Evaluation of anthelmintic activity of leaf extracts of *Coriandrum sativum* in Indian earthworm

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ABSTRACT

The aim of the study was to examine the anthelmintic property of petroleum ether, chloroform, ethanol and aqueous extracts of leaves of *Coriandrum sativum L*. It is an annual herb, commonly known as Coriander. *Coriandrum sativum L* has various medicinal properties as an anti-inflammatory, antibacterial, antifungal, antioxidant, hepatoprotective, antidiabetics, and analgesic activity. The effect of *Coriandrum sativum L* was investigated for anthelmintic on adult Indian Earthworm. Three concentration 20,40,60 mg/ml of each extract were studied to investigate the time of paralysis and death time. The petroleum ether, chloroform, ethanol and aqueous extract shows does response activity and ethanolic extract showed remarkable anthelmintic activity. Albendazole 20mg/ml concentration is used as a standard drug. Thus, *Coriandrum Sativum L* possess potential anthelmintic activity.

Keywords- *Coriandrum sativum*, anthelmintic, albendazole, Indian Earthworm

INTRODUCTION

Helminthiasis is very common and major problem in many countries especially in those of the tropical and subtropical region and a huge population is infected with Helminthes .Helminthiasis, a worm infection caused by invasion of more than one macro parasitic worms.[1] Therefore, the treatment of Helminthes is very necessary and of great importance. As compared to the scientific drugs herbal drugs produce less or minimal side effects. Keeping this in view the present research work deals with evaluation and analysis of anthelmintic activity of leaves of *Coriandrum Sativum*.[1] *Coriandrum Sativum* is considered as n Indian Traditional medicine and cures several disorders of digestive, respiratory and urinary system and also has diuretic and carminative activity.[2,3,4,5,6]

Coriander has also exhibited several other pharmacological ativities such as antioxidant activity[7], anti-diabetic activity[8], antifungal activity[9], hepatoprotective activity[10], anti-ulcer activity[11], anti-protozoal activity[12], sedative activity[13], anti-mutagenic activity[14], anticonvulsant activity[15] , diuretic activity[16], anticancer activity[17] , anxiolytic activity[18] .

C. sativum is an annual, herbaceous plant with characteristic odour that grows 25 to 60 cm in height. Its roots are thin and spindle shaped, vertical stalk, alternate leaves, and small, pinkish-white flowers. A small plant have many branches and sub-branches. New leaves are oval shaped but aerial leaves are elongated. The plant begins to flower from June to July and bears round fruits consisting of two pericarps[19.] The fruits are ovate globular in shape, having longitudinal ridges on its surface. The length of this fruit is 3 to 5 mm and when dried, its colour appears to be usually brown, but it may be straw-coloured or off white[20].

Chemical composition of *Coriandrum Sativum leaf*[21.]

Component content	*Percentage*
Moisture	*87.9*
Protein	*3.30*
carbohydrates	*6.50*
Total ash	*1.70*
Calcium	*0.14*
phosphorus	*0.06*
Iron	*0.01*
Vitamin B_2	*60*
Niacin	*0.8*
Vitamin C	*0.135*
Vitamin A	10,460 I.U. (International unit)/100 g

MATERIALS AND METHODS

Plant Collection and Identification: The leaves of *Coriandrum Sativum* were collected from the local village area of Rourkela (Odisha), in the month of March 2022 and authenticated from the department of Botany, Government Autonomous College, Rourkela (Odisha).

Extract Preparation

The leaves of *Coriandrum Sativum* were washed properly and shade dried. After drying, the leaves were powdered to obtain coarse powder, which was stored in a clean dry and air tight container. Then the powdered material was subjected to extraction process. The powdered material was then subjected to Soxhlet extraction using various solvents i.e. petroleum ether, chloroform, methanol and aqueous. Extracts obtained extracts was then dried under vacuum Drier (ARKA JAIN UNIVERSITY) and the resulting dried extracts were preserved in Desiccator[22,23].

Investigation of anthelmintic activity

This study was conducted to investigate and evaluate the anthelmintic activity of petroleum ether, chloroform, ethanol and aqueous extract of leaves of *Coriandrum Sativum*.The anthelmintic activity was executed as the procedure given by Ajaiyeoba et al. with some minor modifications. The experiment was done in an adult Indian Earthworm *Pheretima posthuma* as it is easily available anatomical and physiological analogous with the intestinal roundworm parasites of human being. The earthworm were collected from the village of Mohanpur, Jharkhand with its average size of 13-15 cm. The earthworm were washed with raise tap water for the removal of dirt. For the experiment, the worms were divided into 14 groups, 2 worms in each group in a petridish. All the extracts were dissolved in dimethyl sulphoxide (DMSO) and then the volume was adjusted with saline water and kept sonicated for an hour. The standard drug Albendazole 20mg/mL, distilled Water as control and three different concentrations of petroleum ether, chloroform, ethanol and aqueous extracts of peel and root (20, 40, 60 mg/mL) in double distilled water were prepared freshly and used for the anthelmintic activity studies. The anthelmintic activity was evaluated at two different stages ‘time of paralysis’ and ‘time of death’ of the earthworms. Time for paralysis was noted when movement completely stopped and was observed, except when the worms were shaken forcibly. Death was noted when the worms almost lost their motility followed with fading away of their body

colors . Death was also confirmed by immersing the worms in slightly lukewarm water. The death of parasite occurred when all the movements of the parasite had stopped[24,25,26,27,28].

