



COMPARATIVE ANTHELMINTIC ACTIVITY OF AEGLE MARMELLOS LINN LEAVES AND CARICA PAPAYA LINN LEAVES

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ABSTRACT

In the present work, experiments were conducted to evaluate the possible anthelmintic effects of alcoholic & aqueous extracts of Aegle marmelos leaves and alcoholic & aqueous extracts of Carica papaya Linn leaves on Indian earthworm (*Pheretima posthuma*) at 20mg/ml concentration. Results were expressed in terms of time for paralysis and time for death of worms. Albendazole was used as a standard and Distill water as a control group. The result revealed that leaves extracts of Aegle marmelos has better activity than Carica papaya Linn leaves extracts.

KEYWORDS: Anthelmintic, *Pheretima posthuma*, *Aegle marmelos*, Carica Papaya, alcoholic, Albendazole.

INTRODUCTION

Anthelmintics are drugs that are used to treat infections with parasitic worms. This includes both flat worms, e.g., flukes and tapeworms and round worms, i.e., nematodes. They are of huge importance for human tropical medicine and for veterinary medicine.^[1] Helminthes infection is the most common infection in man which effects the large proportion of world's population. The World Health Organization estimates that a staggering 2 billion people harbor parasitic worm infections.^[1,2] Albendazole, mebendazole, triclabendazole, thiabendazole, ivermectin, niclosamide, rafoxanide and other popular synthetic anthelmintic drugs were used in helminthiasis. However, resistance has been developing very fast. As well as Some Anthelmintic drugs, such as praziquantel and Albendazole are contraindicated for certain groups of patients such as pregnant and lactating woman.^[3] Thus, this has increased

the need for development of novel anthelmintic drugs. Utilization of traditional medicine should be considered in this scenario to kill these parasitic worms and it will help to find out newer molecular entities. Keeping this in view, the present study deals with the evaluation of the Anthelmintic activity of *Aegle marmelos* Linn leaves and *Carica papaya* Linn leaves.

Aegle marmelos Linn (Rutaceae), is also known as bael, golden apple is a species of tree native to India. It is a very important plant of Ayurveda. All parts of plants i.e. roots, fruit and leaves are used for treatment of various diseases. 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.^[4]

The papaya is a short-lived, fast-growing, woody, large herb to 10 or 12 feet in height. It generally branches only when injured. All parts contain latex. The hollow green or deep purple trunk is straight and cylindrical with prominent leaf scars. Its diameter may be from 2 or 3 inches to over a foot at the base. Papaya is a powerhouse of nutrients and is available throughout the year. It is a rich source of three powerful antioxidant vitamin C, vitamin A and vitamin E; the minerals, magnesium and potassium; the B vitamin pantothenic acid and folate and fiber. Papaya contains many biologically active compounds. Two important compounds are chymopapain and papain, which are supposed to aid in digestion.^[5,6]

MATERIALS AND METHODS

Collection and Authentication of Plant material

Aegle marmelos Linn leaves and *Carica papaya* Linn leaves

Fresh leaves of *Aegle marmelos* Linn & *Carica papaya* Linn were collected from local area of Sangli and authenticated by Dr. Mrs. Manisha V. Kale (Associate Professor, Dept of botany), Jaysingpur College, Jaysingpur, Shirol, Kolhapur. After authentication, fresh leaves of both plants were collected in bulk, washed under running tap water, dried under shade for a period of 7 days and then pulverized in mechanical grinder to obtain coarse powder. The dried powder was stored in airtight bottles.

Extraction methodology

Aqueous Extract of Aegle marmelos Linn leaves

The coarse powdered material (50 gm) was macerated in distilled water for 48 hours. After maceration, the solutions were filtered and the concentrate was evaporated on water bath until

syrupe consistency is left and then evaporated to dryness. The dried extracts recovered were placed in sterilized screw-capped bottles and stored at refrigeration temperature.^[7]

Ethanol Extract of Aegle marmelos Linn leaves

Plant powder (20 g) was successively extracted with 200 ml of 95% ethanol in a Soxhlet apparatus for 04 to 05 hrs. Extracts were filtered & concentrated by keeping in water bath at 40°C until dry mass is obtained.^[7,8]

Aqueous Extract of Carica papaya Linn leaves

The coarse powdered material (20 gm) was macerated in distilled water for 48 hours. After maceration, the solutions were filtered and the concentrate was evaporated on water bath until syrupe consistency is left and then evaporated to dryness. The dried extracts recovered were placed in sterilized screw-capped bottles and stored at refrigeration temperature.^[9]

Ethanol Extract of Carica papaya Linn leaves

Plant powder (20 g) was successively extracted with 200 ml of 95% ethanol in a Soxhlet apparatus for 04 to 05 hrs. Extracts were filtered & concentrated by keeping in water bath at 40°C until dry mass is obtained.^[10,11]

Experimental worms

Indian earthworm *Pheretima posthuma* were used to study Anthelmintic activity. The earthworms were collected from the moist soil from the near region of Jaysingpur, Kolhapur, Maharashtra and washed with normal saline to remove all faecal matter. The earthworms in 6-8 cm in length were used for experimental protocol due to their anatomical and physiological resemblance with the intestinal roundworms parasites of human beings.

