



Research Article

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***In vitro* anthelmintic activity of bark of *Ricinus communis* Linn.**

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ABSTRACT

Aqueous and ethanol extracts from the bark 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 (25 mg/ml) and distilled water as control. Therefore the aqueous and ethanol extract of bark 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 Helminth has been derived from the Greek which means 'worm'. Helminth 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, anaemia, eosinophilia, and pneumonia [4]. Helminthiasis is a macroparasitic 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 anthelmintics [6].

Ricinus communis also known as Castor oil plant belongs to family Euphorbiaceae. 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, antidiabetic and antiprotozoal activity [10]. Literature review indicates that the anthelmintic activity on the bark of *Ricinus communis* has not been evaluated so far and thus this paper reports the anthelmintic activity on the extract of bark of *Ricinus communis* L against earthworms.

EXPERIMENTAL SECTION

Authentication of plant material: The bark of *Ricinus communis* were collected from the local fields of Nalagarh, District Solan Himachal Pradesh and Authenticated by Dr. R. Raina, Sr. Scientist (Medicinal Plants), Department of Forest Products, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan, Himachal Pradesh, India.

Preparation of extract: The bark of *Ricinus communis* was subjected to shade drying. The dried bark was further crushed into powder and then stored in air tight containers for further analysis. Crude extract of bark was prepared by Soxhlet 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 and water. The process of extraction continues till the solvent in siphon tube of an extractor become colorless. After that the extract was taken in a beaker and heated on water bath till all the solvent get evaporated. Dried extract was kept in dessicator for their further use.

Standard used for the activity: Albendazole suspension in the concentration of 20mg/ml procured from Alkum drug and pharmaceuticals 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, H.P.

Method: The anthelmintic assay was carried out as per the method of Deore et al with minor modifications. Earthworms were used for anthelmintic activity, and grouped in to control, standard, aqueous extract and ethanol 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, six groups of four earthworms were released in to 25 ml of solutions of aqueous and ethanolic 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 ascertained by transferring it into a beaker containing hot water (50⁰ C), which stimulated and induced movements if the worm was alive. The death and/or total paralysis time was recorded at room temperature.

RESULTS AND DISCUSSION

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

Table no. 1 Results of Anthelmintic activity of *Ricinus communis* L. extracts

Extracts	Concentrations mg/ml	<i>Pheretima posthuma</i> (Earthworm)	
		P	D
Control	----	----	----
EE	50	18.50 ± 2.25	71.75 ± 11.44
	75	13.50 ± 1.19	31.50 ± 1.25
	100	8.50 ± 0.64	31.00 ± 0.577
AE	50	15.50 ± 2.87	81.50 ± 9.77
	75	10.75 ± 1.37	43.75 ± 0.62
	100	8.25 ± 1.31	31.50 ± 0.95
Std. Albendazole	20	7.75 ± 0.62	40.50 ± 1.04

Where EE: Ethanol Extract, AE: Aqueous Extract, P: Time taken for paralysis (min), D: Time taken for death (min).

CONCLUSION

It can be concluded that the bark of *Ricinus communis* 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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