

**IN VITRO ANTHELMINTIC ACTIVITY ON AQUEOUS AND ETHANOL EXTRACTS
OF *MIMUSOPS ELENGI* LINN. BARK**

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Summary

The anthelmintic activity of ethanolic and aqueous extracts of *Mimusops elengi* Linn. was studied against adult earthworm *Eisenia foetida* (redworm). The ethanolic and aqueous extract prepared by hot and cold extraction respectively. Albendazole was used as the standard drug. The anthelmintic activity was carried out to study the effect of plant extract on Adult earthworm *Eisenia foetida* (redworm), and noted down the paralysis time (Vermifuse), and death time (Vermicidal). It was found that both ethanolic and aqueous extract of bark of *Mimusops elengi* Linn. Found to have significant anthelmintic action against adult earthworm *Eisenia foetida* (redworm) at the dose of 4 mg/ml or more (0 mg/ml); which may be due the presence of glycoside, carbohydrates, tannins, saponins in the extract. Thus it can be concluded that the bark of *Mimusops elengi* Linn. can be used as anthelmintic agent.

Key words: *Mimusops elengi* Linn, *Eisenia foetida*, anthelmintic

Introduction

In the last few decades there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin and lesser side effects. 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]. Anthelmintics are those agents that expel parasitic worms (helminthes) from the body, by either stunning or killing them [2]. The gastro-intestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a foremost problem in treatment of helminthes diseases [3].

Because of increasing anthelmintic resistance and impact of conventional anthelmintic on the environment, it is important to look for alternative strategies against gastrointestinal nematodes. The plants are known to provide a rich source of botanical anthelmintics [4, 5]. A number of medicinal plants have been used to treat parasitic infections in man and animals [6-9].

The literature survey reveals that use of plants as anthelmintic agent is still in infancy in modern system of medicine. Some of the plants which are reported as anthelmintic agent are *Moringa oleifera* [10], *Vitex negundo* [10], *Thespesia lampas (Cav.)* [11], *Trigonella foenum-graecum* [12], *Enicostemma littorale* [13], *Cassia tora* [14]. *Mimusops elengi* Linn. is being used traditionally as anthelmintic agent but its bark is not yet being exploited experimentally, therefore the present study aims to experimentally prove the *Mimusops elengi* Linn. bark as anthelmintic.

Material and Method

Collection and identification of plant material: The bark of plant *Mimusops elengi* was collected from campus of Kurukshetra University, Kurukshetra (Haryana) in the month of August 2010. The plant was taxonomically identified and authenticated as *Mimusops elengi* Linn. by Dr. H.B. Singh, Head, Raw Materials, Herbarium and Museum Division, National Institute of Science Communication and Information Resources (NISCIIR), New Delhi, vide reference no. NISCAIR/RHMD/Consult/-2010-11/1493/91. The stem bark was dried at room temperature (30-40°C). The bark was pulverized in a mechanical grinder prior to use.

Preparation of extracts: Bark of *Mimusops elengi* Linn. was air dried, cut into small pieces and pulverized into a coarsely powdered drug. The powdered drug of the plant was subjected to hot extraction process with ethanol for 72 h and then macerated with distilled water for 8-10 days. The extracts were filtered and concentrated to dryness using a rotary evaporator. Dry extracts were stored at 4°C till further use. The ethanolic extract was dark brownish black and aqueous extract was black in colour.

Preparation of doses: The doses of ethanolic and aqueous extracts were prepared in distilled water. Distilled water was taken as control group, and albendazole (GlaxoSmithkline) as standard drug.

Experimental animal: Adult earthworm *Eisenia foetida* (redworm) were used for the evaluation of *in vitro* anthelmintic activity. They were collected from Agriculture Office, Chambaghat, Solan (H.P.) and authenticated by Dr. J. L. Sharma, Deputy Director, Agriculture Office, Chambaghat, Solan. The average length of earthworm was 2-6 cm and width was 0.1-0.3 cm.

Drugs and Chemicals: Albendazole (Glaxo Smithkline), ethanol (Jianghu Huaxi International Trade Co. Ltd., China)

Experimental procedure: The anthelmintic activity was performed according to the method of Ghosh et al [15]. On adult earth worm *Eisenia foetida* as it has anatomical and physiological resemblance with the intestinal round worm parasites of human beings. *Eisenia foetida* (redworm) was placed in petridish containing five different concentrations (4, 8, 10, 20, 40 mg/ml) each of ethanol and water extract of *Mimusops elengi* Linn. bark. Each petridish was placed with 6 worms and observed for paralysis (or) death. The mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; the time death of worm (min) was recorded after ascertaining that worms neither

moved when shaken nor when given external stimuli. In the same manner albendazole was included as reference compound. The Test results were compared with Reference compound Albendazole (20mg/ml) treated samples.

