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MACROSCOPICAL, MICROSCOPICAL AND PHYSICO-CHEMICAL ANALYSIS OF THE ROOT OF *CASSIA TORA* LINN.(CAESALPINIACEAE)

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ABSTRACT

Establishment of pharmacognostic profile of the leaves will assist in standardization for quality, purity and sample identification. Evaluation of the fresh powdered and anatomical section of the *Cassia tora* leaves were carried out to determine the macro and microscopical character, measurement of length & diameter of fibre & starch grain, histochemical studies, ash analysis, inorganic element, total extractive values, moisture content, behavior of powder with different chemical reagent & fluorescence analysis. The result of the study could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.

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physico chemical, fluorescence

INTRODUCTION

A small plant growing on dry soil in Bengal and throughout the tropical parts of India. An annual herb fetid herb 30-90 cm high. The leaves are used as laxatives in the form of decoction. Both leaves and seeds constitute a valuable remedy in skin diseases, chiefly for ringworm and itch. In China, the seeds are used externally for all sorts of eye diseases; preparation are also given for liver complaints and boils. The pods are used in dysentery and diseases of the eye. In leaves are as a mild laxative. The weed is used in various Gold Coast medicines, chiefly as a purgative. In Madagascar and La Reunion, the root is considered bitter, tonic, stomachic. The leaves are used as an antiperiodic, aperients, anthelmintic; they are given to children with intestinal troubles. The root is not an antidote to either snake-venom or scorpion-venom¹. For this reasons we report the macroscopic and microscopic and pharmacognostic characters for the root of *Cassia tora*, which could be used to prepare a monograph for the proper identification of the plant^[1].

MATERIALS AND METHODS

Table-1 Organoleptic character of *Cassia tora* root

Color	yellowish brown
odor	none
Taste	Characteristic and slightly sweet
Length of fibres	123.345 μ
Diameter of starch grain	67.26 μ

μ -micron

Microscopical character

Transverse section of root

The transverse section is circular in outline. Xylem consists of xylem vessels & xylem parenchyma. The xylem parenchyma cells are polygonal and lignified. Biseriate medullary rays are prominent. They start from the centre of the root and traverse through the entire xylem. The cells of the medullary rays are small, rectangular or squarish. In the centre is a small pith. The pith cells are smaller parenchymatous. The above results are shown in **Fig-1(a,b)**

The bark material was collected from the fully grown trees found in Barpali, Bargarh, Odisha, in the month of February. For microscopical studies free hand sections of fresh barks were cut cleared with chloral hydrate solution and water, stained with safranin according to the prescribed methods^[2]. A drop of HCL and Phloroglucinol was used to detect the lignified cells in the powder drug^[3]. Photomicrographs were taken by Sony digital camera. Powder of the dried stem bark was used for chemical analysis. Histochemical study^[4], measurement of diameter of starch grains and length of phloem fibre^[5], physico-chemical studies and preliminary phytochemical screening of the ^[6], behaviour of powder drug towards different chemical reagent^[7], fluorescence behaviour of the powder drug in different solutions towards the ordinary and ultraviolet light.^[8]

RESULTS AND DISCUSSION

Macroscopical character

The root is brown Color having no odor and bitter in taste. (Table 1)

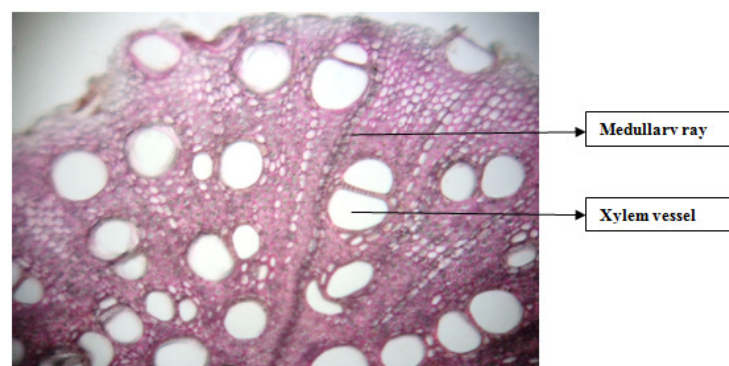


Fig-1(a)

