

Anthelmintic Activity of Aqueous Extract of *Pongamia pinnata* Linn.

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Anthelmintic activity of the various doses of aqueous extract of *Pongamia pinnata* Linn leaves was evaluated on earthworms (*Pheretima posthuma*) and the results were compared with standard drug, albendazole (10 mg/mL). It was found that there was no final recovery in the case of worms treated with aqueous extract of *Pongamia pinnata*. Aqueous extract of *Pongamia pinnata* Linn also exhibited dose dependant inhibition of spontaneous motility (paralysis) and death of earthworms. Aqueous extract of *Pongamia pinnata* Linn showed highly significant ($p < 0.001$) anthelmintic activity at the concentration of 50 mg/mL. The results showed that the aqueous extract of *Pongamia pinnata* Linn possesses wormicidal activity and be useful as an anthelmintic.

Key Words: *Pongamia pinnata*, Anthelmintic activity, *Pheretima posthuma*, Paralysis, Aqueous extract.

INTRODUCTION

Parasitic worms infect humans, livestock and crops, affecting food production with a resultant economic impact. Gastrointestinal parasites caused a serious threat to the health of people. As per WHO, only few drugs are frequently used in the treatment of helminthes in human beings. Anthelmintics from natural sources may play a key role in the treatment of these parasite infections. Despite the fact of development of anthelmintic resistance in parasites using natural remedy, an attempt has been made to study the anthelmintic activity of *Pongamia pinnata* Linn leaves which is traditionally used by Orang Asli in Malaysia to cure various parasites and nematodes.

Pongamia pinnata Linn (Fabaceae) is commonly known as kacang kayu laut in Malay and pongam in Tamil. It is a medium-sized subevergreen tree, common on alluvial and coastal situations and wide spread in Australia, Florida, Hawaii, India, Malaysia, Oceania, Philippines and Seychelles.

The tree leaves are alternate, imparipinnate. Flowers are in lax auxiliary racemes. Seeds are reniform, thick and its helium is small. Roots and barks are hot, acrid and used as anthelmintic as well as useful in the diseases of eye and skin, good for tumours, piles, wounds, ulcers, itching and urinary discharges. Leaves are digestive, laxative, anthelmintic and useful in wounds and inflammation. Flowers are used as

antidiabetic where as fruits and seeds are used as anthelmintic and useful in keratitis and urinary discharges. Oil is also used as anthelmintic and useful in rheumatism, leucoderma, scabies, wounds, leprosy, piles and ulcers. Every part of the plant is useful in the treatment of snakebite¹. Previous phytochemical examination of this plant indicated the presence of furanoflavones, furanoflavonols, chromenoflavones, flavones and furanodiketones²⁻⁷. The literature survey reveals that no scientific reports are available in literature on the anthelmintic activity of the leaves of *Pongamia pinnata*. Hence, this present work is carried out to evaluate anthelmintic activity of *Pongamia pinnata* leaves.

EXPERIMENTAL

The leaves of *Pongamia pinnata* Linn were collected from Alam Jaya, Cheras, Selangor, Malaysia in July 2008. It was authenticated by Dr. J. Anbu Jeba Sunilson, Pharmacognosist, School of Pharmacy, Masterskill University College of Health Sciences, Selangor, Malaysia. A voucher specimen (MUCH/SPH/PP105) was deposited in the departmental herbarium.

Preparation of extract: The collected leaves were washed thoroughly and shade-dried at room temperature. The dried leaves were size reduced to coarse powder (1000 g) and macerated with distilled water for 6 days⁸. The aqueous extract of *Pongamia pinnata* (PPAE) was filtered and concentrated under vacuum using rotary vacuum evaporator. A brownish, mucilaginous, semi-solid extract (20.4 %) was obtained and kept in desiccators until further use.

Collection of worms: Adult earthworms (*Pheretima posthuma*) were collected from moist soil and washed with normal saline. The collected worms were authenticated by Dr. Wong, Zoologist, MUCH, Selangor, Malaysia.

Anthelmintic activity: The anthelmintic activity of aqueous extract of *Pongamia pinnata* Linn was studied by the method developed by Tambe *et al.*⁹. The earthworms of 3-5 cm in length and 0.1- 0.2 cm in width were used due to their anatomical and physiological resemblance with the intestinal roundworm parasites of human beings¹⁰. The worms were divided into seven groups containing six earthworms in each group. Aqueous extract of *Pongamia pinnata* Linn was diluted with 20 % v/v Tween 80 in normal saline to get different concentrations of aqueous extract of *Pongamia pinnata* Linn (10, 20, 30, 40 and 50 mg/mL) and 10 mL of each solution was poured into a petridish separately. The selected earthworms were released into each petridish. Observations were made for the time taken to paralyze and death concluded when the worms lost their motility followed with their body colour fading away and recorded in Table-1. All the results were compared with standard drug albendazole 10 mg/mL.

Bio-statistical analysis: All the data are expressed as mean \pm SEM. The values obtained were compared with control group using One-Way ANOVA followed by Dunnett's test¹¹. The values of $p < 0.05$, $p < 0.01$ and $p < 0.001$ were considered to indicate a significant difference between the groups.

RESULTS AND DISCUSSION

The anthelmintic activity of aqueous extract of *Pongamia pinnata* Linn was studied against the adult earth worm, *Pheretima posthuma*. Aqueous extract of *Pongamia pinnata* Linn showed dose dependant activity at a dose of 10 to 50 mg/mL, which were compared with the standard drug, albendazole (10 mg/mL) for the inhibition of spontaneous motility of earth worms. Aqueous extract of *Pongamia pinnata* Linn showed highly significant ($p < 0.001$) anthelmintic activity at the concentration of 50 mg/mL. The results were recorded in Table-1.

TABLE-1
ANTHELMINTIC ACTIVITY OF AQUEOUS EXTRACT OF *Pongamia pinnata* LEAVES

| Treatment | Concentration (mg/mL) | Time taken for paralysis (min) | Time taken for death (min) |
|--|-----------------------|--------------------------------|----------------------------|
| Control (normal saline) | – | – | – |
| Standard albendazole | 10 | 3.50 ± 0.38 | 7.10 |
| Aqueous extract of <i>Pongamia pinnata</i> | 10 | 54.13 ± 0.59 | 92.20 |
| | 20 | 27.20 ± 0.51 | 60.40 |
| | 30 | 13.40 ± 0.33* | 38.20 |
| | 40 | 7.32 ± 0.30** | 20.40 |
| | 50 | 4.10 ± 0.35*** | 9.22 |

Values are given as in mean ± SEM; (n = 6) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$ considered for significance (ANOVA followed by Dunnett's test).

Conclusion

To scientifically prove the traditional use of *Pongamia pinnata* leaves to cure helminthes, the aqueous extract was tested against *Pheretima posthuma*. Helminthic infections of the gastrointestinal tract of human beings and animals have been recognized to have adverse effects on health standards with a consequent lowering of resistance to other diseases. In this study, the results revealed that the effect of aqueous extract of *Pongamia pinnata* Linn was dose dependent for inhibition of spontaneous motility and death of earthworms. An aqueous extract of *Pongamia pinnata* Linn also showed highly significant ($p < 0.001$) anthelmintic activity at the concentration of 50 mg/mL. Hence, the wormicidal activity of aqueous extract of *Pongamia pinnata* Linn and its effective against parasitic infections concluded that the leaves of *Pongamia pinnata* were scientifically proved to be useful as an anthelmintic.

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