

Investigation of anthelmintic potential of some plants claimed by tribals of satpuda hills

Satish B. Kosalge*, Ravindra A. Fursule

H. R. Patel Women's College of Pharmacy, Shirpur, Dhule, M.S., India.

*Corres. Author: skosalge@rediff.com

Abstract

The aqueous extract of *Cassia auriculata* leaves (Awali), *Erythrina variegata* leaves (Pangora) and *Dioscorea bulbifera* bulbs (Kand) were investigated for their anthelmintic potential against earthworms (*Eicinia faeteda*), tapeworms (*Raillietina spiralis*) and roundworms (*Ascardia galli*). Various concentrations (10-50 mg/ml) of each plant extract were tested in the bioassay and different parameters such as determination of time of paralysis and time of death of the worms were recorded. All the extracts exhibited significant anthelmintic activity at highest concentration of 50 mg/ml. Piperazine citrate (10 mg/ml) was used as reference standard and distilled water as control.

Key words: Anthelmintic, *Cassia auriculata*, *Erythrina variegata*, *Dioscorea bulbifera*

Introduction

Helminth infections are among the most common infections in humans, affecting a large population of the world. Although the majority of infections due to worms are generally limited to tropical regions and pose a great threat to health and contribute to the prevalence of malnutrition, anaemia, eosinophilia and pneumonia¹. Parasitic diseases cause severe morbidity affecting mainly population in endemic areas with major economic and social consequences². The gastro-intestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a foremost problem in treatment of helminthes diseases³; hence there is an increasing demand towards natural anthelmintics.

Cassia auriculata L. (Caselpinaceae) is a tall, much branched bushy shrub growing wild throughout forests and along roadsides and in wastelands. Leaves (Leaflets) are oblong-obovate and useful in treatment of leprosy, ulcers and have anthelmintic activity⁴. *Erythrina variegata* L. (Fabaceae) is a medium size tree. Leaves are 3-foliolate and used in inflammation, as antiseptic, as anthelmintic, in

treatment of joint pain⁵. *Dioscorea bulbifera* L. (Dioscoreaceae) is a twining or climbing, dioecious herb having ovate-cordate leaves fairly common along the edges of the forests. Tubers are used as tonic, expectorant, in asthma, as aphrodisiac and as an anthelmintic⁶. Satpuda hills region of Maharashtra is inhabited several tribes which in their traditional system of medicine use several plants or plant-based preparations for the treatment of various ailments.

During our course of studies on ethnomedicine of this region for the plants that are used as anthelmintic we noticed that the leaves of *Erythrina variegata*, *Cassia auriculata* and tubers of *Dioscorea bulbifera* have a wide reputation among natives of being curative for intestinal-worm infections.

These individual plants were being used by the tribals of Satpuda hills as an anthelmintic in the form of extract, prepared by soaking powder material in water for 10-12 hours. This extract is taken orally once a day for three days to treat intestinal-worm infections.

Experimental

The bulbs of *Dioscorea bulbifera* and leaves of *Erythrina variegata* were procured from Toranmal hills and leaves of *Cassia auriculata* was procured from Karvand road Shirpur.

The plants were identified and authenticated in Department of Botany, S. S.V.P.S. society's Dr. P. R. Ghogrey Science College, Dhule. The plant material was dried in sunlight, pulverized, passed through sieve no. 40 and used for extraction. Powdered material of each crude drug (100 gm) was kept for maceration with 400 ml of distilled water for 12 hrs. The respective extracts were filtered by using Whatman no.1 filter paper and water was removed from each extract by evaporation on water bath.

The anthelmintic assay was carried as per the method of Ajaiyeoba *et al*⁶ with minor modifications. The assay was performed on adult earthworm (*Eicinia fetida*) owing to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings⁷. Because of easy availability, earthworms have been used extensively for preliminary *in vitro* evaluation of anthelmintic compounds^{8, 9}. *Ascardia galli* (Roundworm) and *Raillietina spiralis* (Tapeworm) were simply obtained from intestine of freshly slaughtered fowls and use of *Ascardia galli* and *Raillietina* species as a suitable model for screening of anthelmintic drug was advocated earlier^{10, 11, 12}. Infested intestines of fowls were collected from the local slaughter house and washed with normal saline solution to remove all the faecal matter. These intestines were then dissected and worms were collected and kept in normal saline solution. Earthworms were provided by Agricultural officer, Panchaiyat

Samiti, Shirpur. Earthworm and helminths were identified in Dept. of Zoology SES Science College Shirpur and services of veterinary practitioners were utilized to confirm the identity of worms.

Test samples of all three extracts were prepared at the concentrations, 10, 20 and 50 mg/ml in 25 ml of distilled water and six worms of approximately equal size (same type) were placed in nine cm Petri dish containing above solution of extracts. Piperazine citrate (10 mg/ml) was used as reference standard and distilled water as control^{13, 14, 15, 16}. This procedure was adopted for all three types of worms. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death of worms was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50°C).

Results and discussion

Results obtained indicate that the higher concentration of each plant extract produced paralytic effect much earlier and the time to death was shorter (Table.1). *Erythrina variegata* extract exhibited more potent activity at all concentrations against all three different worms. *Dioscorea bulbifera* extract at higher concentration (50 mg/ml) is more effective against *Eicinia fetida*, *Ascardia galli* and *Raillietina spiralis*. *Cassia auriculata* and *Dioscorea bulbifera* extracts have shown significant anthelmintic activity as compared to standard at 10 mg/ml. In conclusion, this study thus suggests that the plants used by tribals traditionally to treat intestinal worm infections, showed significant anthelmintic activity. The experimental evidence obtained in the laboratory model could provide a rationale for the traditional use of these plants as anthelmintic.

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Table 1: Anthelmintic activity of aqueous extracts

Groups	Concentration (mg/ml)	<i>Eicinia fetida</i> (Earthworms)		<i>Ascaridia galli</i> (roundworm)		<i>Railletina spiralis</i> (Tapeworm)	
		Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)	Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)	Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)
Control(Water Only)	-----	-----	-----	-----	-----	-----	-----
<i>Cassia auriculata</i>	10	65±0.61	122±1.60	96±1.30	138±1.7	71±1.40	96±2.60
	20	43±0.46	81±1.28	48±1.25	96±1.40	42±1.15	71±0.75
	50	33±0.32	62±0.65	31±0.80	69±0.55	26±0.90	51±0.42
<i>Erythrina variegata</i>	10	61±1.20	106±2.37	45±1.10	72±1.27	53±1.80	79±1.26
	20	42±0.80	78±0.90	30±0.60	54±0.40	34±0.74	73±0.48
	50	28±1.10	54±2.10	18±0.53	41±0.78	24±0.42	44±0.56
<i>Dioscorea bulbifera</i>	10	67±1.92	116±1.35	57±2.34	95±2.42	54±0.78	83±0.91
	20	40±1.42	76±1.13	43±0.81	69±1.26	37±0.26	64±0.34
	50	32±1.05	59±2.36	26±1.74	53±1.52	24±0.61	49±0.44
Piperazine citrate (Standard)	10	69±1.15	132±0.88	31±1.43	52±1.26	27±0.64	45±0.68

Each value represents mean ± SEM (N=6).

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