Statistical analysis: The statistical significance between groups was analyzed using one way ANOVA followed by dunette's test. P value (<0.05) was considered significant.

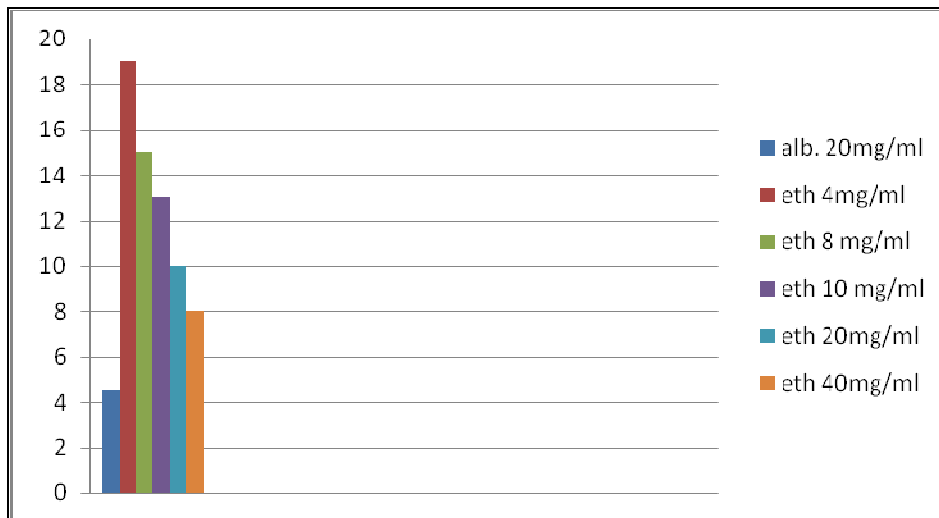
Results and Discussion

Preliminary phytochemical screening of alcoholic extract revealed the presence of glycosides, saponins, carbohydrates, tannins and aqueous extract reveals the presence of glycosides, saponins, carbohydrates, tannins. Both ethanolic and aqueous extract of bark at concentration (4, 8, 10, 20, 40 mg/ml) has shown a significant ($P < 0.01$) anthelmintic activity when compared with the standard *i.e.* albendazole (20mg/kg). The above discussed response is due to the presence of several phytoconstituents in the bark.

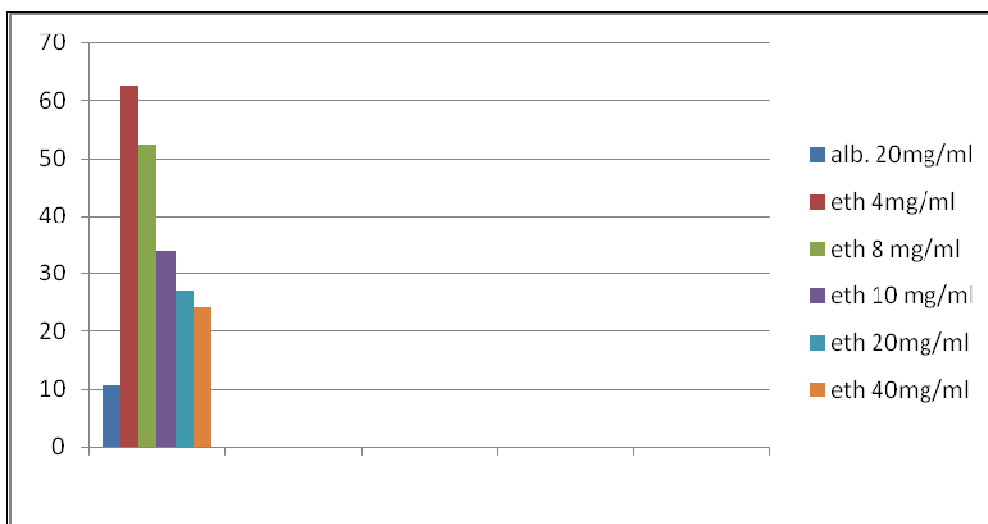
“Table 1: Anthelmintic activity of ethanolic and aqueous extract of *Mimusops elengi* Linn. bark”