RESULT AND DISCUSSION

Anthelmintics are the drugs that expel out parasitic worms (helminthes) from the body by either causing paralysis or by directly killing them by damaging its cuticle, leading to partial digestion or rejection by immune mechanisms[29]. Albendazole attaches to the B-tubulin subunit thus inhibits microtubule polymerization. Albendazole also causes glucose utilization impairment and causes a decreases the storage of parasite's glycogen . When given at higher concentrations, albendazole inhibits parasitic metabolic pathways by supressing enzyme - malate dehydrogenase in the Kreb's cycle. A successive decrease in the level of ATP production occurs, causing energy depletion, leading to the decrease in the movement of the parasite and lastly death30.Results of the study was recorded as shown in table 1. Drugs with higher concentration produced paralytic effects much earlier and the time of death was very short for all the worms. From the above mentioned study it was found that the ethanolic extracts of the leaves of *Coriandrum sativum* showed remarkable anthelmintic activity even at low concentration (20mg/ml) out of all tested extracts as compared to that of standard drug, Albendazole (20mg/ml).

Table No – I. Anthelmintic activity of extracts and standards.

Group	Treatment	Conc. (mg/ml)	Paralysis time (min)	Death time (min)
1	Vehicle	-	-	-
2	Albendazole	20	46 ± 0.5	67 ± 0.5
3	Petroleum ether	20 40 60	21 ± 0.2 19 ± 0.3 18 ± 0.4	37 ± 0.1 36 ± 0.2 35 ± 0.3
4	Chloroform	20 40 60	17 ± 0.5 16 ± 0.3 15 ± 0.4	30 ± 0.2 29 ± 0.2 28 ± 0.3
5	Ethanol	20 40 60	13 ± 0.2 12 ± 0.6 11 ± 0.4	25 ± 0.5 24 ± 0.2 23 ± 0.1
6	Aqueous	20 40 60	14 ± 0.5 13 ± 0.2 11 ± 0.3	27 ± 0.3 26 ± 0.1 25 ± 0.5

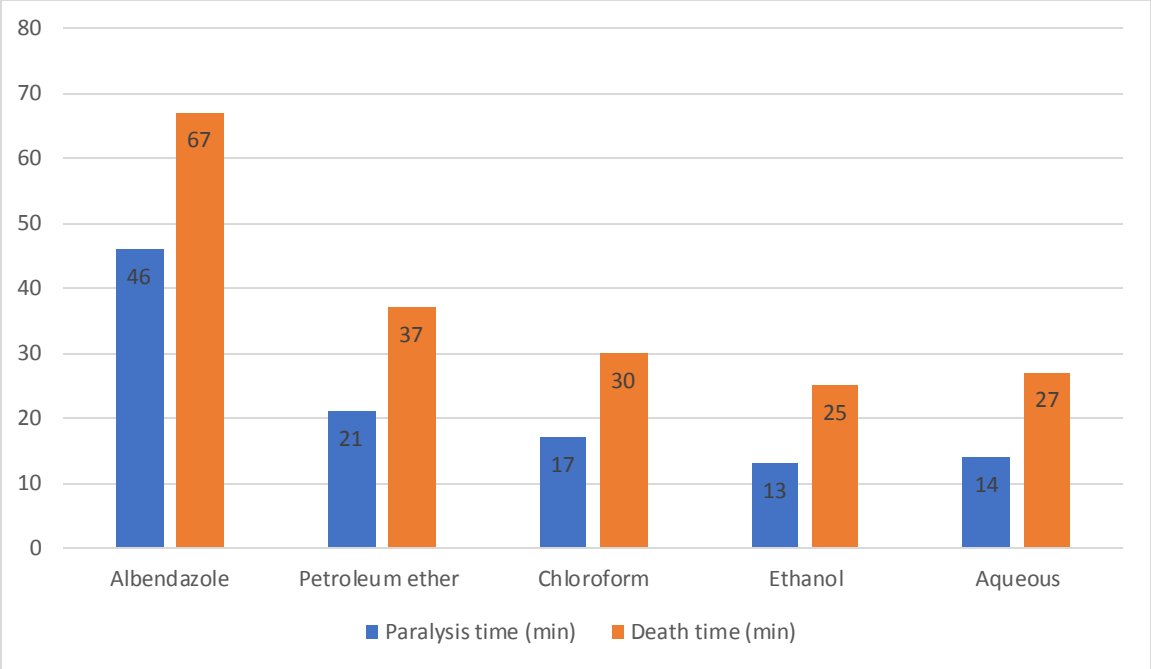

Fig-1. Anthelmintic activity of the leaves of *Coriandrum sativum.*

CONCLUSION

From the above results it was clear that the ethanolic and alcoholic extracts of leaves of *Coriandrum sativum* have potent anthelmintic activity as compared to the other extracts and standard anthelmintic drug (Albendazole). Further studies are required to exhibit the effectiveness and pharmacological explanations for the use of *Coriandrum sativum* as an anthelmintic drug.

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