



*Short Communication*

## A report on anthelmintic activity of *Cassia tora* leaves

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### Abstract

Methanolic extract and its ethyl acetate fraction of *Cassia tora* L. leaves were evaluated for anthelmintic property using the Indian adult earthworm (*Pheretima posthuma*) as a model. Among the earthworms the ethyl acetate fraction was potent. The results were compared with a standard drug, albendazole. The phytochemical analysis of both extracts showed the presence of phenolics like flavonoids and tannins as well as anthraquinones, which may be the active principle. The present study confirms the ethno-medicinal report of the plant as an anthelmintic drug.

**Key words:** anthelmintic property, *Cassia tora*, earthworm model

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### 1. Introduction

Intestinal parasitic infections are one of the main health problems, especially in developing countries, and particularly in children. Inadequate sanitation and poor hygiene may be the main reason behind it (Chan, 1997). Drug resistance and side effects of synthetic drugs have drawn the focus of modern research towards natural remedies, mainly based on medicinal properties of the plants. *Cassia tora* L., a seasonal weed, belongs to the *Leguminosae* family, traditionally reported to have medicinal properties, like laxative, anti-periodic, anthelmintic, ophthalmic, and effective for leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders, etc (Nadkarni, 1985; Chatterjee and Pakrashi, 1992). The leaf juice of other species of *Cassia*, like *C. alata*, *C. occidentalis* and *C. sophera* are known to be effective against ringworm (Uphof, 1968). Hence, the present study was undertaken to evaluate the anthelmintic property of *Cassia tora* leaves.

### 2. Materials and Methods

#### 2.1 Plant material

Leaves of *C. tora* were collected from the Sagar University campus and got authenticated by the Botany Department (Voucher specimen number: Bot/Her/3427G).

#### 2.2 Drugs and chemicals

The following drugs and chemicals were used, albendazole (gift from Unijules, Nagpur), sodium chloride (HIMEDIA), methanol (Qualigens), dimethyl formamide (DMF), and ethyl acetate (MERCK).

#### 2.3 Preparation of extracts

Dried and coarsely powdered leaves were extracted with a soxhlet apparatus. *Cassia tora* leaves were first extracted with 80% methanol, half portion of which is evaporated, dried and used as crude methanolic extract, while the remaining half portion is concentrated and again extracted with ethyl acetate. This fraction is also evaporated, dried and used as an ethyl acetate extract.

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## 2.4 Preliminary phytochemical screening

Various phytochemical tests were carried out on the *C. tora* leaf extracts to detect the presence or absences of carbohydrates, tannins, glycosides, terpenes, steroids, and other compounds (Evans, 1999).

## 2.5 Test organism

Indian adult earthworms (*Pheretima posthuma*) collected from moist soil of the botanical garden were washed with normal saline and used for the anthelmintic study. The earthworms (4-6 cm in length and 0.1-0.2 cm in width) were used for all the experimental protocols due to their anatomical and physiological resemblance with the intestinal roundworm parasites of human beings (Nirmal *et al.*, 2007).

## 2.6 Anthelmintic bioassays

The anthelmintic study was carried following Ajayieoba *et al.* (2001). Both methanolic extract and its ethyl acetate fraction were dissolved in normal saline containing 5% DMF and diluted to get concentrations of 10, 25, and 50 mg/ml. Albendazole (20 mg/ml) was used as the standard drug. All drug and extract solutions were freshly prepared before starting the experiment. Eight groups, with six earthworms each, were placed into 10 ml of desired formulations as following: vehicle (normal saline containing 5%DMF), albendazole (20 mg/ml), and two sets of three different groups were treated with extracts of respective concentrations.

Observations were made for the time taken until the paralysis and death of an individual worm. The paralysis was said to occur when the worms were not able to move even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colors (Girme *et al.*, 2006).

## 3. Results and Discussion

The results of the current investigation indicate that among the extracts of *C. tora*, the ethyl acetate fraction is the

most potent one and requires less time to the paralysis and death of the worms as compared to the methanolic extract. Both extracts showed a concentration depended anthelmintic property (Table 1). The preliminary phytochemical analysis of the extracts has shown the presence of phenolics, like tannins and flavonoids as well as anthraquinones. The function of the anthelmintic drugs, like albendazole, is known to cause paralysis of the worms so that they are expelled in the faeces of man and animals. The extracts not only demonstrated this property, but they also caused death of the worms.

Synthetic phenolic anthelmintics, like niclosamide, interfere with the energy generation in the helminth parasites by uncoupling the oxidative phosphorylation (Martin, 1997). Another possible mechanism of action is that they bind to free proteins in the gastrointestinal tract of the host animal or to glycoprotein on the cuticle of the parasite and by this cause death. Tannins have also been shown to produce anthelmintic activities (Athnasiadou *et al.*, 2001). There are reports for anthelmintic property of phenolics present in different plant extracts like *Baliospermum montanum* Muell. roots (Mali and Wadekar, 2008).

In conclusion, the traditional claim of leaf of *C. tora* as an anthelmintic have been confirmed as the extracts displayed activity against the worms used in the study. Further studies are required to isolate and reveal the active compound contained in the crude extracts of *C. tora* and to establish the mechanism of action.

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Table 1. Anthelmintic activity of extracts of *Cassia tora* leaves

Extract	Concentration (mg/ml)	Time required to paralyze(min)	Time required to death(min)
Vehicle Control	-	-	-
MethanolicExtract	10	48±2.09	56±1.97
	25	28±1.28	34±0.96
	50	10±1.64	16±1.04
Ethyl acetatefraction	10	24±1.73	29±1.07
	25	16±1.89	21±1.02
	50	7±1.01	11±0.99
Albendazole	20	6±1.02	10±1.16

All the values are expressed as mean ± SEM, N=6.

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