

Research Article

Phytochemical Investigation and in Vitro Evaluation of Anthelmintic Activity of *Cassia tora* Linn.

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ABSTRACT

The importance of medicinal plants in traditional health care practices, providing clues to new areas of drug research and biodiversity conservation is now well recognized. *Cassia tora* L. belonging to Family Leguminosae, commonly known as Chakramardha, is a wild crop and grown in most parts of India as a weed. It is an annual foetide herb, 30-90 cm high. Leaves are pinnate, up to 10 cm long rachis grooved, conical gland between each of two lowest pairs of leaflet, leaflets in 3 pairs, opposite, abovate, oblong and base ablique. It grown in dry soil throughout tropical parts of India. According to Ayurveda the leaves are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiogenic and expectorant. The present study gives an account on its pharmacognostical profile and its anthelmintic potential. This research paper presents microscopic characters, physicochemical evaluation, element detection, extractive values, and fluorescent analysis. The preliminary phytochemical screenings of various extracts was performed to establish the pharmacognostic profile of the leaves. The anthelmintic effect of petroleum ether extract of against worms like *Pheritima posthuma* by Ghosh et. al. method. It shows the very good anthelmintic activity which was comparable with standard Piperazine citrate.

Keywords: *Cassia tora* L., Pharmacognostic profile, Anthelmintic activity.

INTRODUCTION



Cassia Tora L., (Syn: *Cassia obtusifolia* L.), of Family, Leguminosae, is a wild crop and grown in most parts of India as a weed. Traditionally, It is used as tonic, carminative and stimulant. Its leaves, seeds, and roots are used medicinally, primarily in Asia^[1,2]. According to Ayurveda the leaves are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiogenic and expectorant^[3,4]. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders. According to Chinese Materia Medica^[5,6] it promotes blood circulation, and its cold nature makes it effective in the treatment of heat syndromes.^[7]

MATERIAL AND METHODS

Plant material: The plant *Cassia tora* Linn. Were purchased from the "Maui high-tech Nursery" at post:-

kalamb; Tal:-Ambegaon; Dist:-Pune, India and authenticated by Dr.S.S.Rahangdale, professor, Botany department, Hon. Balasaheb Jadhav arts, commerce and science college, Ale, Pune, India.

Drugs and chemicals: The drug, Piperazine citrate was used as a standard and it was procured from Glaxo Smith Kline Pharmaceuticals Limited, Bangalore. All organic solvents were procured from CDH Pvt. Ltd., New Delhi and were of analytical grade.

Animals; Indian adult earthworms (*pheritima posthuma*) were used for the study. The earthworm were obtained from Mali training center, Narayangaon, Pune, India.

Microscopic examination: Microscopic characters of drug were read with standard literature. They were studied and examined by using standard method^[8].

Fluorescence analysis: The colour changes of the powdered leaves with respect to different chemical reagents on the basis of different chemical constituents were observed in day and ultraviolet light.^{[9], [10], [11]}.

Physicochemical evaluation: Physico-chemical parameters such as the total ash, acid insoluble ash and water soluble ash were determined as per reported methods.^{[12], [13]} considering the diversity of chemical nature and properties of contents of drugs, five different solvents were used for determination of extractive values as per reported methods^{[8], [14], [15]}

Preparation of extract: The freshly collected leaves were washed with running tap water and shade dried at room

temperature. The dried leaves were grounded in a mixer to get a coarse powder of 60 mesh size. About 500 gm of

Phytochemical screening: The dried and powdered leaves was subjected obtained with each solvent were subjected to various