Anthelmintic screening

For the Anthelmintic activity, Indian adult earthworms (*Pheretima posthuma*) in 6-8 cm in length were used. The earthworms were divided in Twenty Two groups of six earthworms in each group. The ethanol, aqueous extracts (10, 20, 30, 40 & 50 mg/ml conc.) of both Aegle marmelos Linn leaves and Carica papaya Linn leaves were dissolved in sterile distilled water and final volume was adjusted to 50 ml. The extract and standard drug Albendazole (20 mg/ml) were freshly prepared before starting the experiments. The extract of different concentration and standard solution were poured in different Petri dishes. All the earthworms were washed into normal saline solution before they are released in to Petri dishes.

Observation were made for time taken to paralyze (paralysis was said to occur when earthworms didn't revive in normal saline) and death (death was concluded when earthworms lost their motility and followed with their body colors fading away). All the results were expressed as a mean \pm SEM of six earthworms in each group.



Figure 1: Aqueous Extract of Aegle marmelos Linn leaves.



Figure 2: Alcoholic Extract of Aegle marmelos Linn leaves.

OBSERVATION TABLE

Table 1: Anthelmintic Activity of Aqueous & Ethanol extracts of Aegle marmelos Linn leaves against Earthworm.

Treatment	Time taken by earthworms for	
	Paralysis (min) mean \pm SEM	Death (min) mean \pm SEM
Distilled Water (Control)	Absent	Absent
Standard Albendazole (20 mg/ml)	15 \pm 0.3605	41 \pm 0.2516
Aqueous Extract		
10 mg/ml	35 \pm 0.2309	65 \pm 0.3055
20 mg/ml	22 \pm 0.1154	56 \pm 0.1527
30 mg/ml	16 \pm 0.1	36 \pm 0.2645
40 mg/ml	14 \pm 0.4358	24 \pm 0.9165
50 mg/ml	10 \pm 0.2645	15 \pm 0.0577
Ethanol Extract		
10 mg/ml	21 \pm 0.2081	52 \pm 0.1
20 mg/ml	18 \pm 0.0577	45 \pm 0.1527
30 mg/ml	14 \pm 0.2516	31 \pm 0.1527
40 mg/ml	13 \pm 0.0577	20 \pm 0.3214
50 mg/ml	08 \pm 0.1527	10 \pm 0.2309

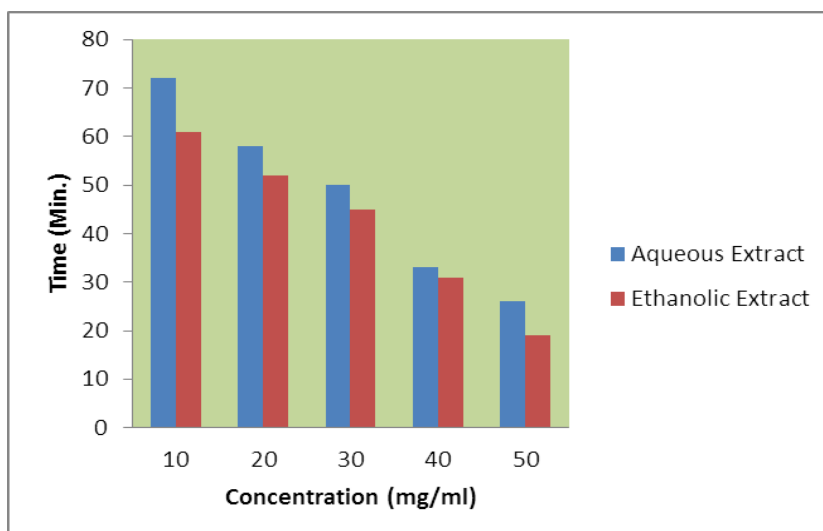


Figure 3: Anthelmintic activity of Aqueous & Alcoholic Extract of Aegle marmelos Linn leaves.

Table 2: Anthelmintic Activity of Aqueous & Ethanol extracts of Carica papaya Linn leaves against Earthworm.

