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# Evaluation of Phytochemical Screening and Anthelmintic Activity of Ethanolic Extract of *Carica Papaya* L. Seed

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**Abstract:** ***Carica Papaya Linn. is belonging to the family Caricaceae and is also known as "paw - paw. " Papaya has remarkable therapeutic characteristics that can be used to cure a variety of illnesses. The Carica papaya plant's various parts, including the fruit, seeds, latex, and leaves, have been shown to have medicinal benefits. This research focuses on anthelmintic activity of seeds. Thus Carica Papaya acts as a multifaceted plant. Identifying the plant chemicals' mechanisms and studying the extract's active ingredient are equally important. Anthelmintic activity of the various aqueous extract of seeds of Carica Papaya Linn. Evaluated on earthworms 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 Carica Papaya L. Aqueous extract of seeds of Carica Papaya Linn. Also showed dose - dependent reduction of earthworm death and paralysis. Aqueous extract of Carica Papaya Linn. Showed highly significant anthelmintic activity at the concentration of 10 mg/ml. The results showed that the aqueous extract of Carica Papaya Linn. It has wormicidal properties and can be used as an anthelmintic.***

**Keywords:** *Carica Papaya* L, caricaceae, PheretimaPosthuma, un - ripe seed, Anthelmintic, Helminths.

## 1. Introduction

Helminthias is a prevalent and serious global disease, affects both humans and animals, causing malnutrition, anemia, eosinophilia, and pneumonia. Intestinal nematodes infect a large group, posing a significant public health threat in developing countries. Infections can occur in tropical regions or temperate climates. [1]

Helminths are invertebrates with flat or round bodies, including flatworms, tapeworms and roundworms. They are subdivided by host organ, with helminth infections being the most prevalent diseases in advanced countries. [2]

About half of the world's population suffers from helminthiasis, a gastrointestinal parasitism affecting a large proportion, particularly in third - world countries. Worms like pinworm, roundworm, and tapeworm infect the gastrointestinal tract and organs, causing various infections like soil - transmitted helminths, schistosomiasis, and lymphatic filariasis. These chronic infections can cause significant morbidity and physical damage to hosts. World Health Organization estimates 2 billion people have parasitic worm infections, impacting livestock, crops, and domestic pets, affecting food production and economic impacts. [3]

Anthelmintic drugs treat infections caused by parasitic worms, which affect various species and burden human health, livestock production, and crop production. There are two major phyla of helminths: nematodes (roundworms) and platyhelminths (flatworms). Nematodes include soil - transmitted human helminthes and tissue - swelling filarial worms, while platyhelminths include trematodes and cestodes. [4]

Carica Papaya Linnaeus, a plant in the Caricaceae family, is gaining popularity in developing countries for herbal medicine. Herbal treatments use plant extracts and bioactive substances, such as alkaloids, which have antimalarial, antihypertension, and ophthalmological properties. [5]

Helminthiasis is a disease caused by worms like pinworm, roundworm, or tapeworm, affecting the gastrointestinal tract and liver. Infected individuals excrete eggs, contaminating soil and causing severe morbidity and mortality. Parasitic diseases like filariasis, onchocersiasis, and schistosomiasis are important parasitic diseases. [6]

**Plant Profile**

*Carica Papaya* L. is a large, apolygamous species with a trunk at the top, resembling an umbrella canopy. Its fruit is oval - shaped with a central seed cavity, with a weight of 1 to 3 kg. Fresh fruit is yellow, orange, or salmon at maturity. Papaya is dioeciously or hermaphroditic, producing male and bisexual flowers. The plant is self - pollinated, with male flowers being smaller than females. Papaya leaves are greenish to yellowish and have potential benefits for treating dengue, malaria, and various viral diseases.

**Table 1:** Botanical Classification of Papaya [7]

| | |
|---|---|
| Domain | Flowering plant |
| Kingdom | Plantae |
| Subkingdom | Tracheobionta |
| Class | Magonliopsida |
| Subclass | Dilleniidae |
| Division | Magnoliophyta |
| Subdivision | Spermatophyta |
| Phylum | Steptophyta |
| Order | Brassicles |
| Family | Caricaceae |
| Genus | Carica |
| Botanical Name | *Carica Papaya* Linn. |

## 2. Materials & Methods

### 2.1 Plant Collection & Authentication

The plant *Carica Papaya* Linn. seeds were collected from the field of Hivare (Vita) Sangli, Maharashtra, India. It was identified and authenticated by Dr. Shankar M. Shendage (M. Sc., Ph. D., M. B. A., FIAAT, and Associate professor department botany), Balwant College, Vita (Sangli).

### 2.2 Collection of Worms

To investigate the effectiveness of anthelmintics, mature Indian earthworms (Pheretimaposthuma) were used. The earthworms (collected from the water - logged areas of soils, in Sangli, Maharashtra) were washed with normal saline to remove all fecal materials. The earthworms4 - 5 cm. in length and 0.1 - 0.2cm in width were used for all experimental protocols. The earthworm can be used to examine anthelmintic activity because it shows morphological and physiological similarities with human intestinal roundworm parasites.

