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# Phytochemical Screening Of Papaya Leaf

**Rahul Mathur*[1], Umme Habiba Khan[2], Vivek Chauhan[2], Vipin Malviya[2], Vishesh Sahu[2], Vishal Sen[2], Vedant Shukla[2], Richa Kashiv[1], Dr. Jagdish Chandra Rathi[3]**

[1]Associate professor, NRI Institute of Pharmaceutical Sciences, Bhopal
[2]Student, NRI Institute of Pharmaceutical Sciences, Bhopal
[3]Principal, NRI Institute of Pharmaceutical Sciences, Bhopal

***Abstract:*** The objective of phytochemical screening of papaya leaf is to identify and analyse the bioactive compounds present in the leaf. These compounds have significant medicinal, therapeutic, and nutritional benefits. The leaves were collected, dried then ground into fine powder using a blender or grinder. The powdered form increases the surface area for efficient extraction of phytochemicals. The powdered material was stored in an airtight container at room temperature, away from direct sunlight until further use. Plant powder was extracted using solvents of varying polarities to ensure a broad spectrum of compounds is obtained. The results of the phytochemical screening of papaya (*Carica papaya*) leaves revealed the presence of various bioactive compounds including alkaloids, flavonoids, tannins, saponins, phenolic compounds, glycosides, terpenoids, and steroids. These compounds are known for their potential therapeutic properties, such as antioxidant, antimicrobial, anti-inflammatory and immune-boosting effects. The results support the traditional use of papaya leaves in herbal medicine for treating ailments like dengue fever, digestive disorders, and infections. The study concludes that papaya leaves are a rich source of phytochemicals with promising medicinal potential.

***Keyword:*** Phytochemical, Papaya, Extraction, Antioxidant, Screening

## INTRODUCTION

C. papaya commonly known as Pepita belongs to the family Caricaceae[1]. The papaya is a big, tree-like flora, with a single hollow trunk growth from 6 to 12 m (15 to 33 ft) tall, with centrifugal arranged leaves bound to the top of the trunk[2]. The leaves are large, 50 cm–70 cm, deeply multilateral, with seven lobes[3]. The flowers and fruits appear on the axils of the leaves, maturing into large fruit, 10 cm–40 cm long and 10 cm–30 cm in diameter. *C. papaya* leaves are used as a green tea for the treatment of malaria in some parts of the world Mature leaves are bitter in taste[4]. They comprise the bitter alkaloids, carpaine and pseudocarpaine, which effect on the heart and respiration like digitalis, but are destroyed by heat. C. papaya was traded throughout America by the Spanish and Portuguese from the 16$^{th}$ century[5].

At present the main issue is the development of multi antibiotic resistance in the pathogens[6]. The bioactive compounds of the leaves of *Carica papaya*; solo and solomix were extracted using ethanol and n-hexane, and investigated for the presence of secondary metabolites. Both ethanol and n-hexane extracts revealed the presence of alkaloids[7]. Flavonoids, glycosides and saponins were present in only the ethanol extract whereas tannins were present in the n-hexane extract[8]. The bioactivities of the leaf extracts were attributed to their phytochemical constituents[9]. The screening of medicinal plant extracts and plant products for antimicrobial and antioxidant properties show that many of such plants are primary sources of antibiotics[10].

Pawpaw (*Carica papaya*) belongs to the family *caricaceae* with over twenty species but only one member of the genus *Carica,* cultivated as a fruit tree, while the other three genera (*Cyclicomorpha, Jarilla and Jacaratia*) are grown primarily as ornamentals[11]. Papaya leaves have been used in the treatment of various ailments including urinary tract infections. The *C. Papaya* plant produces a natural compound (Annonaceous acetogenins) in its leaf, bark and twig tissues that possess both highly antitumour and pesticidal properties[12]. Antimalarial and anti-plasmodial activities have also been demonstrated by the leaf extract of the plans. Leaves of the *C. Papaya* plants contain karpain, substance that kills microorganisms that often interfere with the digestive function[13]. The free radicals impair the proper functioning of the glutathione peroxidase and regulate the action of immune system, leading to various disease conditions[14]. Nutrient antioxidants such as vitamins C and E within the flavonoids are naturally occurring phenolic compounds in the body. phytochemical screening of papaya leaf involves the process of identifying and analysing the various bioactive compounds present in leaves of *Carica papaya*[15].

The objective of phytochemical screening of papaya leaf is to identify and analyse the bioactive compounds present in the leaf. These compounds can have significant medicinal, therapeutic, and nutritional benefits.

## EXPERIMENTAL

**Collection of Plant Material:** Collection of plant, Ensure they are free from any contaminants like dust or pests.

**Figure 1: Leaves of Papaya**

**Washing and Drying:** The leaves are thoroughly washed with clean water to remove dirt and impurities. They are then air-dried in the shade to prevent degradation of active compounds.

### Preparation of Plant Material

**Grinding:** Once the leaves are dried, they are ground into a fine powder using a blender or grinder. The powdered form increases the surface area for efficient extraction of phytochemicals.

**Storage:** The powdered material is stored in an airtight container at room temperature, away from direct sunlight until further use.

### Extraction of Phytochemicals

Phytochemicals were extracted using solvents of varying polarities to ensure a broad spectrum of compounds is obtained. The common methods include:

**Solvent Extraction:** Materials Required: Powdered papaya leaves, solvents like ethanol, methanol, chloroform, water, or acetone.