Treatment	Time taken by earthworms for	
	Paralysis (min) mean \pm SEM	Death (min) mean \pm SEM
Distilled Water (Control)	Absent	Absent
Standard Albendazole (20 mg/ml)	15 \pm 0.3605	41 \pm 0.2516
Aqueous Extract		
10 mg/ml	30 \pm 0.1	72 \pm 0.2
20 mg/ml	22 \pm 0.2645	58 \pm 0.3055
30 mg/ml	25 \pm 0.2	50 \pm 0.1527
40 mg/ml	18 \pm 0.2886	33 \pm 0.3605
50 mg/ml	14 \pm 0.1154	26 \pm 0.2081
Ethanolic Extract		
10 mg/ml	32 \pm 0.2886	61 \pm 0.6305
20 mg/ml	29 \pm 0.1	52 \pm 0.3605
30 mg/ml	21 \pm 0.2	45 \pm 0.1154
40 mg/ml	17 \pm 0.1	31 \pm 0.6305
50 mg/ml	12 \pm 0.2081	19 \pm 0.1154

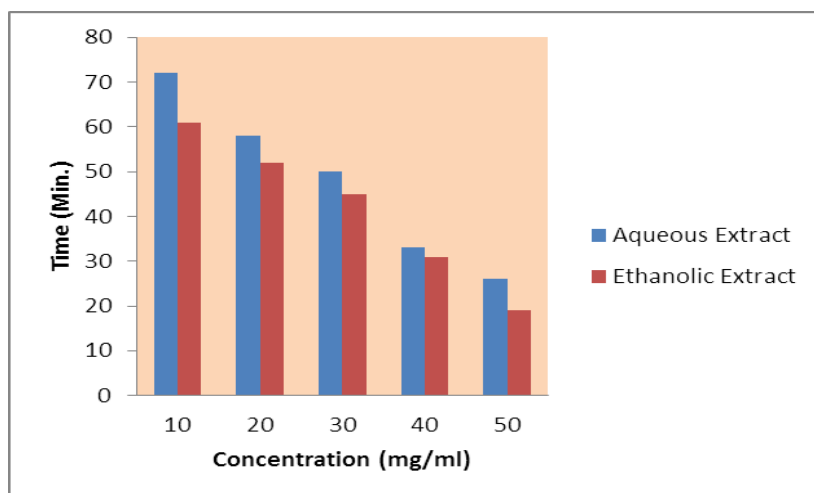


Figure 4: Anthelmintic activity of Aqueous & Alcoholic Extract of Carica papaya Linn leaves.

Table 3: Phytochemical Evaluation of Aegle marmelos Linn leaves (Alcoholic and Aqueous extract).^[12,13]

Chemical tests	Result	Chemical tests	Result
<u>Test for Saponins</u> Foam test	Positive	<u>Test For Tannins</u> A. 5% Ferric chloride B. Acetic acid test C. Dil. KMnO ₄ Test	Positive Positive Positive
<u>Test For Steroids</u> Salkowaski test	Positive	<u>Test For Flavonoids</u> A. Lead acetate test B. NaOH + Dil.acid	Positive Positive
<u>Test For Alkaloids</u> Dragendroff's test Wagner's test Mayer's test	Positive Positive Positive	<u>Test for Glycosides</u> Borntrager's test	Positive

Table 4: Phytochemical Evaluation of Carica papaya Linn leaves (Alcoholic and Aqueous extract).^[14,15]

Chemical tests	Result	Chemical tests	Result
<u>Test For Carbohydrates</u> A. Benedicts Test B. Fehling's Test C. Molisch's Test	Positive Positive Positive	<u>Test For Tannins</u> A. 5% Ferric chloride B. Acetic acid test C. Dil. KMnO ₄ Test	Positive Positive Positive
<u>Test For Steroids</u> Salkowaski test	Positive	<u>Test For Flavonoids</u> A. Lead acetate test B. NaOH + Dil.acid	Positive Positive
<u>Test For Alkaloids</u> Dragendroff's test Wagner's test Mayer's test	Positive Positive Positive	<u>Test for Glycosides</u> Borntrager's test	Positive

RESULTS AND DISCUSSION

The perusal of the data reveals that as the concentration increases paralysis and death time decreases. In Table 1 of Anthelmintic Activity of Aqueous & Ethanol extracts of *Aegle marmelos* Linn leaves, ethanolic extract at the concentration of 50 mg/ml showed both paralysis and death in 08 min and 10 minutes respectively as compared to aqueous extract, Paralysis & death time is 10 & 15 minutes respectively. While In Table 2 of *Carica papaya* Linn leaves, ethanolic extract at the concentration of 50 mg/ml showed both paralysis and death in 12 minutes and 19 minutes respectively as compared to aqueous extract, Paralysis & death time is 14 & 26 minutes respectively. The extract of both the plant show cidal action as shown by standard Albendazole on earthworms. Ethanolic extracts required least time to cause paralysis and death of the earthworms followed by aqueous extracts of both plants.

CONCLUSION

From the above results, it is concluded that the Ethanolic extract of *Aegle marmelos* Linn leaves and *Carica papaya* Linn leaves shows potent Anthelmintic activity as shown by standard Anthelmintic drug. Some of these phytoconstituents may be responsible to show a potent Anthelmintic activity. It is also confirmed that these drugs triggers natural immune system to fight against various parasites and helminthes. This comparative study reveals that *Aegle marmelos* Linn leaves shows potent Anthelmintic activity as compared to *Carica papaya* Linn leaves.

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