

Comparative Studies of Anthelmintic Activity of *Zingiber officinale* and *Cassia tora*

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ABSTRACT

Aqueous extracts from the seeds of Charota (*Cassia tora*) and rhizome of Ginger (*Zingiber officinale*) are investigated for their anthelmintic activity against the earthworm *Pheretima posthuma*. Three concentration (25, 50 and 100 mg/ml) of each extracts studies for anthelmintic activity, which involves the determination of time of paralysis and time of death of the worm. Both the extracts exhibit significant anthelmintic activity at highest concentration of 100 mg/ml. Piperazine citrate in concentration of 10 mg/ml has been used as standard reference. Determination of paralysis time and death time of the worms were recorded. Dose dependent activity was observed in both plant extracts but *Cassia tora* shows more activity as compared to *Zingiber officinale*.

Keywords: *Zingiberofficinale*, *Cassia tora*, Anthelminthic activity.

1. INTRODUCTION

Among the most widespread of all chronic infection are those caused by various species of parasitic helminths (worms). Inhabitants of tropical or subtropical, low income countries are most at risk; children often become infected with one or more species almost as soon as they are born and may remain infected throughout their lives. In some cases these infection results mainly in discomforts and does not cause substantial ill health, but others such as schistosomiasis and hookworm disease, can produce very serious morbidity. Worm infestations are also a major cause for concern in veterinary medicine, affecting domestic pets form animals.^[1-2]

One of the mechanisms responsible for antioxidant potentials of Nigella sativa oil (NSO) could be the inhibition of 5-lipoxygenase. Also, it possesses a fairly good activity against earthworms and tape worms. Recently, NSO has been found to

have antihelminthic activity same as Casia tora against human parasitic infections (*S. mansoni* and *S. haematobium*) and *Fasciola hepatica*.^[3-5] Worm infestations are more common in the developing countries; it is seen in people with poor hygiene. Anthelmintics has two properties either vermucidal which kill the worm or vermifuse which promotes expulsion of worms.^[6-7]

There are so many types of worms like pinworms, hookworms, roundworms, tapeworms and liver flukes etc. A person may infect with a worm either eating contaminated food, or drinking contaminated water.^[8] Most substances that are toxic to earthworms produce a primary irritation or agitation, which results in the withdrawal of the worm from the neighborhood of the poison. This is observed with santonin, but is no more marked with this than with other anthelmintics.^[9] Please note that many of these pharmaceuticals are extremely toxic.

Taken in improper dosages they can be dangerous to humans as well as lethal to parasites.^[10] Anthelmintics are poisonous in nature and, in improper dosages, dangerous to humans.

The present study was done with the aim to investigate the anthelmintic activity of different natural drugs such as *Zingiber officinale* and *Cassia tora*. In this experiment we performed the *in vitro* study of anthelmintic activity of natural drug and compared with the standard drug Piperazine citrate.^[11]

2. MATERIAL AND METHODS

2.1. Plant Material

Both the natural drugs i.e. Ginger (*Zingiber officinale*) and Charota (*Cassia tora*) were collected from the local market of Telibandha market, Raipur (C.G.). The collected materials were authenticated by Indira Gandhi Agriculture College, Raipur, (C.G.) India.

2.2. Worm Collection and Authentication

The earthworms adult *Pheritima posthuma* were collected from pond area of Indira Gandhi Agriculture University, Raipur, (C.G.) and washed with normal saline to remove all fecal matter were used for the anthelmintic study. The worm was authenticated by Indira Gandhi Agriculture College, Raipur, (C.G.) India.

2.3. Extraction Method

The collected material, rhizome of Ginger (*Zingiber officinale*) was washed thoroughly in water, crushed in mortar pestle and exhaustively extracted by percolation using water as solvent hot extraction process. The seeds of Charota (*Cassia tora*) were first grinded in mortar pestle and extracted from water as a solvent by percolation method. The extracts were concentrated with the help of water bath and made suitable Semi solid mass for further studies. These extracted semisolid mass further diluted with distilled water as 25, 50 and 100mg/ml concentration.