### 2.3 Preparation of Extract

The *Carica Papaya* L. rhizomes were collected, washed with distilled water, shade dried & lastly, grind into fine powder & stored separately in air - tight bottles.

Soxhlet apparatus is a popular and inexpensive extraction technique used for the extraction of different bioactive compounds from plant material.

For extraction, the powdered samples of seed were extracted with ethanol and hydroalcoholic solvent (ethanol and water in a ratio 2: 1). Plant samples were cold macerated for 72 hours, after which filtrates were concentrated in vaccume, packaged, and stored for later use. [8]

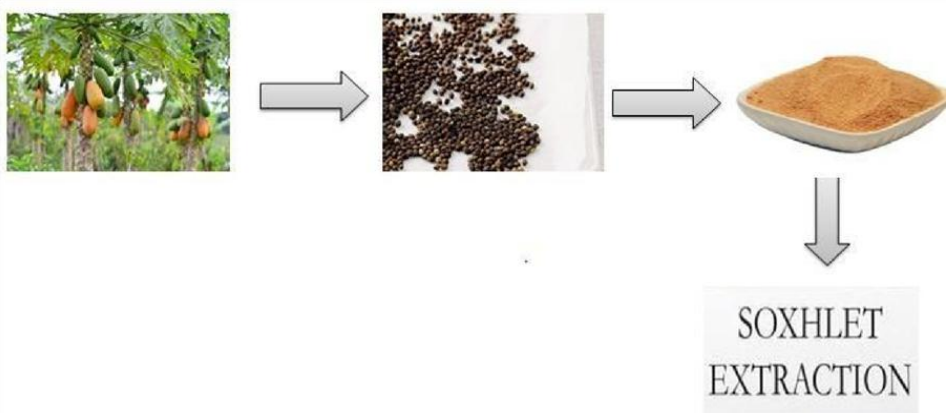


**Figure 1:** Preparation of Extract

### 2.4 Preliminary Phytochemical Testing of Extract

Ethanolic preparations of. *Carica Papaya* L. Seedwere subjected to various phytochemical investigations for alkaloids, phenols, glycosides, flavonoids, tannins and carbohydrates. [9]

**Table 2:** Phytochemical Screenings

| S.No | Test | Procedure | Observations |
|---|---|---|---|
| **Detection of Alkaloids** | | | |
| 1 | Dragendroff's test | Few ml filtrate + 1 - 2 ml Dragendorff's reagent | Reddish - brown precipaitate |
| 2 | Hager's test | Few ml filtrate + 1 - 2 ml Hager's reagent | Creamy white precipitate |
| 3 | Mayer's Reagent | Few ml filtrate + 1 - 2 drops of Mayer's reagent (Along the sides of test tube) | A creamy white/yellow precipitate |
| **Detect ion of Flavonoids** | | | |
| 4 | Ferric chloride | Test Extract aqueous solution + Few drops 10% ferric chloride solution | A green precipitate |
| 5 | Lead acetate | Test 1ml plant extract + Few drops of 10% lead acetate solution | A yellow precipitate |
| 6 | Ammonia test | Filtrate + 5ml dil. Ammonia solution + conc. $H_2SO_4$ | A yellow colour |
| 7 | Conc. $H_2SO_4$ test | Plant extract +Conc. $H_2SO_4$ | An Orange colour |
| **Detect ion of Cardiac Glycosides** | | | |
| 8 | Test for Cardenolides | Extract + Pyridine + Sodium nitroprusside + 20% NaOH | A red colour, fades to brownish yellow |
| 9 | Bromine water | Test Plant extract + Few ml of bromine water | A yellow precipitate |
| 10 | Baljet test | 2ml extract + A drop of Baljet's reagent | A yellow - orange colour |
| **Detection of Reducing Sugars** | | | |
| 11 | Benedict's test | 0.5ml filtrate + 0.5ml Benedict's reagent + Boiled for 2 min | Green/yellow/red colour |
| 12 | Fehling's test | 1ml each of Fehling's solution A & B + 1ml filtrate boiled in water bath | A red precipitate |
| 13 | Modified Borntrager's test | Plant extract + Ferric chloride solution + Boil for 5min. + cooled + Equal volome of benzene + Benzene layer is separated + Ammonia solution | A rose - pink to blood red coloured solution |
| 14 | 10% NaOH test | 1ml dil. $H_2SO_4$ + 0.2ml extract + Boiled for 15min +Allowed cooling + Neutralize with 10% NaOH + 0.2ml Fehling solution A & B | A brick red precipitate |