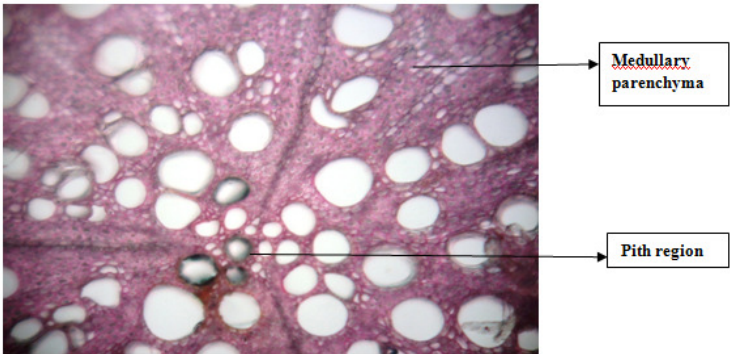
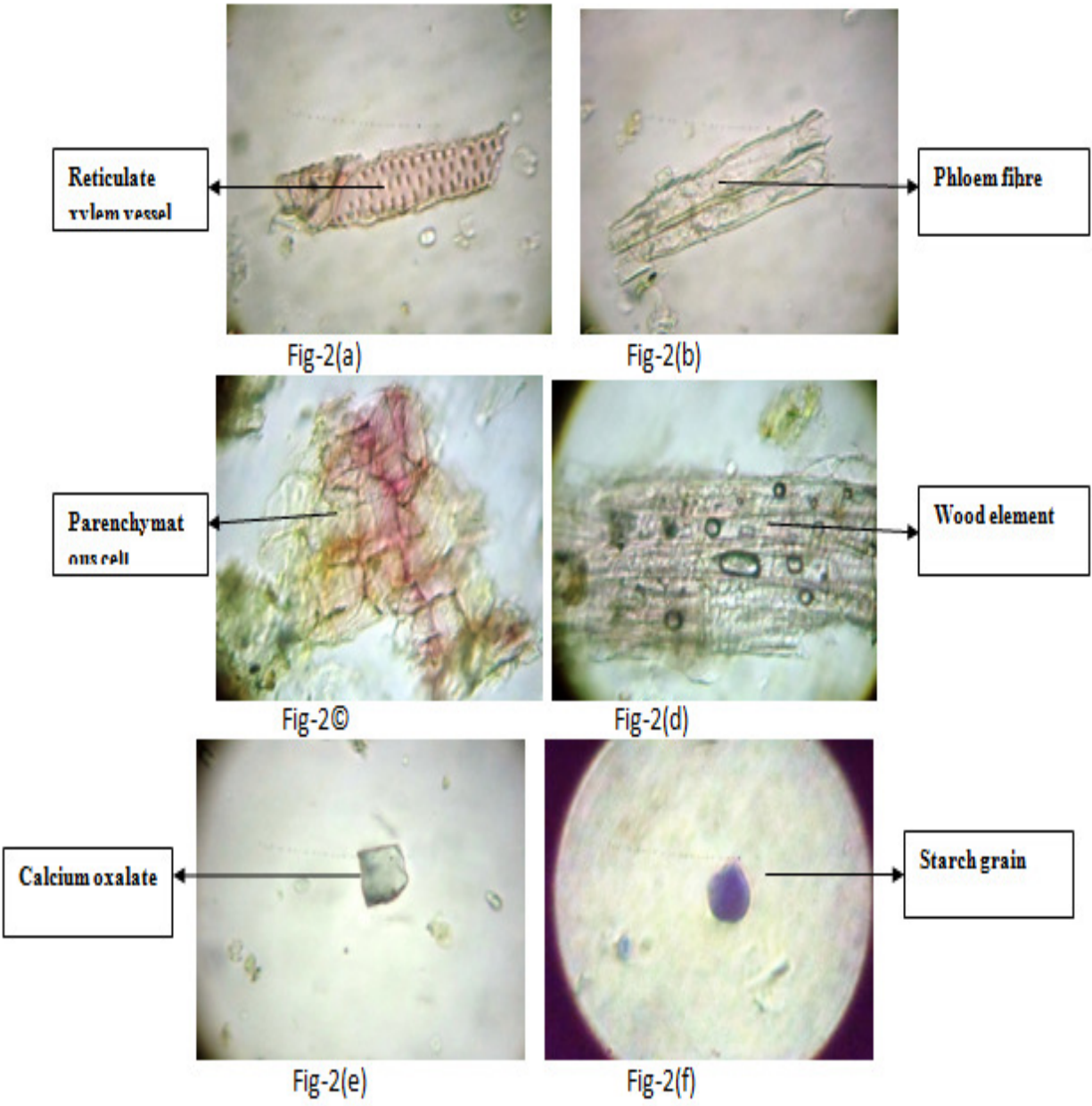


Fig-1(b)

Starch grain are abundant, both simple and compound and each measures between 13.46 & 26.92 microns in diameter. Phloem fibres occurs 25 behavior 25e in groups of 3 to 5. Calcium oxalate crystals are present in the form of prisms, scattered all over in the powder. Wood element- Abundant fragments of xylem fibres. Vessels are reticulate xylem vessels. The above results are shown in **Fig-2(a,b,c,d,e and f)**. The lenth of phloem fibre are found to be 123.345 μ & the diameter of starch grain are found to be 67.26 μ .

