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EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF *CASSIA TORA* EXTRACT BY *IN VITRO* METHODS

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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 Leguminoseae, 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, obovate, 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, cardiotonic and expectorant.The present study gives an account on its pharmacognostical profile and its anthelmintic potential.

INTRODUCTION

The use and search of drugs and dietary supplements from plants have been intensified in recent year. Medicinal plants are a source of great economic value in the Indian sub-continent. *Cassia Tora* L., (Syn: Cassia obtusifiolia L.), of Family, Leguminose, 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. According to Ayurveda the leaves are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardio tonic and expectorant. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders. According to Chinese Materia Medica. It promotes blood circulation, and its cold nature makes it effective in the treatment of heat syndromes.

Cassia tora is a dicot legume known as sickle senna, sickle pod, tora, coffee pod, tovara, chakvad and foetid cassia. The plant can grow 30-90 centimeters high and consists of alternative pinnate leaves with leaflets mostly with three opposite pairs that are obviate in shape with a rounded tip. The leaves grow up to 3-4.5 centimeters long. The cassia tora is also known as Charota an Chakvad in Hindi, Chakunda in Bengali & Oriya, Kawaria in Gujarati, Chakramandrakam in Malayalam, Takala in Marathi, Chakramarda&Dadmari in Sanskrit, Tagarai in Tamil and Chinnakasinda in Telugu. The chemical constituent of cassia tora is (+)- rhein, aloe-emodin, chrysophanol, 7% resins, cathatrine, calcium, iron, phosphorus, 1,3,5-trihydroxy-6-7-dimethoxy-2-methylanthroquinone, beta-sitosterol, naptho-alpha-pyrone-toralactune, chrysophanol, physcion, emodin, rubrofusarin, cchrysophonic acid-9-anthrone, tricontan-1-0l, stigmasterol, b-sitosteral-b-D-glucoside, freindlen, palmitic, stearic, succinic and d-tartaric acids uridine, quercitrin, isoquercitrin.

Botanical Name(s): Cassia Tora

FamilyName: Caesulpinaceae

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Rosidae

Order: Fabales

Family: Fabaceae

Subfamily: Caesalpinioideae

Tribe: Cassieae

Sub-tribe: Cassiinae

Genus: Cassia

Species: S. tora

Popular Name(s): Foetid Cassia, Tora, Sickle Senna, Wild Senna, Sickle Pod, Coffee Pod, Tovara, Chakvad, Ringworm Plant

Parts Used: Leaves, seeds, roots

MATERIALS AND METHODS

Cassia tora, ethanol, egg albumin, phosphate buffer (pH 6.8),In vitro anti-inflammatory activity (protein denaturation method).