**Procedure:** A specific amount of powdered leaf material (e.g., 20-50 g) is soaked in a solvent ethanol (e.g., 200-500 ml) in a conical flask or beaker. The mixture is allowed to stand for 24-72 hours with intermittent shaking. After extraction, the solution is filtered using filter paper to remove solid residues. The filtrate is concentrated using a rotary evaporator or by allowing the solvent to evaporate naturally. The concentrated extract is collected and used for further phytochemical analysis.

**Figure 2: Extraction of Papaya**

**Phytochemical Screening Tests**

After the extraction process, specific chemical tests are conducted to identify the presence of various phytochemical groups. Some of the commonly used tests are as follows:

**Test for Alkaloids:** Dragendorff's reagent and Mayer's reagent.

Procedure: A small portion of the extract is treated with a few drops of Dragendorff's or Mayer's reagent. Formation of a precipitate (yellow or reddish-brown) indicates the presence of alkaloids.

**Test for Flavonoids:** Lead acetate or concentrated sulfuric acid ($H_2SO_4$).

Procedure: A portion of the extract is mixed with lead acetate solution or treated with sulfuric acid. A yellow or orange color indicates the presence of flavonoids.

**Test for Tannins:** Ferric chloride solution ($FeCl_3$).

Procedure: A few drops of ferric chloride solution are added to the extract. A blue-black or green coloration indicates the presence of tannins.

**Test for Saponins:** The extract is diluted with water and shaken vigorously. Persistent frothing indicates the presence of saponins.

**Test for Phenolic Compounds:** Ferric chloride or Folin-Ciocalteu reagent.

Procedure: A small portion of the extract is treated with the reagent. A deep blue or green color indicates the presence of phenolic compounds.

**Test for Glycosides:** Glacial acetic acid and sulfuric acid.

Procedure: The extract is treated with acetic acid followed by the addition of sulfuric acid. The appearance of a brown ring at the interface indicates the presence of glycosides.

**Test for Terpenoids:** Chloroform and concentrated sulfuric acid.

Procedure: A small portion of the extract is treated with chloroform and sulfuric acid. A reddish-brown coloration at the interface indicates the presence of terpenoids.

**Figure 3: Identification test for the presence of various phytochemical groups**

## RESULTS AND DISCUSSION

The results of the phytochemical screening of papaya (*Carica papaya*) leaves typically reveal the presence of various bioactive compounds. These results are documented in a tabular format, showing the presence (+) or absence (–) of specific phytochemical groups.

**Table No.1: Results of sample based on common phytochemicals tests on papaya leaves**

| Phytochemical | Test Used | Result |
|---|---|---|
| **Alkaloid** | Dragendorff's Test<br>Mayer's reagent<br>Hager's reagent<br>Wagner's reagent | (+) Positive<br>(+) Positive<br>(-) Negative<br>(+) Positive |
| **Flavanoid** | Lead acetate test<br>Sulfuric acid test | (+) Positive<br>(+) Positive |
| **Tannins** | Ferric chloride test<br>Gelatin test | (-) Negative<br>(+) Positive |
| **Saponins** | Foam test | (+) Positive |
| **Phenolic Compounds** | Ferric chloride test<br>Potassium hydroxide test | (-) Negative<br>(+) Positive |
| **Glycoside Test** | Acetic acid and sulfuric acid test | (+) Positive |
| **Terpenoids** | Chloroform and sulfuric acid | (+) Positive |
| **Cardiac Glycoside Test** | Killer-Killiani test | (-) Negative |
| **Anthraquinone** | Borntrager's test | (-) Negative |

**Alkaloids:** Presence of alkaloids indicates potential therapeutic applications, as alkaloids are known for their analgesic and antimalarial properties.

**Flavonoids and Phenolic Compounds:** These compounds are powerful antioxidants, which help in reducing oxidative stress and protecting cells from damage.

**Tannins:** Known for their astringent properties, tannins can exhibit anti-inflammatory and antimicrobial activities.

**Saponins:** The presence of saponins, which are natural surfactants, suggests potential benefits in boosting the immune system and lowering cholesterol.

**Glycosides and Terpenoids:** These bioactive compounds have significant medicinal importance, including anti- inflammatory, antibacterial, and anticancer effects.

**Steroids:** Steroids present in the leaves may have anti- inflammatory and hormone-regulating properties.

The presence or absence of these compounds supports the traditional uses of papaya leaves in herbal medicine, such as treatments for dengue fever, digestive disorders, and immune system support. Further analysis and research would be necessary to quantify these compounds and explore their specific biological activities.

## CONCLUSIONS

The phytochemical screening of papaya (*Carica papaya*) leaf reveals the presence of various bioactive compounds, including alkaloids, flavonoids, tannins, saponins, phenolic compounds, glycosides, terpenoids, and steroids. These compounds are known for their potential therapeutic properties, such as antioxidant, antimicrobial, anti- inflammatory, and immune-boosting effects. The results support the traditional use of papaya leaves in herbal medicine for treating ailments like dengue fever, digestive disorders, and infections.

The study concludes that papaya leaves are a rich source of phytochemicals with promising medicinal potential. Further research is recommended to quantify these compounds and investigate their specific pharmacological activities, which could lead to the development of natural health products and new therapeutic agents. The phytochemical screening of papaya leaf confirms its traditional medicinal uses and highlights its potential as a source of natural antioxidants, antimicrobials, and anti- inflammatory agents. The identified phytochemicals may contribute to the development of new pharmaceuticals and nutraceuticals.

## CONFLICTS OF INTERESTS

There no conflicts of interests.

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