



Invitro anthelmintic activity of Averrhoa carambola leaf extracts.

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ABSTRACT

To evaluate the anthelmintic activity of *Averrhoa carambola* leaf extracts by *in vitro* methods. *Averrhoa carambola* (Family: Oxalidaceae) is a small evergreen tree about 9 m height with close drooping branches. It is found in tropical countries especially in South India, Sri Lanka, Myanmar, Java and China. Anthelmintic activity of the leaf ethanolic and aqueous extracts were estimated using adult Indian earth worm *Pheritima postuma* and compared the results using the standard synthetic drug Albendazole. Two parameters of death and paralysis were evaluated in the study. The study revealed that both the extract showed significant dose dependant action, inhibition of spontaneous motility and death of organisms tested. The study indicates significant anthelmintic activity on the leaf extracts of *Averrhoa carambola* and the ethanolic extract was found to be more potent.

Key words: *Averrhoa carambola*, Anthelmintic activity, *Pheritima postuma*, Albendazole.

INTRODUCTION

Helminth infections are among the most widespread infections in humans, distressing a huge population of the world. Although the majority of infections due to helminths are generally restricted to tropical regions and cause enormous hazard to health and contribute to the prevalence of undernourishment, anaemia, eosinophilia and pneumonia^[1]. Helminthic infestations are now being recognized as a cause of chronic ill health and sluggishness amongst the children. More than half of the world population suffers from worm infestations of one or other. Helminthes also affects domestic animals and live stocks causing considerable economic loss. Various alternative and traditional systems of treatments reports the efficacy of several natural products eliminating helminthes.^[2] Antihelminthics are those agents that expel parasitic worms (helminthes) from the body, by either stunning or killing them. Helminthes infections are commonly found in community and being recognized as cause of much acute as well as chronic illness among the various human beings as well as cattle's. More than half of the population of the world suffers from various types of infection and majority of cattle's suffers from worm infections. Intestinal infections with worms can more easily treated than those the infections occurs in other loca-tions in the body, because the worms need to be killed by the drug and the drug need not be absorbed when given by oral route Considering the above facts we had chosen *Averrhoa carambola* leaves for the evaluation of Anthelmintic activity. *Averrhoa carambola* (Family: Oxalidaceae) is a small evergreen tree about 9 m height with close drooping branches. It is found in tropical countries especially in South India, Sri Lanka, Myanmar, Java and China. The fruits are sweet, and sour; they are thermogenic, febrifuge, antipyretic, antiscorbutic and tonic. It is useful in traditional Ayurvedic medicine as a diaphoretic, diuretic, expectorant, antidiarrhoeal, anthelmintic, antiemetic and in acute dyspepsia. It alleviates hemorrhoids, intermittent fever, liver dysfunctions and various kinds of poisoning.^[3,4]

EXPERIMENTAL SECTION

Preparation of extracts

Fresh leaves were collected from Vilavancode Taluk of Kanya Kumari district in the month of August. August month is selected for the collection of leaves because this is the time after monsoon and probably this time the active constants were more in the plant. The plant was authenticated by botanist and a voucher specimen was deposited in the Department of Pharmacognosy of Al Shifa College of Pharmacy. The leaves were first dried in sun and then under shade. It is powdered to a coarse form and extract separately using ethanol and water as solvent by cold maceration process. The extracts were concentrated under reduced pressure and preserved in refrigerator till further studies. Phytochemical evaluation was done on the extracts for the detection of active constants.

Chemicals and organisms

All chemicals used in the estimation were of analytical grade. Albendazole was obtained as gift sample from MRL labs Chennai. Adult Indian earth worm used for the study was obtained from the College of Agriculture Trivandrum.

Anthelmintic activity (in vitro)

Anthelmintic activity was evaluated on adult Indian earth worm *Pheritima posthuma* due to its anatomical and physiological resemblance with intestinal round worms. The anthelmintic property was evaluated as per the method of Pal et al with certain modifications^[5,6]. Eight groups each containing three earth worms of equal size were released into 10 ml of different concentrations of various extracts. Each group was treated with Albendazole (40mg/ml), Ethanolic and aqueous extracts (50,100 & 150mg/ml) in normal saline with 5%DMSO and in normal saline alone as control. Two parameters of paralysis and death were measured. Paralysis time was noted when no movement was observed with slight pin prick method. Death of earthworms were recorded when no movement showed by the worms on vigorous shaking or by dipping in warm water (60°C).

RESULTS

Preliminary Phytochemical screening

Preliminary phytochemical screening of *Averrhoa carambola* revealed the presence of Saponins, Flavonoids, Polyphenols, Tannins and triterpenoids in various extracts.

Anthelmintic activity

The study revealed that all the extracts possess significant anthelmintic activity in a dose dependant manner on comparing with the standard drug Albendazole. Among the various test extracts ethanolic extract at a concentration of 150mg/ml taken the least time for paralysis and death. The minimum time taken by the ethanolic extract for paralysis is 3 minutes and for death is 9 minutes where as the minimum time taken by the aqueous extract for paralysis is 5 minutes and for death is 12 minutes. The minimum time taken by Albendazole for paralysis and death is 3 and 7 minutes respectively. The results are tabulated in Table No. 1.

Statistical Analysis

The values are expressed in Mean plus or minus standard error mean of three organisms. Statistical analysis was done using Dunnetts test.

DISCUSSION

Phytochemical analysis of the crude extract revealed presence of tannins and saponins as the phytoconstituent. Tannins were shown to produce anthelmintic activities^[7]. Chemically tannins are polyphenolic compounds^[8] Some synthetic phenolic are shown to interfere with the energy generation in helminth parasites by uncoupling oxidative phosphorylation^[9]. It is possible that tannins contained in the extracts produced similar results. Another possible anthelmintic effect of tannins is that they can bind to free proteins in the gastro intestinal tract of host animal or glycoprotein on the cuticle of the parasite and cause death^[10]. Here the leaf extract shown paralysis as well as death of Indian earth worms on a dose dependant manner. The mechanism of action of albendazole on worm is its inhibitory action on microtubular function. Based on these we can assume that tannins and saponins present in the Leaf extract of *Averrhoa carambola* may responsible for this anthelmintic activity.

Table 1. *In vitro* anthelmintic activity of leaf extracts of *Averrhoa carambola* on Indian Earth worm (*Pheritima posthuma*)

Test Sample	Concentration (mg/ml)	Time taken For (Minutes)	
		Death	Paralysis
Control	-	-	-
Albendazole	40	3.07±0.06	7.82±0.08
Ethanollic Extract	50	5.12±0.08*	14.02±0.6*
Ethanollic Extract	100	4.36±0.66*	12.15±0.32*
Ethanollic Extract	150	3.22±0.05*	9.53±0.01*
Aqueous Extract	50	7.21±0.27	18.44±0.04
Aqueous Extract	100	5.93±0.04	15.10±0.80
Aqueous Extract	150	5.02±0.32*	12.21±0.60*

Results are expressed in Mean ± SEM, n=3 *P<0.01 with standard.

CONCLUSION

The study came to the conclusion that the leaf extracts of *Averrhoa carambola* can be used as a significant natural anthelmintic drug. However this is only a preliminary study and further detailed study is required for the elucidation of the possible mechanism of this activity and also to isolate the phytoconstituents which gives this particular activity.

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