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

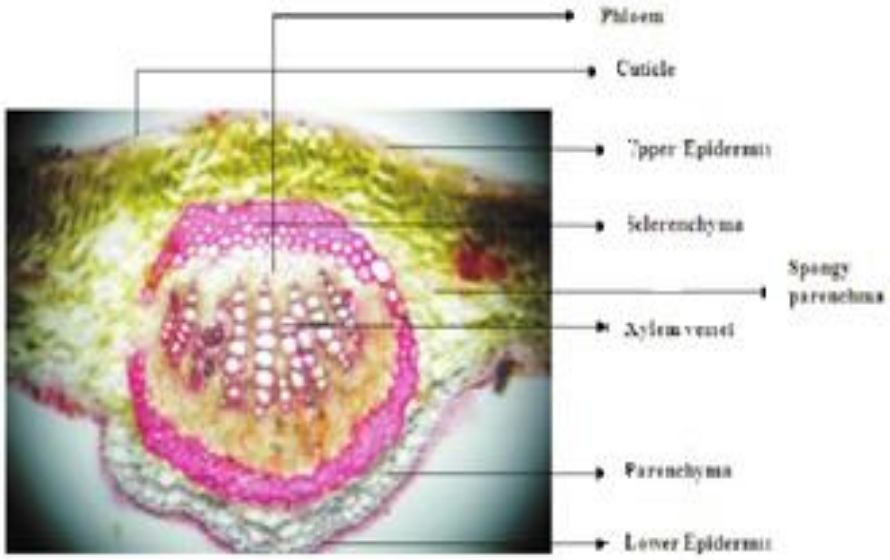

Fig. no 1 Transverse section of leaf

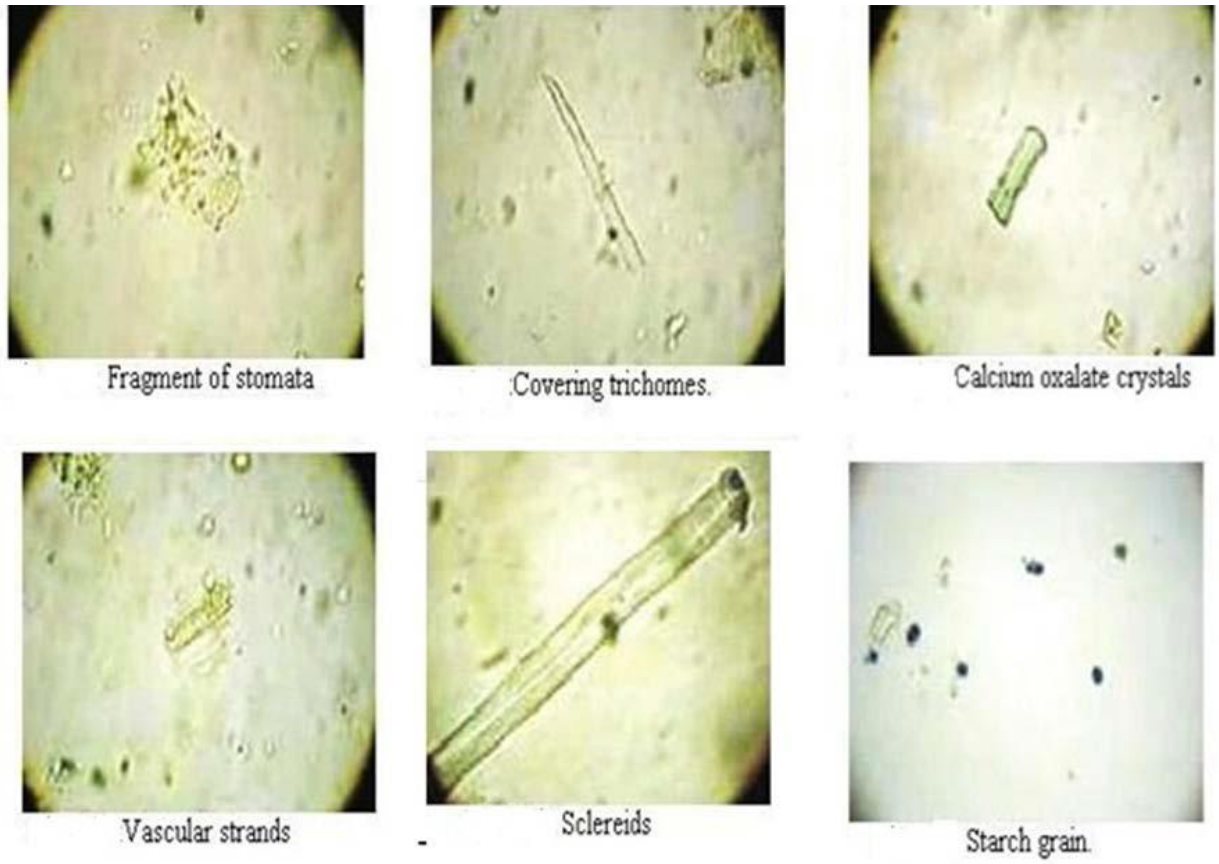

Fig no : 2 Powder drug characteristic of leaf

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

Sr. no	Parameter	Range
1	No. of stomata	30-40/sq.mm
2	Stomatal index	51.66 µ
3	Vein-islet no.	20-30/sq.mm
4	Vein-termination no.	50-90/sq.mm
5	No. of palisade cell	11-27
6	Diameter of starch grain	13.46-26.92µ20.19µ

Table no.2 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
Ash value in percentage	
Total ash	12.5 w/w
Water soluble ash	6 w/w
Acid insoluble ash	1 w/w
Sulphated ash	2.5 w/w.

PHYTOCHEMICAL EVALUATION

Table No.3: Phytochemical evaluation of leaves *Cassia tora* Linn.

Plant constituent	Ethanol: water (80:20)
Steroids	+
Flavonoids	+
Alkaloids	+
Carbohydrates	+
Proteins	+
Tannins	+
Glycosides	-
Saponins	-
Triterpenes	-
Triterpenes	-

Preparation of extract

All the crude drugs were powdered and then extracted using continuous hot extraction by using Soxhlet extraction method and the solvent used for the extraction was hydro alcoholic solvent ethanol: water in 80:20 proportions.

Fig. No. 3 Soxhlet apparatus

***In vitro* Anti-inflammatory screening**

Materials and Methods

- Control — Distilled Water
- Standard — Diclofenac sodium (50 µg/ml)
- Test compound — 50 µg/ml, 100 µg/ml,200µg/ml
- Instrument used — UV spectrophotometer.

Method:

Evaluation of in vitro anti-inflammatory activity by protein denaturation Method.

The mixture (10ml) consisted of 0.4ml of egg albumin (from fresh hens egg), 5.6ml of phosphate buffered solution (PBS, pH 6.4) and 4ml of varying concentration of test samples so that final concentration become 50 µg/ml ,100 µg/ml, 200µg/ml. Similar volume of distilled water served as control. Then the mixtures were incubated at (37^0c ± 2) for 15 min. and then heated at 70°c for 5min. After cooling, their absorbance was measured at 660nm (JASCO UV Spectrophotometer) by using vehicle as blank and their viscosity was determined by using Ostwald viscometer. Diclofenac sodium at the final concentration of 50 µg/ml, 100 µg/ml, 200µg/ml was used as reference drug and treated similarly for determination of absorbance. The % inhibition of protein denaturation was calculated by using the following formula,

% Inhibition of protein denaturation= absorbance of control - absorbance of test/abs of control × 100

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.

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.2

Phytochemical evaluation: The preliminary phytochemical screening shows the presence the phytoconstituents like Steroids, Flavanoids, Alkaloids, Carbohydrates, Tannins , Protein and Saponins and the absence of Fixed oil,Triterpens and in different extract. The results are depicted in Table no.3.

In vitro anti-inflammatory activity (protein denaturation method):

Table No. 4 % inhibition of protein denaturation

Concentration (µg/ml)	**% Inhibition of protein denaturation**	
	Diclofenac Sodium	*Cassia tora*
50	73.86	38.46
100	84.06	45.11
150	86.71	82.48

CONCLUSION

Cassia tora is one of the most important sources of medicinally important widely used in Ayurvedic as well as Chinese system of medicine. Most of the scientific works have been conducted on the seeds although activities of leaf extract are also reported. This study also concluded that extract have great potential for the anti-inflammatory activity.

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