Fig no: 1 Transverse section of leaf

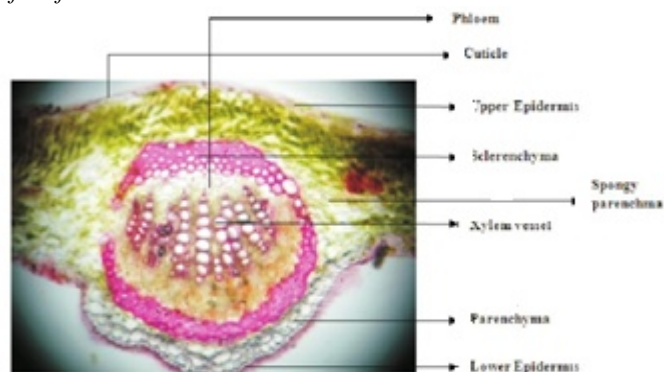


Fig no:2 Powder drug characteristic of leaf

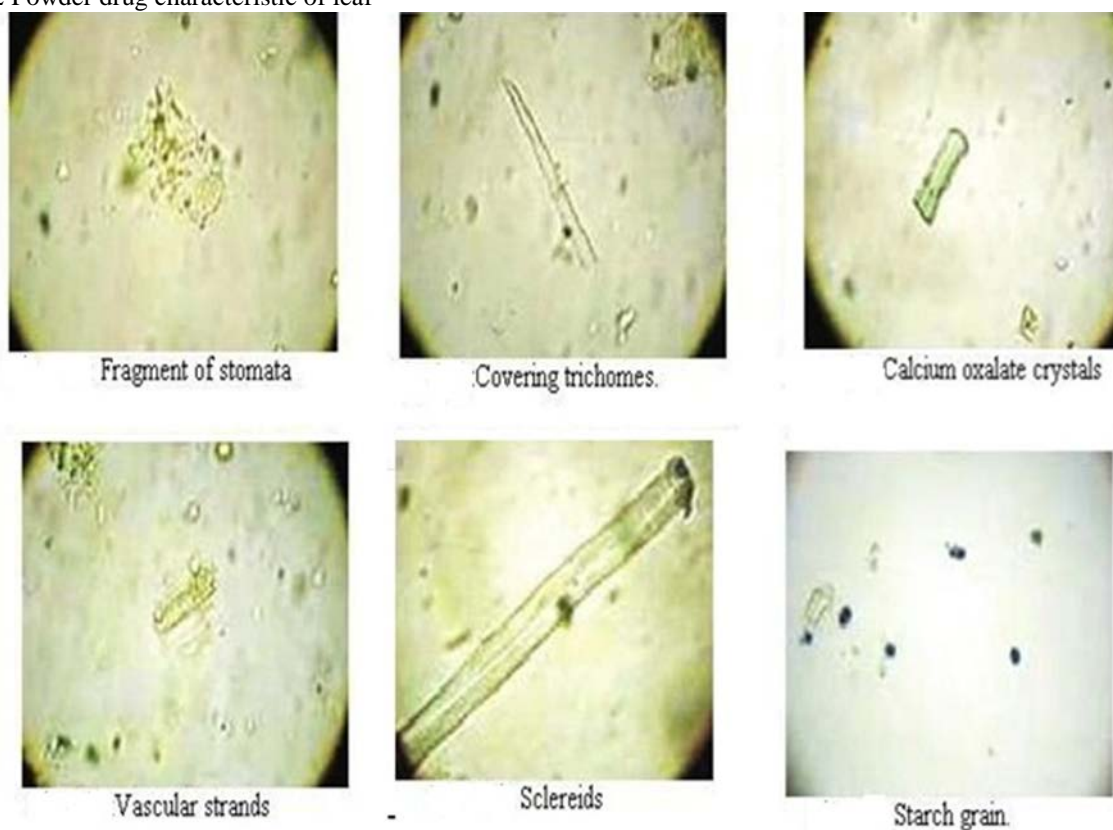


Table No.1 Quantitative microscopy study of leaves of *Cassia tora* Linn.

Sr. No.	Parameter	Range	Mean
1.	No. of stomata	30-40/sq.mm	35/sq.mm
2.	Stomatal index	51.66 μ	
3.	Vein-islet no.	20-30/sq.mm	25/sq.mm
4.	Vein-termination no.	50-90/sq.mm	70/sq.mm
5.	No. of palisade cell	11-27	19
6.	Diameter of starch grain	13.46-26.92 μ 20.19 μ	

(μ - micron; sq.mm-per square millimeter)

the crude drug powder was subjected for Soxhlet extraction by using different solvents ranging from non-polar to polar solvents.

qualitative phytochemical tests for the identification of chemical constituents & element present in the plant material. [8], [15], [16]

Anthelmintic activity: The anthelmintic activity of Pet.ether extracts of against worms like *Pheritima*

wavelengths in UV, which can be the identifying character of the plant *Cassia tora* Linn. The fluorescence

Table No.2: Fluorescence analysis of the powder leaves of *Cassia tora* Linn.

Reagent	Day Light	Short Wavelength	Long Wavelength
Powder as such	Light green	Green	Green
Powder + 1N NaOH in methanol	Green	Green	Light Green
Powder + 1N NaOH	Light Green	Green	Dark green
Powder + Ethanol	Green	Green	Dark green
Powder + HNO ₃ +NH ₃ solution	Dark green	Dark green	Brown
Powder + 50%HNO ₃	Brown	Black	Black
Powder + 1N HCL	Light green	Green	Green
Powder + HCL	Light green	Green	Green
Powder + H ₂ SO ₄	Green	Green	Green
Powder + 50% H ₂ SO ₄	Green	Green	Green
Powder + Glacial acetic acid	Green	Dark green	Green
Powder + HNO ₃	Brown	Green	Brown

Table no.3 Physicochemical evaluation of *Cassia tora* Linn.