Powder microscopy



positive tests for starch, tannin, polyphenol, lignin, steroid and alkaloid. (Table-2).

Histochemical tests

Transverse sections root of *Cassia tora* were treated with routinely used chemicals and reagents, gave

Table-2 Histochemical test of *Cassia tora* root

SL.No	Reagent	Test for	Inference
1	Section + Iodine solution	Starch	+
2	Section + IKI	Starch	+
3	Section + Sudan Red	Oil globules	-
4	Section + Ferric chloride	Tannin/Phenol	-
5	Section + Lugol's iodine	Tannin	+
6	Section + Toluidine blue	Polyphenol	+
7	Section + Phloroglucinol & HCL	Lignins	+
8	Section + Liberman	Steroid	+
9	Section + 5% KOH	Flavonoid	-
10	Section + Dragendorff's reagent	Alkaloid	+

+ Present, - Absent

Physico-chemical analysis.

Ash values

The total ash, water soluble ash, acid insoluble ash and sulphated ash of *Cassia tora* root were found to be 5.4 w/w, 2.85 w/w, 1.9 w/w, 8.2 w/w. The total ash of *Cassia tora* root was found to be more than water

soluble ash and acid insoluble ash. Sulphated ash was found to be more than total ash and water soluble ash. Acid insoluble ash was found to be less as compared to other ash values (Table-3). Ash value is a measure of the quality and purity of the drug.

Table-3 Physicochemical analysis of *Cassia tora* root

Extractive value in percentage (w/w)	Petroleum ether	1.28 w/w
	Chloroform	1.52 w/w
	Ethyl acetate	1.12 w/w
	Methanol	4.62 w/w
Ash value in percentage(w/w)	Total ash	5.4 w/w
	Water soluble ash	2.85 w/w
	Acid insoluble ash	1.9 w/w
	Sulphated ash	8.2 w/w
Loss on drying in percentage(w/w)		12.9w/w

w/w- weight/weight

Total extractive values

The petroleum ether, chloroform, ethyl acetate and methanol extractive values of root of *Cassia tora* were found to be 1.28 w/w, 1.52 w/w, 1.12 w/w, & 4.62 w/w. The root showed more amounts of methanol soluble components than petroleum ether, chloroform & ethylacetate extracts (**Table-3**). The extractive values were determined to find out the amount of soluble compounds.

Loss on drying

Table-4 Behaviour of *Cassia tora* root powder with different chemical reagents

SL.No	Acid/Reagent	Observation
1	Powder as such	Light brown
2	Powder + Picric acid	Yellowish brown
3	Powder + Con.Nitric acid	Reddish brown
4	Powder + Con.HCL	Light yellow
5	Powder + Con.H ₂ SO ₄	Deep violet
6	Powder + Glacial acetic acid	Light yellow
7	Powder + 5% FeCl ₃	Light yellow
8	Powder + NaOH(5N)	Yellowish brown
9	Powder + KOH (5%)	Light brown
10	Powder + Iodine/20	Yellowish brown

Fluorescence analysis

Fluorescence analysis of entire root have been carried out in daylight and under U.V light. The powders were

Table-5 Fluorescence analysis of *Cassia tora* root powder.

SL.No	Reagent	Day light	Short wave
1	Powder as such	Brown	Brown
2	Powder + 1N NaOH in methanol	Brown	Black
3	Powder + 1N NaOH	Black	Black
4	Powder + Ethanol	Brownish green	Brown
5	Powder + HNO ₃ +NH ₃ solution	Light yellow	Green
6	Powder + 50%HNO ₃	Brown	Black
7	Powder + 1N HCL	Yellowish brown	Green
8	Powder + HCL	Brown	Green
9	Powder + H ₂ SO ₄	Brown	Dark green
10	Powder + 50% H ₂ SO ₄	Brown	Dark green
11	Powder + Glacial acetic acid	Brown	Green
12	Powder + HNO ₃	Dark brown	Dark green

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The moisture content of root was found to be 12.9 w/w. (**Table-3**).

Behaviour of powdered materials towards some chemical reagents

The behavior of the powdered root were treated with Picric acid, conc.sulphuric acid, con.hydrochloric acid, con.nitric acid, glacial acetic acid, 5% ferric chloride, sodium hydroxide (5N), potassium hydroxide (5%), Iodine/20 solution were observed and the results are present in (**Table-4**).

treated with different organic solvents and solutions were again observed in normal daylight and under U.V. light and the observations are pooled in (**Table-5**)

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