

SHORT COMMUNICATIONS

Evaluation of anthelmintic activity of *Momordica charantia* L. seeds

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Momordica charantia L. (Family Cucurbitaceae) commonly known as bitter gourd or bitter melon is used in the Traditional System of Medicine for the treatment of many ailments such as abortifacient, contraceptive, dysmenorrhoea, eczema, emmenagogue, antimalarial, galactagogue, gout, jaundice, abdominal pain, kidney stone, laxative, leprosy, leucorrhoea, piles, pneumonia, psoriasis, purgative, rheumatism, fever and scabies. The present work aims at evaluation of anthelmintic property of *M. charantia* seeds extracts against Indian adult earthworm *Pheretima posthuma*. Albendazole was used as the standard drug. Petroleum ether, chloroform, ethanol and aqueous extracts at concentration of 20 mg/mL each were evaluated for anthelmintic activity. The time taken for each worm for paralysis and death were determined. Among all the extracts chloroform extract showed best anthelmintic activity by inducing paralysis within 3 min and death within 8 min. The extracts showed better result when compared to the standard drug Albendazole.

Keywords: *Momordica charantia* L., *Pheretima posthuma*, Cucurbitaceae, Anthelmintic activity, Chloroform extract, Seeds.

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Introduction

Helminthes infections are very common amongst man, mostly prevalent in developing countries being an important reason for morbidity of a large proportion of the world's population. Helminthes are generally restricted to tropical regions and regions which are poverty-stricken or in developing countries with warm, moist environments and poor sanitary conditions¹. Helminthes are parasitic worms which usually inhabit intestinal tract of host. Helminthic infections cause

enormous hazard to health leading to harmful diseases, including malaria and tuberculosis and if untreated can lead to death. Undernourishment, anaemia, eosinophilia and pneumonia can also be contributed by helminthic infections². Helminthes may also affect nutrition by inducing iron-deficiency anaemia when infected by heavy hookworm, as *Necator americanus* and *Ancylostoma duodenale*, which feed directly on the blood of their host^{3,4}. The parasitic anthelmintic worms develop resistance to most of the conventionally used drugs thereby limiting their effectiveness⁵. For these various reasons, despite extensive use of synthetic chemicals in modern clinical practices all over the world, the screening of new medicinal plants for their anthelmintic activity is the need of hour and hence is of great scientific significance.

In continuation to search for new less toxic, free from side effects, easily available, one such plant is *Momordica charantia* L. often called bitter melon, bitter gourd or bitter squash. Various preparations of *M. charantia* fruit juice extracts to dried fruit have been traditionally used worldwide, particularly for blood sugar lowering effects. In Traditional System of Medicine, it is used for the treatment of many ailments like abortifacient, contraceptive, dysmenorrhoea, eczema, emmenagogue, antimalarial, galactagogue, gout, jaundice, abdominal pain, kidney stone, laxative, leprosy, leucorrhoea, piles, pneumonia, psoriasis, purgative, rheumatism, fever and scabies⁶. However, there is no report on anthelmintic activity of this plant. In the light of the above information, the present investigation was under taken to evaluate the anthelmintic potential of different extracts of *M. charantia* seeds.

Materials and Methods

Drugs and chemicals

The drug, Albendazole was procured from Ranbaxy Lab, Mumbai. All organic solvents and chemicals were purchased from SD Fine Chemical Ltd, Mumbai and were of analytical grade.

Plant material

The seeds were procured from Bangalore local market in September 2012 and they were identified and authenticated by Department of Botany, Bangalore University. A voucher specimen (TOCS/MC-S/2012)

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was deposited in the Department of Biotechnology, The Oxford College of Science, Bangalore. The seeds were shade dried, pulverized, passed through sieve no. 40 and stored in air tight container.

Preparation of extract

Coarsely powdered seeds of *M. charantia* (250 g) were subjected to successive extraction by cold maceration for 7 days. The extraction was done with different solvents like petroleum ether, chloroform, ethanol and distilled water. Each time the marc was dried and later extracted with other solvents. All the extracts were concentrated by rotary vacuum evaporator and evaporated to dryness. The yield was found to be 1, 1.3, 0.7 and 1.53 % w/w, respectively with reference to the air dried plant material.

