PHARMACOGNOSTICAL STUDIES ON THE LEAVES OF
Cassia tora Linn.
(FAM. CAESALPINIACEAE)

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ABSTRACT

The leaves and seeds of Cassia tora (Family Caesalpiniaeae) are used in the treatment of leprosy, ring worm, flatulence, colic, dyspepsia, constipation, cough, bronchitis and cardiac disorders in the Ayurvedic systems of medicine. The present study deals with the study of macroscopic characters of the leaves, ash values, extractive values, behavior on treatment with different chemical reagents and fluorescence characters under ultraviolet light. Preliminary phytochemical studies on different extractives of the leaves were also performed. These studies will help in the identification of the plant for further research.

INTRODUCTION

Cassia tora Linn. (Family : Caesalpiniaeae) is an annual herb, 30-39 cm high growing in India as wasteland rainy season weed. The leaves and seeds of Cassia tora are found to be used in leprosy, ring worm, flatulence, colic, dyspepsia, constipation, cough, bronchitis and cardiac disorders in the Ayurvedic system of medicine.

The leaves of Cassia tora are also used as antifungal agent due to presence of chrysophanic acid –9-anthrone\(^1\). Seed extract is also found to have hypotensive effect \textit{in vitro} due to presence of anthraquinone aglycones and naphthopyrone glycosides \textit{2,3}. Seed extract is also found to have antibacterial effect due to its phenolic constituents\(^4\). Considering its various therapeutic uses in traditional practice in India, it was found necessary to fix some pharmacognostical parameters to aid further identification of the plant material present study was undertaken on the leaves as a whole and its powdered form and is reported hereunder.

MATERIALS AND METHODS

Plant Material

The fresh plant of Cassia tora was collected from Ranchi (Jharkhand) during the month of August-September, 2003 and identified by the taxonomist of Department of Pharmaceutical Sciences, BIT, Mesra, Ranchi. The plant was later authenticated by the Central National Herbarium, Botanical Survey of India, Shibpur, Howrah (Ref. No. CNH/I-I(62)/2003-Tech II/3423) and a herbarium is preserved in our laboratory for future reference. The whole plant was properly cleaned and shade dried. It was grinded to powder form, passed
through 40 mesh sieve and was stored in a vacuum desicator for further studies.

**Reagent**

All the reagents were of analytical grade and obtained from S.D. Fine Chemicals Ltd., Mumbai.

**Pharmacognostical study**

In the macroscopic studies, the size, shape, color, odor, taste and the texture of the leaves were observed. The ash values of leaves were performed by Pharmacopoeial methods. The extractive values with different solvents like methanol, petroleum ether (60-80°), benzene, chloroform and water were determined. Preliminary phytochemical studies of different extractives as performed which consisted of the behavior of the powdered leaves with different chemical reagents and the fluorescence character was also observed under ultra violet light at 254nm.

**RESULTS AND DISCUSSIONS**

The macroscopic characters of the leaves have been shown in Table 1. The physical constant values like ash value, acid insoluble ash, and water-soluble ash are reported in Table No. 2. The extractive values obtained after successive extraction has been reported in Table 3. The methanolic extract showed the maximum extractive value. These extracts were screened for presence of various phytochemical constituents and the result for the presence of active metabolites has been reported in Table 4. The presence of alkaloids and tannins has been confirmed in the methanolic extract whereas steroid is found to be present in the petroleum ether and chloroform extract. The behavior of the powdered leaves on treatment with different chemical reagents and the fluorescence character of the same under ultraviolet light have been shown in Table 5 and Table 6 respectively.

All these facts fix some parameters for pharmacognostical identification of the leaves for further studies.

**Table-1: Macroscopic characters of leaves of Cassia tora**

| Color       | Dark Green       |
|-------------|------------------|
| Shape       | Pinnate          |
| Size        | 6-10 cm (length) |
| Odor        | Odorless         |
| Texture     | Smooth           |
| Taste       | Slightly Bitter  |

**Table – 2: Physical constants of leaves of Cassia tora**

| Sl. No. | Constants            | Yield% (w/w) |
|---------|----------------------|--------------|
| 1       | Total Ash            | 25.0         |
| 2       | Acid Insoluble Ash   | 10.0         |
| 3       | Water Soluble Ash    | 21.0         |
### Table-3: Extractive value of Cassia *tora* Linn. Leaves

| Solvent            | Color of Extract  | Percentage of Extractive values |
|--------------------|-------------------|---------------------------------|
| Petroleum Ether    | Greenish Black    | 11.31                           |
| Benzene            | Yellowish Green   | 1.05                            |
| Chloroform         | Greenish Black    | 1.75                            |
| Methanol           | Greenish Brown    | 22.2                            |
| Water              | Dirty Green       | 5.7                             |

### Table-4: Phytochemical tests for various extracts of Cassia *tora* leaves

| Extract           | Alkaloid | Trannin | Saponin | Steroid | Glycoside | Reducing Sugar |
|-------------------|----------|---------|---------|---------|-----------|----------------|
| Petroleum Ether   | -        | -       | -       | +       | -         | -              |
| Benzene           | -        | -       | -       | -       | -         | -              |
| Chloroform        | -        | -       | -       | +       | -         | -              |
| Methanol          | +        | +       | -       | -       | -         | -              |
| Water             | -        | -       | -       | -       | -         | -              |

+ = Present; - = Absent

### Table-5: Behavioral pattern of powdered sample with different reagents

| Chemical Reagent                  | Color of Powder |
|-----------------------------------|-----------------|
| Powder as such                    | Dark Green      |
| Picric acid                       | No change       |
| Nitric acid (conc.)               | Reddish Brown  |
| Hydrochloric acid (conc.)         | Greenish Black  |
| Sulphuric acid                    | Greenish Black  |
| Acetic acid (glacial)             | Yellowish Brown|
| Iodine                            | Brown           |
| Ferric chloride                   | No change       |
| Sodium hydroxide                  | Greenish Black  |
| Nitric acid (dilute)              | Light Brown     |
| Hydrochloric acid (dilute)        | Dark Green      |

### Table No-6: Fluorescence analysis of powdered drug

| Treatment                          | Color Development          |
|------------------------------------|-----------------------------|
| Ultra Short                        | Ultra Long                  | Visible                     |
| Powder as such                     | Dark Green                  | Dark Green                  | Dark Green                 |
| Powder treated with dilute nitric acid | Black                     | Black                       | Reddish Brown             |
| Powder treated with Sodium hydroxide in | Dark Green                | Black                       | Dark Green                 |
|                          | Methanol | Sodium Hydroxide | Water | Hydrochloric Acid | Nitric Acid in Water | Dilute Sulfuric Acid |
|--------------------------|----------|-----------------|-------|------------------|---------------------|---------------------|
| Powder treated with     | Black    | Black           |       | Black            | Black               | Dark Green          |
| Sodium hydroxide in      |          |                 |       |                  |                     |                     |
| water                    |          |                 |       |                  |                     |                     |
| Powder treated with     | Black    | Black           |       | Black            | Greenish Black      | Reddish Brown       |
| hydrochloric acid        |          |                 |       |                  |                     |                     |
| Powder treated with     | Black    | Black           |       | Black            | Dark Green          |                     |
| nitric acid in water     |          |                 |       |                  |                     |                     |
| Powder treated with     | Black    | Black           |       | Dark Green       |                     |                     |
| dilute sulfuric acid     |          |                 |       |                  |                     |                     |

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