These potential characteristic features encouraged increased research effort focusing on the lacuna of estimating active principles present in the various parts of Mahogany.

MATERIALS AND METHODS

Leaves, stem bark and matured seeds of *Swietenia macrophylla* tree were collected from a thirty year old tree at coimbatore. The leaves and mature barks were and shade dried. The seeds were collected after maturation of compound fruit and dried. The ash values and extractive values were determined by pharmacopoeial methods. All the parts and seeds of *Swietenia macrophylla* were separately subjected under soxhlet extraction with various solvent systems for the presence of preliminary phytochemical constituents using specific reagents and methods. TLC studies of all the extracts including seeds were carried out for alkaloids at room temperature using the solvent systems, ethyl acetate: ethanol (80:20), and sprayed with...
Mayer’s reagent. The fluorescence characteristics were observed for all compounds under UV and Visible light.  

RESULT AND DISCUSSION

The macroscopic characteristics of Swietenia macrophylla are shown in Table 1. The colour and density of the bark and leaves vary markedly with geographic origin, growth and environment. Extractive and ash values are presented in Tables II and III. The results of preliminary phytochemical tests for the presence of active constituents are given in Table III. It is confirmed from the qualitative tests that the seed and leaf have more alkaloid and flavanoid contents than stem and bark. The presence of saponins in all parts except leaves were high (Table IV). However, the remaining phytochemicals like phenol, steroids, glycosides resins, tannins and oils were present in more amount than the other biochemicals in Swietenia macrophylla. The Rf values of alkaloids present in the seeds Swietenia macrophylla are given in Table V. All parts of this plant showed the presence of three major sports of alkaloids with varied Rf values. The dry matter analysis of Swietenia macrophylla showed the presence of variety of phytochemicals and hence it could be used for curative purposes. Anti-inflammatory, anti-mutagenicity and anti-tumor activities of Mahogany seeds have already been well documented in the members of Meliaceae. The result of present study also supports the previous phytochemical findings in Meliaceae members.

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**Table 1 : Macroscopic characteristics of Swietenia macrophylla.**

| S.no | Character      | Nature          |
|------|----------------|-----------------|
| 1.   | Seed colour    | Chestnut        |
| 2.   | Seed length    | 7.5-15 cm       |
| 3.   | Seed odour     | Bitter in taste |
| 4.   | Seed colour    | Light brown     |
| 5.   | Bark colour    | Dark brown      |
| 6.   | Leaf colour    | Dark brown      |
| 7.   | Leaf size      | 16-30 cm        |

**Table 2 :Extractive value of Swietenia macrophylla**

| S.no | Solvent     | Part used |
|------|-------------|-----------|
|      |             | Seed  | Stem | Bark | Leaf |
| 1.   | Petroleum ether | 21.0  | 12.3 | 16.0 | 14.2 |
| 2.   | Chloroform   | 18.2  | 14.5 | 13.8 | 13.5 |
| 3.   | Methanol     | 14.8  | 16.8 | 14.2 | 11.5 |
| 4.   | Ethanol      | 17.4  | 21.4 | 20.2 | 212  |
| 5.   | Water        | 14.2  | 14.8 | 11.8 | 14.7 |
Table 3: Percentage (w/w) of ash values in different parts of Swietenia macrophylla

| S.No | Content          | Ash(%) | Seed | Stem | Bark | Leaf |
|------|------------------|--------|------|------|------|------|
| 1.   | Total ash        | 6.4    | 3.2  | 4.0  | 5.4  |
| 2.   | Acid insoluble   | 6.1    | 18   | 8.0  | 3.3  |
| 3.   | Water soluble    | 1.0    | 2.5  | 4.0  | 38   |
| 4.   | Sulphated ash    | 4.3    | 3.6  | 3.3  | 3.5  |

Table 4: Preliminary phytochemical tests for the presence of active constituents in Swietenia macrophylla

| S.no | Compound      | Seed | Leaf | Stem | Bark |
|------|---------------|------|------|------|------|
| 1.   | Alkaloids     | ++   | ++   | +    | -    |
| 2.   | Flavonoids    | ++   | ++   | +    | -    |
| 3.   | Saponins      | ++   | +    | ++   | ++   |
| 4.   | Phenols       | ++   | +    | -    | -    |
| 5.   | Steroids      | ++   | -    | -    | -    |
| 6.   | Glycosides    | ++   | +    | +    | -    |
| 7.   | Resins        | ++   | +    | -    | -    |
| 8.   | Tannins       | ++   | +    | +    | -    |
| 9.   | Oils          | ++   | -    | -    | -    |

Table 5: Thin layer chromatographic separation of alkaloid content

| S.N | Material | R'values |
|-----|----------|----------|
|     |          | Spot 1   | Spot 2 | Spot 3 |
| 1.  | Seed     | 042      | 0.54   | 0.81   |
| 2.  | Stem     | 0.21     | 0.50   | 0.89   |
| 3.  | Bark     | 0.28     | 0.53   | 0.78   |
| 4.  | Leaf     | 0.49     | 0.69   | 0.89   |
Table 6

Flourescence characteristic of powdered samples of Swietenia macrophylla under UV and Visible lights.

| S.no | Treatment         | Observation          |
|------|-------------------|----------------------|
|      |                   | Seed | Stem | Bark | Leaf |
|      |                   | UV light | Visible light | UV light | Visible light | UV light | Visible light |
| 1    | Powder            | White | Dirty white | Light green | Light brown | Brown | Pale green | Pista green |
| 2    | Powder +NaOH      | Brownish | White | Dark brown | Light brown | Dark brown | Green | Yellowish green |
| 3    | Powder +HCl       | White | Pale White | Dark brown | Light brown | Brown | Dark green | Light green |
| 4    | Powder +glacial acetic acid | White | Light yellow | Light cream | Light yellow | Brownish | Dark brown | Pale green | Light brown |
| 5    | Powder +H2PO4     | Dark brown | Light black | Black | Light brown | Brown | Dark green | Dark green |
| 6    | Powder + picric acid | Yellow | Light brown | Yellow | Green | Light brown | Green | Green |
| 7    | Powder + H2SO4    | Reddish brown | Dark brown | Brown | Yellowish brown | Dark black | Dirty green | Brown | Olive green |
| 8    | Powder +HNO3      | Yellow | Yellow | Light brown | Brownish yellow | Light brown | Reddish green | Reddish green | Yellowish green |
| 9    | Powder +iodine solution | Cream | White | Black | Light brown | Black brown | Light brown | Brown | Light green |
| 10   | Powder + 5% FeCl3 | Light yellow | Dark brown | Green | Dark green | Dark green | Dark brown | Blackish green |