| | | | |
|---|---|---|---|
| **Detect ion of Phenolic compounds** | | | |
| 15 | Iodine test | 1ml extract + Few drops of dil. Iodine solution. | A transient red colour |
| 16 | Ferric chloride test | Extract aqueous solution + Few drops 5% ferric chloride solution. | Dark green/bluish black colour |
| 17 | Gelatin test | Plant extract is dissolved in 5ml distilled water + 1% gelatin solution + 10% NaCl | A white precipitate |
| 18 | Lead acetate test | Plant extract is dissolved in 5ml distilled water + 3ml of 10% lead acetate solution. | A white precipitate |
| **Detect ion of Tannins** | | | |
| 19 | Gelatin test | Plant extract is dissolved in 5ml distilled water + 1%gelatin solution + 10% NaCl | A white precipitate |
| 20 | Bromine water test | 10 ml of bromine water + 0.5gm plant extract | Decoloration of bromine |
| 21 | Lead sub acetate test | 1ml filtrate + 3 drops of lead sub acetate solution | A creamy gelatinous precipitate |
| 22 | Braymer's test | 1ml filtrate + 3ml distilled water + 3 drops 10% Ferricchloride solution | Blue - green colour |
| **Detection of Carbohydrates** | | | |
| 23 | Barfoed's test | 1ml filtrate + 1ml Barfoed's reagent + Heated for 2 min. | A red precipitate {monosaccharides} |
| 24 | Molish's test | 2ml filtrate + 2 drops of alcoholic α–naphthol + 1ml Conc. $H_2SO_4$ (along the sides of test tube) | A violet ring |
| 25 | Seliwanoff's test | Test 1ml extract solution + 3ml seliwanoff's reagent + heated on water bath for 1 min. | A rose red colour {ketoses} |
| 26 | Test for starch | Aqueous extract + 5ml 5% KOH solution | A cinary colouration |

### 2.5 Experimental Work

**Sample description:** Sample Test

**Sample form**: Semi Solid

**Activity:** In Vitro Anti Anthelmintic Activity

**Anthelmintic Assay**

The sample test was tested for anthelmintic activity. Pheretimaposthuma of nearly equal size was selected randomly for the present study. The worms were acclimatized to the laboratory condition before experimentation. The earthworms were divided into four groups of six earthworms each. Albendazole was diluted with normal saline solution to obtain 10mg/ml served as standard and poured into petri dishes. The sample test was dissolved in a small quantity of 10mg/ml DMSO and adjusted the volume with normal saline solution up to 15 ml. The sample test was evaluated by the time taken for complete paralysis and death of earthworms. The mean lethal time for each test compound was recorded and compared with the standard drug. The time taken by worms to become motionless was noted as paralysis time. To ascertain the death of the motionless worms frequently applied external stimuli, which stimulate and induce movement in the worms, if alive.

## 3. Result and Discussion

Alkaloids, phenols, cardiac glycosides, and flavonoids were identified in the preliminary phytochemical analysis of *Carica Papaya* L. the following are the result of the phytochemical study, as shown in table

**Table 3:** Result of Phytochemical Screeing of *Carica Papaya* L.

| Sr. No | Chemical Constituents | Observation |
|---|---|---|
| 1 | Alkaloid | Present |
| 2 | Phenol | Present |
| 3 | Glycosides | Present |
| 4 | Flavonoids | Present |
| 5 | Tannins | Present |
| 6 | Carbohydrates | Present |

Extracts were tested for their anthelmintic properties. The extract caused paralysis that leads to the loss of mobility and loss their reaction to external stimuli, which leads to the death. The ethanolic preparation of *Carica Papaya* Linn. showed good anthelmintic activity at high concentrations, which was compared to the reference standard drug, Albendazole.


**Figure 2:** Anthelmintic Activity Of Blank, Standard (Albendazole), Test.

The result of anthelmintic activity exhibited by test on Pheretimaposthumais shown in below Table -

**Table 4:** Anthelmintic Activity of Albendazole and *Carica Papaya* L. Extract

| Sr. No. | Group | Concentration mg/ml | Average Time in (min) | |
|---|---|---|---|---|
| | | | Paralysis Time (min) | Death Time (min) |
| 1 | Blank | Vehicle | - | - |
| 2 | Albendazole | 10 | 1.07 | 2.05 |
| 3 | Test | 10 | 3.00 | 7.05 |

1) A closer inspection of data from this table indicates that Test 10mg/ml showed very high activity as compared to standard drug.
2) Ethanolic extracts derived from the seed of *Carica Papaya* Linn. are potent against the tested, According to table. These finding are a good backup for the traditional use of *Carica Papaya* L. as an anthelmintic.

## 4. Summary and Conclusion

The current study's results indicated that the Ethanolic preparations of *Carica Papaya* Linn. Has anthelmintic efficacy against the Indian earthworm Pheretimaposthuma. At a dosage of 10mg/ml, the rhizome has significant anthelmintic action as determined by the times it takes for the earthworm to be paralyzed or die.
The most common effect of Albendazole on worms is flaccid paralysis which leads to worms' expulsion via peristalsis. Albendazole causes muscle relaxation and flaccid paralysis by increasing the chloride ion conductance of the worm muscle membrane. This causes hyperpolarization and reduced excitability

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