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An evaluation of anthelmintic activity of *Ricinus communis* Linn. leaves by using different type of solvent

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Abstract

Aqueous and ethanol ethyl acetate chloroform methanol extracts from the leaves of *Ricinus communis* were investigated for their anthelmintic activity against *Pheretima posthuma* and three concentrations (50, 75 and 100 mg/ml) of each extract were studied for activity, in which paralysis and death time of the worm. Both the extract exhibited remarkable anthelmintic activity at all three concentrations. Albendazole suspension is used as standard reference (20mg/ml) and distilled water as control. Therefore the aqueous and ethanol methanol extract of leaves of *Ricinus communis* has been demonstrated for the first time.

Keywords: *Pheretima posthuma*, *Ricinus communis*, Anthelmintic activity, helminthiasis.

Introduction

Helminthiasis or worm infection is one of the most prevalent diseases in the World [1]. The disease is highly prevalent particularly in third world countries due to poor management practices [2]. The word Helminthes has been derived from the Greek which means 'worm'. Helminthes infections are among the most common infections in man, affecting a large proportion of the world's population. The parasites can be acquired by contact with a) infected Water b) infected meal c) infected animal [3]. In developing countries they pose a large threat to public health, and contribute to the prevalence of malnutrition, anemia, eosinophilia, and pneumonia [4]. Helminthiasis is a macro parasitic disease of humans and animals in which a part of the body is infested with parasitic worms such as pinworm, roundworm, or tapeworm [5]. The World health Organization (WHO) estimated that 80% of the population of developing countries relies on traditional medicines, mostly plant drugs for their primary health care needs. The use of medicinal plant is growing worldwide because of the increasing toxicity and allergic manifestations of the synthetic drugs. Hence there is an increasing demand towards natural Anthelmintic [6].

Ricinus communis also known as Castor oil plant belongs to family Euphorbiaceous. This plant is native of India, and it has spread thence over all the warmer countries of the world [7]. It is an annual or perennial bush or occasionally a soft-wooded small tree grown up to 6 m. or more, found nearly throughout India, Brazil, South Africa and Russia [8]. In the Indian system of medicine, the leaf, root and seed oil of this plant have been used for the treatment of inflammation, liver disorders, hypoglycemic and laxative [9]. Castor oil is widely used as a cathartic, and also for lubrication and illumination. Roots are administered in the form of a decoction for lumbago and in the form of a paste for toothache [7]. Stem of *Ricinus communis* have anticancer, ant diabetic and antiprotozoal activity [10]. Literature review indicates that the Anthelmintic activity on the leaves of *Ricinus communis* has not been evaluated so far and thus this paper reports the Anthelmintic activity on the extract of leaves of *Ricinus communis linn* against earthworms.

Authentication of plant material

The fresh leaves of *Ricinus communis* were collected from the Malshiras District Solapur, Maharashtra and authenticated head of department of Yashvantrao chavan institute of sciences, Satara.

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Preparation of extract: The leaves of *Ricinus communis* linn was subjected to shade drying. The dried bark was further crushed into powder and then stored in air tight containers for

Sr.no	Reagents	Colour/precipitate	Constituents	Inference
1	Salvoski's test	No change	steroids	-
2	Dragendroff reagent	Orange precipitates	Alkaloids	++
3	Ammonia Sulphate solution 0.2% in water	No colour	flavonoids	-
4	Picric acid solution	Precipitation	Proteins	++
5	Lead acetate test	Precipitation	Tannins	+++
6	Frothing test	Form	Sapoonins	+++
7	Mollish reagent	Purpule colour at the junction	carbohydrate	+
8	Ferric chloride test	Bule colour	phenol	+
9	Lieberman's burchard test	No colour	Triterpenes	-

Standard used for the activity: Albendazole suspension in the concentration of 20 mg/ml mfg. by CIPLA LTD used as reference standard.

Animals: Earthworms (*Pheretima posthuma*) of about 4-5 cm long were used for anthelmintic activity, collected from Department of Agriculture, Satara.

Method and requirements

Sr. No	Equipment	Model Name
1	Incubator	BTI-25, Amp-15
2	Refrigerator	GDA19A1/2013
3	Hot air over	LC-T
4	Grinder	Unicon – CM/L-7852591
5	Ultra-sonicator	Bio-technique India

All the glass wares previously washed were sterilized in hot air oven. Petri-dishes, pipettes, test tube were wrapped separately in the paper and kept in the hot air oven for sterilization at 180 °C for 1hrs. Take 10gm of powdered drug of night jasmine in 4 different beakers and then add 50 ml of ethanol in each baker. Then the beaker is kept in sonicator for sonication extraction for time 60 minutes.

The Anthelmintic assay was carried out as per the method. (Deore *et al*) with minor modifications [12]. Earthworms was used for anthelmintic activity grouped in to control, standard, and aqueous, ethanol, methanol ethyl acetate, chloroform, extract, four animals in each group having length 4-5 cm. Albendazole was used as standard, where distilled water as control.

In the first set of experiment, seven groups of four earthworms were released in to 25 ml of solutions of aqueous and ethanol extracts of bark of *Ricinus communis* Linn (50, 75 and 100 mg/ml each) in distilled water. They were observed for their spontaneous motility and evoked responses. Time required for paralysis and death of animals were noted for each sample. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. The death of the worm was

further analysis. Crude extract of leaves was prepared by ultra-sonication extraction method. About 125 mg of powdered plant material was uniformly packed into a thimble and extracted with solvents (2 liters each). Solvents used were ethanol, water, ethyl acetate chloroform methanol then the beaker are kept in sonicator for sonication extraction for time 60 minutes respectively. After the sonication filter the extract then collect in different Petri plates and keep the petriplates for evaporation at room temperature. Then collect all the extract keep in refrigerator.

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ascertained by transferring it into a beaker containing hot water (50 °C), which stimulated and induced movements if the worm was alive. The death and/or total paralysis time was recorded at room temperature.

Result and Discussion

The result of Anthelmintic activity is shown in Table no.1. In the present study ethanol, aqueous, methanol, ethyl acetate chloroform the extracts showed remarkable Anthelmintic activity against intestinal parasitism. The all extract shows paralysis as well as death of worms in less time than ethanol, methanol, and aqueous extract especially at higher concentration of 100 mg/ml.

Table 1: Results of Anthelmintic activity of *Ricinus communis* linn extracts.

Extract	Concentration (mg/ml)	Time taken for paralysis (min)	Time taken for death (min)
Ethanol	50	20.50±1.25	70.01±0.50
	75	17.20±0.54	32.50±1.25
	100	9.50±0.69	30.50±0.44
Aqueous	50	18.56±0.58	81.50±1.55
	75	17.22±0.25	43.45±0.76
	100	9.05±0.62	31.07±0.56
Ethyl acetate	50	40.30±1.22	98.24±0.77
	75	35.41±0.12	60.01±0.41
	100	22.05±0.56	40.99±0.52
Chloroform	50	35.03±0.67	97.11±0.76
	75	28.44±1.20	70.05±0.44
	150	20.22±0.70	45.90±0.72
Methanol	50	26.03±0.60	85.60±0.46
	75	19.47±1.12	60.05±0.76
	100	11.75±0.70	35.50±0.44
Control		-	-
Albendazol	20	8.30±0.60	40.21±1.04

Conclusion

It can be concluded that the leaves of *Ricinus communis* Linn possess Anthelmintic activity against the worms and hence further investigation of active principles might help in finding

of new compounds, which will be effective against parasitic infections.

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