Sr. No.	Group	Concentration (mg/ml)	<i>Eisenia foetida</i> (earthworm/redworm)	
			Time taken for Paralysis (P) in min. (Mean and SEM)	Time taken for Death (D) in min. (Mean and SEM)
1	Ethanolic extract	4	19.00 ± 1.414**	62.50 ± 1.643**
		8	15.00 ± 1.414**	52.33 ± 1.862**
		10	13.50 ± 1.049**	34.00 ± 2.098**
		20	10.83 ± 1.472**	27.16 ± 2.483**
		40	8.50 ± 1.378**	24.16 ± 1.169**
2	Aqueous extract	4	28.66 ± 2.066**	73.00 ± 1.862**
		8	17.16 ± 1.472**	66.33 ± 2.422**
		10	15.33 ± 1.506**	63.83 ± 2.639**
		20	12.66 ± 1.506**	36.83 ± 2.639**
		40	9.83 ± 0.752**	31.66 ± 1.214**
3	Albendazole	20	4.50 ± 0.547	10.50 ± 1.049
4	Control (Distilled Water)

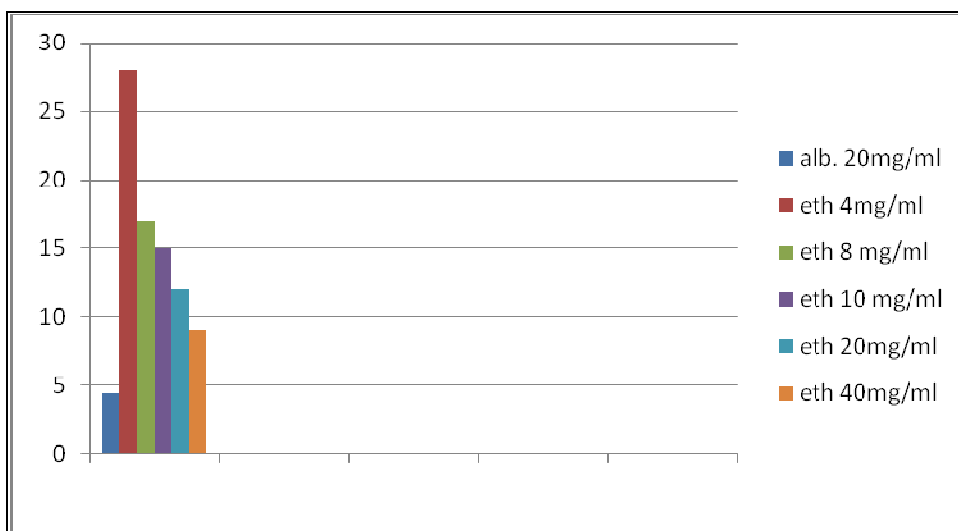
**P<0.01 When compared with standard albendazole
Results are mean ± SEM (n=6)



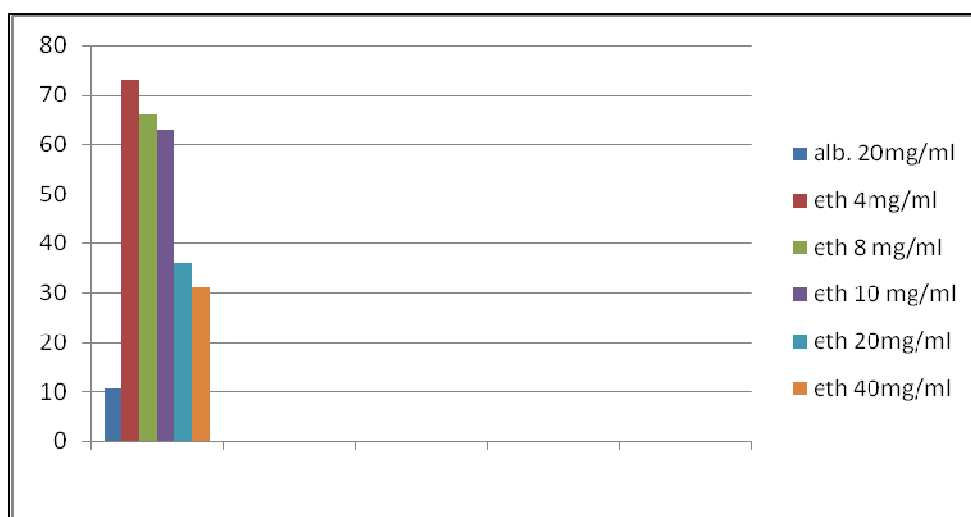
Graph of different concentration of ethanolic extract v/s time taken for Paralysis



Graph of different concentration of ethanolic extract v/s time taken for death



Graph of different concentration of aqueous extract v/s time taken for paralysis



Graph of different concentration of plant extract v/s time taken for death

Conclusion

From the above result it is concluded that alcoholic and aqueous extracts of bark of *Mimusops elengi* Linn. have a potent anthelmintic activity which is comparable with standard drug albendazole. Further studies involving *in vivo* model are required to find out and to establish effectiveness and pharmacological rationale for the use of bark as anthelmintic drug.

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