Earthworm collection and authentication

Healthy adult Indian earthworm (*Pheretima posthuma*; Annelida; Megascloecidae) were collected from Microbial Resources Division, Gandhi Krushi Vijnana Kendra (GKVK), Govt of Karnataka, Bangalore. The earthworm of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings^{7,8}.

Anthelmintic activity

Petroleum ether extract, chloroform extract, ethanol extract and aqueous extract of *M. charantia* seeds were investigated for their anthelmintic activity. The anthelmintic assay was carried out as per the method of Sravani and Paarakh⁹. The extracts were suspended in Tween 80 (0.1 %) in normal saline. All the drugs and extracts were prepared freshly before starting the experiment. Six groups of six earthworms each were released into 20 mL of desired formulation as follows; vehicle (0.1 % Tween 80 in normal saline), Albendazole (5 mg/mL), petroleum ether extract (20 mg/mL), chloroform extract (20 mg/mL), ethanol extract (20 mg/mL) and aqueous extract (20 mg/mL). Observations were made for the time (in min) taken to cause paralysis and death of individual worms up to 4 hrs of the test period. Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when the worms lost their motility followed by fading away of their body color⁹.

Results and Discussion

The results of the anthelmintic activity are given in the Table 1 and Fig 1. It is very clear that chloroform extract showed the most potent anthelmintic activity with shortest time of paralysis (3.84±0.16 min) and death (8.99±0.04 min). The ethanol extract showed good anthelmintic activity with paralysis time (12.33±3.51 min) and death time (38±6.55 min) followed by aqueous extract with paralysis time (38.33±6.11 min) and death time (49.66±2.51 min) and petroleum ether extract with paralysis time (44.33±5.03 min) and death time (68.33±7.50 min). All the extracts had better anthelmintic activity when compared to standard drug Albendazole with paralysis time (64±7.21 min) and death time (97±5.13 min). Whereas, in control group, worms were observed for 24 hrs and no paralysis or death was found during that period. Potency of the extract was found

Table 1 — Anthelmintic activities of different extracts of *Momordica charantia* seeds

Treatment group	Concentration (mg/mL)	Paralysis time (min)	Death time (min)
Vehicle (0.1 % Tween 80 in normal saline)	-----	-----	-----
Albendazole	5	64±7.21	97±5.13
Petroleum ether extract	20	44.33±5.03	68.33±7.50
Chloroform extract	20	3.84±0.16	8.99±0.04
Ethanol extract	20	12.33±3.51	38±6.55
Aqueous extract	20	38.33±6.11	49.66±2.51

Results are expressed as mean ± SD of six determinations; vehicle worms were alive up to 24 hrs of observation. -----: worms were alive.

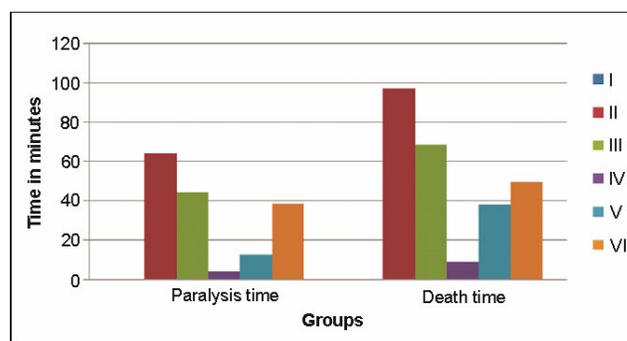


Fig. 1— Anthelmintic activities of *Momordica charantia* seeds on *Pheretima posthuma*. Group I: Vehicle (Normal saline); group II: standard Albendazole (20 mg/mL); group III: Petroleum ether extract (20 mg/mL); group IV: chloroform extract (20 mg/mL); group V: Ethanol extract (20 mg/mL); group VI: Aqueous extract (20 mg/mL) respectively.

to be inversely proportional to the time taken for paralysis/death of the individual worms.

This investigation revealed that chloroform extract of *M. charantia* showed most potent anthelmintic activity followed by ethanol extract, aqueous extract and lastly by petroleum ether extract against *P. posthuma*.

Conclusion

It can be concluded that the chloroform extract possess more potent anthelmintic activity. All the extracts showed better anthelmintic activity when compared to standard drug Albendazole. Further studies are required to identify the actual chemical constituents that are present in the crude extracts of this plant which are responsible for anthelmintic activity and to establish the effectiveness and pharmacological rationale for the use of *M. charantia* as an anthelmintic drug.

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