



Short Communication

In Vitro* Anthelmintic Activity of *Mimusops Elengi* Bark**PRAKASH DABADI*¹, BC KOTI², AHM VISHWANATH SWAMY², CHANDRAKALA³¹ Bapuji Pharmacy College, Davanagere 577004, Karnataka, INDIA.² K.L.E Colleges of Pharmacy, Hubli, Karnataka, INDIA.³ DRM Science College, Davangere 577004, INDIA**ARTICLE DETAILSArticle history:*

Received on 11 August 2011

Modified on 16 September 2011

Accepted on 20 September 2011

*Keywords:**Anthelmintic activity,
Mimusops elengi,
paralysis and death,
Pheretima posthuma.***ABSTRACT**

Antianthelmintic activity of successive extracts (petroleum ether chloroform, acetone and ethanol) of *Mimusops elengi* bark were evaluated separately on adult Indian earthworm (*Pheretima posthuma*) and compared with that of albendazole. It was found that the extracts exhibited respectively dose-dependent action and inhibition of spontaneous motility (paralysis) and death of earthworms. The results indicated that the alcoholic and chloroform extracts were more potent.

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INTRODUCTION

Helminth derived from the Greek word 'helminth', Meaning 'worm'. Helminthic infestations are now being recognized as a cause of chronic ill health and sluggishness amongst the children. Helminthiasis or infections with parasitic worms are pathogenic for human beings. Anthelmintics or antihelminthics are drugs that expel parasitic worms (helminths) from the human body.^[1] More than half of the population of the world suffers from infection of one or the other and majority of cattle's suffers from worm infections.^[2] Because the worms need not be killed by the drug and the drug need not be absorbed when given by mouth, there is usually a wider margin of safety than with drugs for worm infections in other sites. Indiscriminate use of synthetic anthelmintics can lead to resistance of parasites.^[3] Herbal drugs have been in use since ancient times for the treatment of parasitic diseases in human.^[4] Moreover these drugs are unaffordable because of their high cost. These factors paved the way for herbal remedies as alternative anthelmintics.

Mimusops elengi Linn. (Family- *sapotaceae*) commonly known as Bakul is an evergreen tree found all over India. It is grown as an ornamental tree in the gardens and is an ethnobotanically important medicinal plant.

The plant has been used in ayurvedic medicine for various therapeutic purposes as cardiotoxic, stomachic, anthelmintic and astringent. Phytochemical review shows the presence of taraxerol, taraxerone, urosolic acid, betulinic acid, α -spinosterol, β -sitosterol, lupeol, saponins and mixture of triterpenoid saponins in the bark of this plant ^[5,6]. There are reports available regarding the activity of *Mimusops elengi* bark shows calcium channel blocking, hypotension activities ^[7], antimicrobial ^[8], antibacterial ^[9] and gastric ulcer models ^[10]. Hence, the present study has been designed to investigate the effect of *Mimusops elengi* anthelmintic its activity against *Pheretima posthuma*.

MATERIALS AND METHODS

The stem barks of *Mimusops elengi* Linn. of family Sapotaceae were collected from mature trees grown locally. The bark of the plant was identified and confirmed by Dr.B.D.Huddar, Head of Botany Department, Shri Kadasiddheshwar Arts College and H.S Kothambri Science Institute, Hubli. After authentication, the plant material was shade-dried, until free from moisture. Then, they were subjected to size reduction to get coarse powder of desired particle size.

Drugs and chemicals

Albendazole (Ranbaxy, New Delhi) were used as reference standards. Normal saline were used as control and all other chemicals were of analytical grade.

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Table 1: Anthelmintic Activity of *Mimusops elengi* Bark Extracts

Group	Treatment	Concentration (mg/ml)	Paralysis time (min.)	Death Time (min.)
1	Vehicle	-	-	-
2	Albendazole	25	10.01±0.10	15.04±0.14
		50	7.03±0.32	11.04±0.23
		100	6.08±0.21	10.04±0.12
3	Petroleum ether	25	45.08±0.15	66.25±0.22
		50	38.12±0.16	45.10±0.28
		100	22.13±0.24	36.06±0.12
4	Chloroform	25	20.13±0.24	27.19±0.14
		50	16.14±0.20	19.11±0.12
		100	11.38±0.32	15.53±0.24
5	Alcoholic extract	25	13.03±0.16	18.70±0.24
		50	10.66±0.18	14.17±0.12
		100	7.82±0.25	11.74±0.26
6	Acetone	25	104.24±0.18	124.15±0.26
		50	97.05±0.85	78.04±0.12
		100	66.01±0.24	56.04±0.27

