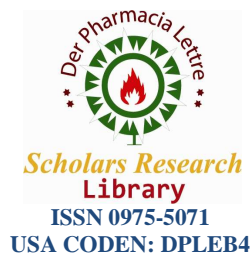




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Comparative anthelmintic activity of ethanolic extracts of *Hibiscus rosa-sinensis* linn. flower with *Aegle marmelos* leaves

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ABSTRACT

The objective of present study was to compare the anthelmintic activity of ethanolic extract of *Aegle marmelos* leaves and flowers of *Hibiscus rosa-sinensis* by using Indian earthworms (*Pheretima posthuma*). Various standards such as Piperazine citrate, Albendazole and Pyrantel pamoate at concentration of 20 mg/ml were used to compare anthelmintic activity with the extracts (*Aegle marmelos* and *Hibiscus rosa-sinensis*) at the same concentration in terms of paralysis time and death time of worms. The result revealed that ethanolic extract of *Hibiscus rosa-sinensis* flower have better paralyzing effect and less cidal effect as compared to ethanolic extract of *Aegle marmelos* leaves but both the extract did not have better activity than standards.

Keywords: Piperazine citrate, Albendazole, Paralysis, Pyrantel pamoate

INTRODUCTION

Hibiscus is a large genus that contains herbs, shrubs and trees widely distributed in the tropical and sub-tropical region of world. *Hibiscus rosa-sinensis* Linn. (Malvaceae) is commonly known as jasut in Hindi and China rose in English. It is an evergreen woody, glabrous, showy shrub of 5-8 ft in height. Leaves are bright green, ovate, coarsely toothed above, flower are solitary, axillary, bell shaped, large 4-6 inch in diameter with pistil and stamens projecting from the centre^[1]. Folklorically the flowers are used as demulcent, emollient, refrigerant, aphrodisiac emmenagogue and as anthelmintic^[2]. A decoction of flower is used in bronchial catarrh. The dark red petals in the form of mucilaginous infusion are used in ardor-urinae, strangury, cystitis and other irritable conditions of the genito-urinary tract^[3]. The flower of *Hibiscus rosa-sinensis* were reported to possess various activity such as analgesic^[4], anticonvulsant^[5], antidiabetic^[6], antipyretic^[7], wound healing^[8], antibacterial^[9], immunomodulatory^[10], antiestrous^[11], antioxidant^[12] and hair growth^[13].

Aegle marmelos is also known as bael, golden apple is a species of tree native to India. All parts of plants i.e. roots, fruit and leaves are used as medicinal purposes. The bael fruit has a smooth, woody shell with a green, gray or yellow peel. The essential oil of the bael tree to be effective against 21 types of bacteria. The juice of bael fruit is generally used for constipation and gastrointestinal problems^[14].

MATERIALS AND METHODS

Plant material:

The flowers of *Hibiscus rosa-sinensis* Linn and leaves of *Aegle marmelos* were collected from the gardens of Mathura district, Uttar Pradesh and authenticated by Birbal Sahni Institute of Palaeobotany, Lucknow, Uttar

Pradesh, India and a herbarium specimen was deposited in the department of pharmacognosy with Ref. No. 13374/13371.

Preparation of extracts:

The flowers of *Hibiscus rosa-sinensis* and leaves of *Aegle marmelos* were collected from gardens of Mathura (Uttar Pradesh) and dried in shade and coarsely powdered. It was then passed through the sieve no. 20. A weighted quantity (375g) of the powder drug was extracted with petroleum ether (60-80°C) using soxhlet extractor. Defatted drug was subjected to ethanolic extraction and extract was dried by distilling off the solvent and then dried in desiccator. The marc collected after ethanolic extraction was subjected to aqueous extraction by maceration process for seven days consecutively and then extract was dried by evaporating the water and stored for further activity.

Experimental worms:

Adult Indian earth worms (*Pheretima posthuma*) were collected from the moist soil as well as water logged area of Mathura district and washed with normal saline to remove all faecal matter were used for the anthelmintic activity. The earth worms of 3-6 cm in length and 0.1-0.3 cm in width were used for the experimental protocol due to their anatomical and physiological resemblance with the intestinal roundworms parasites of human beings.

Drugs and chemicals:

Piperazine citrate, Albendazole and Ayrantal pamoate were used as standard drugs. Petroleum ether (60-80), Ethanol, Di methyl sulfoxide (DMSO) were used in various part of experiment.

In-vitro Anthelmintic activity:

The *in-vitro* anthelmintic activity was evaluated on adult Indian earth worms (*Pheretima posthuma*). Worms were divided in to three groups of six worms in each group, to assess the anthelmintic activity ethanolic extract of *Hibiscus rosa-sinensis* Linn flowers and leaves of *Aegle marmelos*.

Group 1 served as control group and worms in this group were placed in solution containing DMSO in distill water. Groups 2 was served as standard and further divided in to three sub groups of six animals in each sub groups and treated by piperazine citrate, albendazole and pyrantal pamoate at concentration of 20 mg/ml in solution containing DMSO and distill water. Group 3 was act as test group and divided in to two sub groups and each sub groups was treated by ethanolic extract at concentration of 20 mg/ml. Observation were made for the time taken to paralyze and death of the individual worms. Mean time for paralysis in minute was noted when worms become motionless and to ascertain death, each worms was frequently applied with external stimuli, which stimulates and induce movement in the earthworms. Death was confirmed when no movement in worms even after application of external stimuli.

Table no.-1: Observation table for comparative activity of *Hibiscus rosa-sinensis* flower with *Aegle marmelos* leaves

Groups	Treatment	Concentration	Time taken to paralysis and death of worms	
			Paralysis time (Min.)	Death Time (Min.)
Control	Drugless	5% DMSO in Distill water	A	A
Test	a. <i>Aegle marmelos</i> Ethanolic	20mg/ml	19.53± 0.6041	53.118± 2.006
	b. <i>Hibiscus rosa-sinensis</i> Ethanolic	20mg/ml	12.59 ± 0.6944	55.54 ± 2.892
Standard	Albendazole	20mg/ml	17.76± 0.3812	50.39 ± 0.8105
	Piperazine Citrate	20mg/ml	7.81±0.1661	A
	Pyrantel pamoate	20mg/ml	19.60 ± 0.4647	64.58 ± 1.948

Results are expressed as Mean± SEM, n=6 in each group, A=absent of activity.

RESULTS

In this comparative study the ethanolic extracts of both the plants produce paralysis as well as death of the worms. As shown in Table no.-1, extract of *Hibiscus rosa-sinensis* flowers have better paralyzing effect on worm as compared to extract of *Aegle marmelos* leaves. The extract of both the plant show cidal action as shown by standards.

CONCLUSION

The study was performed on Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal round worms of human being and easily availability for in-vitro anthelmintic activity.

Piperazine citrate and Pyrantel pamoate causes spastic and flaccid paralysis of worms respectively, which may resulting in to expulsion of worms. On the other hand albendazole causes death of worms by inhibiting tubulin polymerization and blocking glucose uptake ^[15].

The mechanism action of *Hibiscus rosa-sinensis* and *Aegle marmelos* is not yet fully understood, but the anthelmintic activity justify its folkloric use in curing helminthiasis.

Therefore it can be concluded that the ethanolic extract of *Hibiscus rosa-sinensis* and *Aegle marmelos* have profound anthelmintic activity against tested worms as shown by standards. Further in future researches will also being carried out in our department to establish the prescribed mechanism of action and to identify phytochemical moiety which is responsible for this activity.

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