

Study of Anthelmintic Activity of Carica Papaya on Different Animals

B. Kishore, A. Sharada, S. Varsha, G. Srivalli, B. Rama Devi

Department of Pharmaceutical Chemistry, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana

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*Corresponding author: B. Kishore, Department of Pharmaceutical Chemistry, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana

Abstract

The main aim of the present study was to know about the anthelmintic activity of Carica papaya on different animals like goats, sheep, rats, mice, earthworms, pigs, cattle, and hen and experimental designs to perform assay of anthelmintic activity. In this assay, the animals are divided into four groups (A, B, C, and D) and the group A as control, group B as standard, groups C and D as given an extract of Carica papaya seeds or latex or leaves, and the methods to estimate results.

Keywords: Anthelmintic activity, *Carica papaya seeds*, leaves and latex, fecal egg counts

1. Introduction

Helminthiasis is a disease that majorly affects a part of the body which is caused by roundworms, pinworms, or tapeworms. The worm deposits on the gastrointestinal tract but it also affects the liver and other organs of the body.[2] The plants were used to cure diseases in animals since ancient days, this system of treatment is generally known as indigenous, Unani, or folk medicines.[7] Carica Papaya is also known as Pawpaw [1] and it is belonging to the family Caricaceae and it is growing in various parts of the world including India, tropical America, and Europe.[20] It is a fast-growing large herb to 10-12 feet's and the green fruit contains papain similar to pepsin, leaves contain alkaloid carprine, fruit and latex contain glucoside carposide.[10]The papaya latex showed an antiparasitic efficacy[3], leaves and seeds contain antibacterial, anti-inflammatory, antihepatotoxicity, anthelmintic and antimicrobial activities.[29,32] The papaya

seeds combined with other substances like black cumin seeds, Tamarindus indica L show more effective antimicrobial and anthelmintic activity respectively.[1,32] The Carica papaya fruit is used as an immunostimulant, antioxidant agent, immature fruit and roots used for the abortifacient activity, the latex and seeds are used for gastrointestinal nematode infections, anthelmintic activity.[29] The milky juice of unripe fruit is using as a power full anthelmintic agent in most countries mainly against roundworms, the boiled leaves are used for malaria, and as an anthelmintic agent, the seeds as tea and vermifuge of fallen leaves for hypertension.[19] The benzyl isothiocyanate and papain are two major active constituents that are responsible for producing anthelmintic activity.

2. on Goats

2.1. Materials and methods:

Collection Carica papaya seeds: The seeds were collected

from papaya fruit brought from the market. The seeds were cleaned and dried under the shade for 2 weeks. Then dried seeds were pulverized into fine powder by using the grinder.[15]

Preparation of extract: Take 75g of Carica papaya seeds for preparation of aqueous extraction of seeds. The seeds powder was blended in 150ml of distilled water. The mixture was centrifuged at 1500rpm and filter by using the vacuum pump. The 0.5g of active ingredient contained in 1ml of extract. [9,18].

2.2 Invitro assay

For the in-vitro assay on 10 goats of age 6-12 months which showed 800-1200 eggs per gram of feces (EPG) before treatment were selected and given an aqueous extract of Carica papaya for 100mg/kg weight of a goat thoroughly orally once in a day for three consecutive days. And 10 health healthy goats were kept in control without any treatment [15]

"By examination of a fecal sample of goats with EPG done before treatment and third, seventh, twenty-first days after the treatment to find the efficacy of anthelmintic activity of the extract. The weight of goat was measured before treatment and after the treatment".[15]

3. on Earthworms

Majorly on earthworms, the experiment was performed by extracts of various parts like leaves, seeds, latex.

3.1 Materials and method

Collection of earthworms: Pheretima Posthuma was an Indian adult earthworm that was collected from waterlogged areas and in moist soil and identified by the pharmacology department. Then collected earthworms were washed with saline to remove fecal matter. [5] The selected earthworms' lengths are 5-7cm and widths are 0.1-0.3cm. [28]

Collection of seeds: The Carica papaya seeds were collected, identified, and authenticated pharmacognosy department. The seeds were shade dried and pulverized into a fine powder and stored in an airtight container for further use.[5]

Method of extraction: The seed powder was extracted by using

70% Hydro-alcoholic solvent and the extract is kept for drying at 40-50degrees.[5]

Collection and extraction of latex: Latex of Carica papaya was collected from the area of Kakinada [16] and the fresh latex of Carica papaya is collected and cut longitudinal into 4-6 parts with a knife. The cute latex parts were collected in a container. Further, the prepared latex was made into different concentrations of 20, 50, 100. [2]

3.2 In-vitro Assay of anthelmintic activity

The adult earthworms were selected for in-vitro assay of anthelmintic activity since it's physiological and anatomically similar to roundworms parasites of intestines in animals and humans.[14]

Each group containing 6 adult earthworms was divided into 10 groups. The seed extract and albendazole standard reference for seed extract made into different concentrations of 20, 40, 60 mg/ml by using normal saline as a solvent.[5] For latex extract was made into 20, 50 100 concentrations, and the standard was Piperazine citrate, for both normal salines acted as a control.[16] All the earthworms were washed with normal saline and kept in a different concentration of extracts in a Petri dish. Then note the time required for the death or paralysis of earthworms. It is confirmed by fading and mobility of the body of earthworms and time is compared with a standard and control. [5,14,16]

4. on Rats

4.1 Materials and method

Collection and extraction of Carica papaya seeds: The seeds were collected from dried ripen papaya fruit available in the commercial market and dried under the shade for the time of 2 weeks and ground into fine powder. The extraction of seed powder was infused by boiling 10g in 100ml of distilled water for 15 minutes and filter it. Then distilled water was added to the filtrate to make 10% of the concentration.[4]