2.4. Evaluation of Anthelmintic activity

Anthelmintic activity of the plant materials was evaluated by exposing the adult *Pheritima posthuma* to different plant extracts. For each extract, three petri dishes were used i.e. two for extracts to be tested and one for normal as control. Observations were made on the basis of motility/survival of worms.

The anthelmintic activity was performed according to the method of Ghosh *et al.*^[12] on adult Indian earthworm *Pheritima posthuma* as it has anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. Eighteen groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 ml each extract of three concentration (25, 50 and 100 mg/ml) prepared in distilled water. These three concentration (25, 50 and 100 mg/ml) of each extracts studies for anthelmintic activity. Third group were prepared as control i.e. Piperazine citrate in concentration of 10 mg/ml has been used as standard reference. Observations were made on the basis of time taken for paralysis and death of individual worm. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was confirmed when the worms lost their motility followed by fading away of their body colors. Observations were made for the time taken to paralyze or death of individual worm. Death was confirmed when the worms lose their motility followed by fading away of their body colors. Results are shown in table 1.

3. RESULTS AND DISCUSSION

Piperazine citrate increasing chloride ion conductance of worm muscle membrane produces hyperpolarisation and cause a flaccid paralysis that result in expulsion of the worm by peristalsis. This action is mediated by its agonistic effects upon the inhibitory GABA (γ -aminobutyric acid)

receptor. It was selectivity for helminths is because vertebrates only use GABA in the CNS and the helminthes. Piperazine citrate reduces the worm excitability that leads to muscle relaxation and flaccid paralysis. The aqueous seed extract of *Cassia tora* demonstrated paralysis as well as death of worms in a less time as compared to Piperazine citrate especially at higher concentration of 100 mg/ml. In conclusion, the traditional use of seeds of *Cassia tora* as an anthelmintic have been confirmed as the seed extracts displayed activity against the worms used in the study. From the results, it is observed that *Cassia tora* showed potent anthelmintic activity while the *Zingiber officinale* has taken long time for death of worms. Both plants show dose dependent anthelmintic activity. *Cassia tora* has shown paralysis within 24 to 26, 18 to 20 and 16 to 18 min and death within 68, 54 and 51 min at concentration of 25, 50 and 100 mg/ml respectively, while *Zingiber officinale* has shown paralysis within 32 to 34, 28 to 31, 25 to 29 min and death within 86, 78 and 65 min at 25, 50 and 100 mg/ml respectively. Death of worm was comparable with that of Piperazine citrate which shows paralysis within 23 to 25 min death within 62 min.

Table 1: Anthelmintic Activity of *Cassia tora* and *Zingiber officinale*

Plant extracts	Conc (mg/ml)	Time taken for paralysis (min)	Time taken for death of worms (min)
<i>Cassia tora</i>	25	24.32±2.2	68.57±12.6
	50	18.09±1.6	54.33±3.1
	100	16.11±1.2	51.07±11.4
<i>Zingiber officinale</i>	25	32.65±1.6	86.5±5.3
	50	28.65±3.7	78.24±5.5
	100	25.25±4.2	65.5±12.7
Piperazine citrate	10	23.36±1.5	62±6.8

All values expressed as mean ±SD; n= 6 in each group

4. CONCLUSION

The anthelmintic activity of *Cassia tora* seed extract and *Zingiber officinale* rhizome extract have been tested against the

worms *Pheritima posthuma*. It has been seen from the Table 1 that both the extracts require higher concentration as compared to Piperazine citrate as standard drug for anthelmintic activity. Both the extracts showed a dose dependent anthelmintic activity but the seeds of *Cassia tora* shown higher activity than rhizome of *Zingiber officinale*.

5. REFERENCES

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