

Comparative *In vitro* Anthelmintic Activity of *Mentha piperita* and *Cassia tora*

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ABSTRACT: Helminthiasis is the most common cause of the intestinal infestation. Anthelmintic from natural sources may play a key role in the treatment of parasitic infestation. Methanol extracts from the leaves of *Mentha piperita* and *Cassia tora* were investigated for their anthelmintic activity against *Pheritima posthuma*. Each extract was studied in the bioassay a 30 mg/ml, which involved determination of time of paralysis and time of death of the worms. The methanol extracts of leaves of both *M. piperita* and *Cassia tora* were found to be the most active.

Key words: *Mentha piperita*, *Cassia tora*, *Pheritima posthuma*, *In vitro* anthelmintic activity.

INTRODUCTION

Mentha piperita is a popular herb tonic worldwide. It is generally used as a flavouring agent. It has been a popular home remedy for digestive ailments for two centuries in India. It is a perennial, glabrous, strong scented herb from the family Menispermaceae. The volatile oil obtained from this plant, known as mint or peppermint oil, is used as antiseptic, stimulant, carminative and for allaying nausea and vomiting and also has got commercial value.¹ The major components of this oil are menthofuran,²⁻³ menthol, menthyl acetate, neomenthol, menthone and isomenthone.⁴ The plant has been used for anti-nociceptive, anti-inflammatory,⁵ antimicrobial and antioxidant activities.⁶ The flavonoids namely eriocitrin, narirutin, hesperidin, luteolin-7-O-rutinoside, isorhoifolin, diosmin, rosmarinic acid, and 5, 7-dihydroxycycromone-7-O-

or glycoprotein on the cuticle of the parasite and cause rutinoid isolated from the plant showed antiallergic effects.² Menthone is also a major constituent of the plant. *Cassia Tora* L., Caesalpinaceae, is a wild crop and grows in most parts of India as a weed. According to Ayurveda the leaves and seeds are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiogenic and expectorant. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders.^{8,9} An ethanolic extract of seeds was evaluated by Patil et al. for its hypolipidemic activity on triton induced hyperlipidemic profile¹⁰. Some synthetic phenolic anthelmintics e.g. niclosamide, oxiclozanide and bithionol are shown to interfere with energy generation in helminth parasites by uncoupling oxidative phosphorylation¹¹. Another possible anthelmintic effect of tannins is that they can bind to free protein in the gastrointestinal tract of host animal

death¹²

MATERIALS AND METHODS

Plant materials:

The *Mentha piperita* and *Cassia tora* Plant leaves are collected freshly botanical garden of Dattakala college of Pharmacy, Swami chincholi bhigwan Pune india. The leaves were air-dried and grinded to fine powder.

Preparation of extracts:

The Mentholic extraction process, The *Mentha piperita* and *Cassia tora* leaves powder 50gm of fine leaves powder was macerated with 250 ml methanol for 5 days at room temperature. The mixture was filtered using Whatmann No. 1 filter paper. The filtrate extracts was first dried in hot air oven at room temperature (25°C) and cooled. The *mentha piperita* and *cassia tora* powder were reconstitute in saline water for each experiment.

Animals:

India adult earthworms, which were collected from moist soil of swami-Chincholi and washed with normal saline to remove all fecal matter, were used for anthelmintic study. The earthworms (*Pheretima posthuma*) of 3–5 cm in length and 0.1–0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings.

Drugs and chemicals:

The following drugs and chemicals were used. Chemicals: Methanol, DMF, Saline water. Preliminary phytochemical screening:

Various phytochemical tests were carried out on the *Mentha piperita* and *Cassia tora* leaf extracts to

detect the presence or absences of carbohydrates, tannins, glycosides, terpenes, steroids, and other compounds¹³

Anthelmintic activity:

The anthelmintic study was carried following¹⁴. Both methanolic extract of *Mentha piperita* and *Cassia tora* were dissolved in normal saline containing 5% DMF and diluted to get concentrations of 20, 30 and 50 mg/ml. All drug and extract solutions were freshly prepared before starting the experiment. Two groups, with three earthworms each group, were placed into 30 ml of desired formulations as following: vehicle (normal saline containing 5% DMF) 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 colors¹⁵.

RESULTS:

The results of the current investigation indicate that among the menthanolic extracts of *Mentha piperita* and *Cassia tora*, the methanolic extracts *Mentha piperita* is the most potent one and requires less time to the paralysis and death of the worms as compared to the methanolic extract *Cassia tora*. Both extracts showed a concentration depended anthelmintic property (Table 1).

Table 1. *In vitro* anthelmintic activity of various extractives of *M. piperita* and *C.tora* at 30 mg/ml.

Treatment	Conc. (mg/ml)	Time of paralysis (min)	Time of death (min)
1 Mentha piperita L	20	8±1.48	25±2.40
2 Mentha piperita L	30	6±2.50	18±1.40
3 Mentha piperita L	50	4±1.04	10±1.06
4 Cassia tora L	20	22±2.50	55±1.56
5 Cassia tora L	30	14±1.54	32±2.50
6 Cassia tora L	50	7±1.76	15±2.04

Results are expressed as Mean \pm SEM from eight observations

The preliminary phytochemical analysis of the extracts has shown the presence of phenolics, like tannins and flavonoids as well as anthraquinones. The functions of the anthelmintic drugs, like a DMF, 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 phosphorylation¹⁶. 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 activities¹⁷. There are reports for anthelmintic property of phenolics present in different plant extracts like *Baliospermum montanum* Muell. roots¹⁸.

Discussion and conclusion:

The methanolic extracts of *Mentha piperita* is the more potent and requires less time to the paralysis and death of the worms as compared to the methanolic extract of *Cassia tora*. In conclusion, the traditional claim of leaf of *M.piperita* and *C.tora* as an anthelmintic have been confirmed as the extracts displayed activity against the worms used in the study

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