Selection of rats: "The 18 male Sprague Dawley-strain rats were used in the experiment. Before starting the experiment measure the weight of rats it should be between 100-150g and

rats were 4-8 weeks old. The rats were divided into 3 groups containing 6 rats in each group and kept in experimental cages and feed with commercial food two times a day and tap water when it was necessary. But on the experiment started day food is not given only water was received". [4,10]

4.2 Experimental design: In the divided three first group was kept as a control, for the second group 0.6g and the third group 1.2g of infused seed per kg body weight. The seed infusion was given to rat forceful feeding through the oral route. Then fecal matter was collected on day of 1,2,3,7,8,9,13,14,15,19,20 and 21 days. After the treatment of 21 days, surgery was done for postmeridian to count *H. diminuta*, worm count. Compare second, third groups with a control group to estimate the anthelmintic activity.[4]

5. on Sheep

5.1 Material and methods

Collection and extraction of seeds: The seeds were collected from the ripened fruit of *Carica papaya* and wash it with fresh water to remove the dirt then dry it under the sun and ground it into fine powder. [13,17] The 75g of powder was mixed with 150ml of distilled water and then centrifuged at 1500rpm then the mixture was filtered using a filter paper and the filtrate is used for the experimental study.[17]

Preparation of standard: The mebendazole was used as a standard and 12.5mg/kg of the dose was given to a sheep.[17]

5.2 Experimental design

The sheep were divided into four groups as A, B, C, and D which contains 10 sheep in each group. Group A was treated as control without giving any medication, group B was treated with a standard and group C was treated with feed additives, and group D was treated with an aqueous extract of seeds. The drug and extract were given for 3days and the same process repeated after two weeks and it is done again after two weeks and the results were assessed by using a t-test and ANOVA test.[17]

There were some more assays for determining the anthelmintic effect like egg hatch assay, larval development

and validity assay [13], fecal egg count, and necropsy and worm counts. [6,25]

6 on Mice

The *Carica papaya* latex and seeds were used for the anthelmintic activity in mice.[3]

6.1 Materials and method

Collection of seeds

The seeds were collected from ripening papaya, dried, and ground into fine powder.[21]

Collection and extraction of latex: The latex of *Carica papaya* was collected by making 4-6 incisions on unripe fruit with a knife and excluded latex was collected in a trunk. Then latex was dried in a hot air oven at 65-80 degrees Celsius, after drying the latex store in a brown container and extracted by the maceration method.[33]

Selection of mice: The 25 albino mice were selected for the experiment; they were weeks old and 20-25g of weight each and kept clean condition in a room for infection-free.[21]

Infecting the mice: The mice were infected with a suspension of *H. polygyrus* in 0.2ml of distilled water.[11]

6.2 Experimental design

The mice were divided into three groups and the first group was non-infected and non-treated (5 mice), the second group was infected and non-treated (5 mice), the third group was infected and treated (15mice).[21]

6.3 Assay

In this assay the dried *Carica papaya* powder was given to mice orally with 1.2g/kg of dose for three consecutive days on 18th,19thand 20th of after the infection.[21]

The parasites were examined by using various methods like the concentration floatation method, necropsy, and mounting of worms.[21]

7 on Hen

7.1 Material and methods

Collection of latex: The latex of papaya was collected from green papaya fruit by 2-3mm depth incisions from the skin and collected latex made into 20% concentration with distilled

water. [8,30]

Selection of hens: The brown male hens were selected at 10 weeks old and are infection-free. Then hens were infected when they become 18 weeks old.[22]

7.2 Experimental design

The hens were divided into four groups as A, B, C, and D. Then group A was kept as control, group B was treated with piperazine of 322 mg/kg body weight as a standard reference, to group C extract administrated as a feed additive 300mg/day and to group D the crude extract in 1:10 of water. The drug and extract were administrated for 3days and repeated the process after two weeks and again after two weeks. The result was estimated by fecal egg count.[12]

8 on Pigs

8.1 Material and methods

Collection and extraction of seeds: The seeds were collected from the ripened fruit, dried, and ground into fine powder. Then the powder was extracted with infusion technique.[27]

8.2 Experimental design

The 126 *Ascaris suum* test animals were collected from the intestines of pigs that were affected by a virus. Worms were cleaned with a NaCl and worms were divided into three groups. To group-1 papaya seed extract was given concentrations of 10%, 20%, 30%, and 40%. The was group-2 kept as positive control by giving citrate piperazine in 0.2%, 0.3%, 0.4%, and 0.5% concentrations, and group-3 was kept as a negative control by giving a solution of 0.9% NaCl. The process was repeated twice and the result was observed by keeping worms in a hot water. If the worm moves then it is still alive if it does not move then worms dead or got paralyzed.[27]

9 on Cattle

9.1 Material and methods

Collection and extraction of leaves of *Carica papaya*: The leaves of *Carica papaya* were collected, dried, and pulverized into a fine powder and made different concentrations like 25, 50, and 100mg/ml, and albendazole 15mg/ml was used as a

standard. [23,26]

Collection of test pathogen: The parasites *H. Contortus* and *P. Cervi* from killed cattle and wash the worms then store in a 0.9% phosphate buffer saline at Ph 7.4 [23,]

9.2 Assay: The assay similar to an assay of earthworms by divided into different groups. [5,14,23]

Conclusion

The study mainly discusses the various experimental designs and assays on different animals for estimating the anthelmintic activity of extracts of *Carica papaya* on animals.

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