Extractive value in Percentage	
Petroleum ether	1 .68 w/w
Chloroform	2 .36 w/w
Ethyl acetate	2 .26 w/w
Methanol	10.78 w/w
Water	14.35w/w
<i>Ash value in percentage</i>	
Total ash	1 2.5 w/w
Water soluble ash	6 w/w
Acid insoluble ash	1 w/w
Sulphated ash	2.5 w/w.
Loss on drying	5 .15 w/w

posthuma by Ghosh et.al method with minor modifications. The assay was performed on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings [17, 18, 19, 20, 21]

Eighteen groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 100 ml of desired formulation. Three groups were prepared as control i.e distilled water, Standard i.e Piperazine citrate (10mg/ml) and Test i.e extracts (25, 50,100mg/ml).Observations were made for the time taken to paralyse or death of individual worms.

Paralysis was said to occur when the worms do not receive even in normal saline. Death was concluded when the worms lose their motility followed with fading away of their body colour.

RESULT AND DISCUSSION

Microscopic examination: The microscopic studies can be done for the identification of the particular drug. The microscopic characters were found to be matching with the description given in the standard books. Hence their identity was confirmed. The results are shown in Fig no: 1 & 2, and Table no: 1.

Fluorescence analysis: The fluorescence analysis also represented the behavioral changes of the powder leaves extracts with different chemical reagents in different

characteristics of the powder when treated with various chemical reagents have been extensively studied in different wavelengths (254nm&366nm), which was sets the standard parameter for authentication. The results are shown in Table no: 2

Physicochemical evaluation: The physicochemical characters like extractive values and LOD were assessed and find out the percentage. Ash values showed the inorganic Calcium, Magnesium, Potassium, sulphate, Iron, silicates, carbonates, phosphate & chloride present in leaves of *Cassia tora* L. and acid insoluble ash values, water soluble ash shows the inorganic elements that were soluble in acid and water respectively. Sulphated ash was found out and this is useful to find out free metals present in the drug with sulphated form. The high percentage of water soluble residue in the ash of *Cassia tora* L. was evaluated and the results are depicted in Table no.3 &4.

Phytochemical evaluation: The preliminary phytochemical screening shows the presence the phytoconstituents like Steroids,Flavanoids,Glycosides, Alkaloids, Carbohydrates,Tannins , Protein and Saponins and the absence of Fixed oil,Triterpens and Coumarins in different extract. The results are depicted in Table no.5.

Anthelmintic activity: The anthelmintic activity of Pet.ether extracts of against worms like *Pheritima posthuma* by Ghosh et.al method. It showed that *Cassia tora linn.* leaves demonstrated paralysis as well as death

Table no. 4 Elemental evaluation of *Cassia tora* Linn.

Sr.no	Test	Observation	Inference
1	For calcium	White ppt.	Present
2	For magnesium	White crystalline ppt.	Present
3	For potassium	Yellow ppt.	Present
4	For iron	Blue colour	Present
5	For sulphate	White ppt.	Present
6	For phosphate	Yellow crystalline ppt.	Present
7	For chloride	White ppt.	Present
8	For carbonate	White ppt.	Present

Table No.5: Phytochemical evaluation of leaves *Cassia tora* Linn.

Plant constituent	Pet ether	Chloroform	Ethyl acetate	Methanol	Water
Steroids	+	+	+	+	+
Flavonoids	+	+	+	+	+
Alkaloids	+	+	+	+	+
Carbohydrates	+	+	+	+	+
Proteins	+	-	-	+	+
Tannins	+	+	+	+	+
Glycosides	+	+	+	+	+
Saponins	-	-	-	-	+
Triterpenes	-	-	-	-	+
Fixed oil	-	-	-	-	-
Coumarins	-	-	-	-	-

+ Present - Absent

Table No.6 Anthelmintic activity of leaves of *Cassia tora* Linn.

Plant Extract	Conc(mg/ml)	Time taken for paralysis(min)	Time taken for death of worms(min)
PE	25	46±2.4	81.9±13.8
	50	33±1.8	78.20±2.9
	100	22.16±1.3	60±10.6
PC	10	24.42±1.3	66.23±5.9

(PE-Petroleum Ether, PC-Piperazine Citrate)

of worms in a less time as compared to piperazine citrate especially at higher concentration of 100 mg/ml. The result shows that Pet. ether extracts have potent anthelmintic activity. Which is shown in Table no: 6.

CONCLUSION

The present study on pharmacognostical characters of *Cassia tora* L may be useful to supplement information in regard to its identification and can be an authenticate parameter of standardization. This study also concluded that leaves extract have great potential as anthelmintic against worms and that they can be used in the treatment of various infectious diseases caused by resistant worms.

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