All values represent Mean +SD; n= 6 in each group

Preparation of the Extract

The powdered material was subjected to successive extraction in a Soxhlet apparatus using solvent petroleum ether (40-60°C), chloroform, acetone and alcohol. The concentrated extract was then taken in a China dish and evaporated on a thermostat controlled water bath till it forms a thick paste. This thick mass was kept for vacuum drying in desiccators till it become free from moisture. The solutions were prepared 10, 50, 100mg/ml.

Animals

Indian adult earthworms (*Pheretima posthuma*) collected from moist soil and washed with normal saline to remove all faecal matter were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to their anatomical and physiological resemblance with the intestinal roundworm parasites of human beings.

Anthelmintic activity

The anthelmintic activity was performed according to the method (Ghosh et al) [14]. On adult Indian earth worm *Pheretima posthuma* as it has anatomical and physiological resemblance with the intestinal round worm parasites of human beings. *Pheretima posthuma* was placed in petridish containing three different

concentrations (25, 50,100mg/ml) each of *Mimusops elengi* (petroleum ether, chloroform, acetone and alcoholic extract) solutions. 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 or when given external stimuli. In the same manner albendazole was included as reference compound. The Test results were compared with Reference compound albendazole (25, 50, 100 mg/ml) treated samples.

RESULTS AND DISCUSSION

The results of anthelmintic activity are shown in Table 1. Preliminary phytochemical studies on *Mimusops elengi* bark revealed the presence of like alkaloids, tannin, saponins, taraxerone, taraxerol, ursolic acid, betulinic acid, α -spinosterol, β -sitosterol [5], querrcitol [6], lupeol [7], isoretronecyl tigelate [8] and mixture of triterpenoid saponins [9,10], steroidal saponin, β -sitosterol. Some of these phytoconstituents may be responsible to show a potent anthelmintic activity. From the result both alcoholic and chloroform extract of *Mimusops elengi* bark showed an anthelmintic activity when compared to the standard drug. Each crude extract at the

concentration of 25, 50 and 100 mg/ml produced anthelmintic activity in dose dependent manner giving shortest time of paralysis (P) and death (D) with 100 mg/ml concentration. Acoholic extract of *Mimusops elengi* bark at concentration of 100 mg/ ml caused paralysis in 7.8min and death in 11.74 min, while chloroform extract showed paralysis in 11.38 min and death in 15.53 min against *Pheritima postuma*. The reference drug albendazole showed the same at 6.08 min and 10.04 min respectively. The predominant effect of albendazole on the worm is to cause a flaccid paralysis that result in expulsion of the worm by peristalsis. Albendazole by increasing chloride ion conductance of worm muscle membrane produces hyper polarisation and reduced excitability that leads to muscle relaxation and flaccid paralysis. [12] The crude extracts of *Mimusops elengi* revealed the presence of tannins as one of the chemical constituents. Tannins were shown to produce anthelmintic activities.[13] Chemically tannins are polyphenolic compounds.[14] Some synthetic phenolic anthelmintics (eg) niclosamide, oxiclozanide and bithionol are shown to interfere with energy generation in helminth parasites by uncoupling oxidative phosphorylation.[15] It is possible that tannins contained in the extracts of *Mimusops elengi* produced similar effects. Another possible anthelmintic effect of tannins is that they can bind to free proteins in the gastro intestinal tract of host animal [16] or glycoprotein on the cuticle of the parasite [17] and causes death. In conclusion, the traditional claim of *Mimusops elengi* as an anthelmintic activity has been confirmed as the extracts showed potent activity against *Pheritima postuma*. Further studies are necessary to isolate and reveal the active compound contained in the crude extracts of *Mimusops elengi* responsible for activity and to establish the mechanism of action are required.

CONCLUSION

In conclusion, the present study has shown that, all the extract of *Mimusops elengi* bark have significant anthelmintic activity, the alcoholic and chloroform extract being more potent. Further, it would be interesting to isolate and possible active phytoconstituents responsible for the anthelmintic activity and study its pharmacological actions.

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