

# Qualitative Analysis of Phytochemicals Screening of Extract of Papaya Seeds

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## Abstract

Phytochemical analysis of fruit seeds is an important commercial interest in the food industry to produce nutritional supplements for the treatment of degenerative diseases. Papaya seeds have a high medicinal value. The present study was intended to investigate the Preliminary phytochemical studies of different extracts of *Carica papaya* seeds. Dried and ground papaya seeds (5g), respectively mixed with 95ml of solvent (water, methanol, and ethanol) for 24 hours were used for this study. Extraction was done by Soxhlet extraction methods. The extract was then separated and sorted through Whatman's filter paper. Three different extracts of papaya seeds were prepared and analyzed for their phytochemical Substance. The results revealed the presence of phytochemical constituents was higher in ethanol extract of papaya seeds than in methanol and aqueous products. Therefore, the results scientifically confirm the use of papaya seeds in traditional medicine and can be used to treat various diseases caused by free radicals and chemicals due to the presence of secondary metabolites.

**Key Index Terms:** Papaya seeds- Phytochemicals- Soxhlet extraction- Extracts-disease

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## INTRODUCTION

The interest in natural antioxidants has increased considerably in recent years because of their beneficial effects on prevention and risk reduction in several diseases. Phenolic compounds are biologically active molecules that serve as natural antioxidants. Preliminary screening studies may aid in the identification of bioactive principles, which could lead to drug discovery and development (1). Papaya is a member of the Caricaceae family, which includes four genera. In India, the genus *Carica* L. is represented by four species, the most frequently grown and well-known of which is *Carica papaya* L. (2)

Papaya fruit is a sweet, cheap, and easily available tropical fruit. In addition to papaya, its seeds also have economic value and medicinal properties. Papaya seeds are rich in many nutrients and antioxidants. The nutrients contained in papaya seeds are folic acid, potassium, copper, magnesium, and fiber. It also contains some very important nutrients such as protein, carbohydrates, beta-carotene, fatty acids, benzyl isothiocyanate, glucosinolate benzyl, beta-sitosterol, the enzyme caricin, myrosinase, and 40% water (3,13). Medicinal plants containing phytochemicals such as flavonoids are said to have antioxidant, antibacterial, and antiallergic effects, maintain an inflammatory balance and reduce the risk of certain types of cancer. (4). Many plant compounds are found in papaya fruits and various components such as seeds, latex, leaves, and roots. Papaya seeds also contain a variety of botanical ingredients that help treat many diseases.

The pulp of seeds and skins contains a variety of antioxidant phytochemicals, including natural phenols and flavonoids. Phytochemicals are bioactive nutrient-free plant compounds found in fruits, vegetables, grains, and seeds that reduce the risk of serious chronic illness (14,15). But there is little or no information on the phytochemical properties of this nutritious seed. Hence, the present work evaluates the qualitative phytochemical analysis of poorly utilized papaya

seed. Considering all these facts, the present study was designed to investigate the presence of various phytochemicals in the three different extracts of papaya seeds, a plant that evokes various therapeutic effects.

## MATERIAL AND METHODS

**Collection and preparation of sample:** The plant *Carica papaya* was collected in a sterile polythene bag, rinsed, sundried, and made into a powdery form before use. Plant materials were collected from a local fruit shop in the Ramanathapuram district. The fruit seeds were collected, washed in tap water, rinsed in sterile distilled water, and dried for 5 days at 100 C. The dried fruit seeds were blended to powder with a clean mortar and pestle and stored in airtight glass containers kept in a laboratory cupboard until required for further analysis. The fruit seeds were separately extracted with ethanol, methanol, and aqueous.



**Papaya Seeds**



**Papaya seeds Powder**

**Preparation of extracts of papaya fruit seeds:** Extraction of seeds powder was done by maceration and Soxhlet Extraction. In the maceration, 20g powdered seeds were soaked in 100 mL water and 20 g powdered seeds were soaked in 100 mL methanol for 5 days in a closed container at room temperature with occasional shaking or stirring. The extract was then repeated from the fruit seeds particles by straining. The process is repeated once or twice with fresh solvent. Finally, the last residue of the extract was pressed out of the plant particles using a mechanical press and then filtered using Whatman filter paper.

### Qualitative Phytochemical analysis of Papaya seeds:

Phytochemicals like flavonoids and phenols are strong antioxidants and have an important role in the health care system (5). Screening of active compounds from plants has led to the discovery of new medicinal drugs which have efficient protection and treatment roles against various diseases, including cancer and Alzheimer's disease (6). Qualitative phytochemical screening was done for the evaluation of major phytochemical constituents such as Alkaloids, Flavonoids, Tannin, Saponins, Terpenoids, Phenol, Anthro quinine, Glycosides, Phytosterol, and steroids using the standard procedure of analysis (7,8,9). The reactions in this analysis revealed the presence or absence of these compounds in the seed with different extractions.

**Test for Alkaloids:** The concentrates were treated with 2% dilute HCl and kept in a water bath at 100°C for 2minutes. In the wake of cooling, scarcely a few drops of 5% NaOH solution were added into the blend and were noticed for the arrangement of turbidity or yellow precipitate.

**Test for Flavonoids:** A couple of drops of NaOH solution were added to the extracts. Development of exceptional yellow color which vanishes on adding oil. HCl was noticed.

**Test for Tannins:** Uniform mixture of 0.5ml of the extract was set up in 1ml of water. To the blend, 2 drops of FeCl<sub>3</sub> solution were added. The presence of catholic tannins is demonstrated by the appearance of a green dark tone.

**Test for Saponins:** Five ml of distilled water and 0.5ml of concentrate were mixed and shaken for 15 minutes. Foam development shows the presence of saponins in the seed powder extract.

**Test for Terpenoids:** To the 4ml of concentrate, 0.5ml of acidic anhydride, 0.5ml of chloroform, and conc. H<sub>2</sub>SO<sub>4</sub> was added to the mixture and noted for the arrangement of red-violet tone.

**Test for Glycoside** Keller- Gilani test 0.5ml of concentrate was blended in with 2ml of glacial acetic acid to the combination; a few drops of conc. H<sub>2</sub>SO<sub>4</sub> and FeCl<sub>3</sub> were added. Reddish-brown colored shading at the intersection of two layers and presence of phenols was indicated by a blue-green or black colouring. Blue-green color in the upper layer demonstrates the presence of glycosides in the seed powder extract.

**Test for the presence of phenols:** The presence of phenols was determined by using the method described by Yadav & Agarwala [20]. Two grams of the sample were soaked in 10ml of methanol. After 24 hours, it was filtered using Whatman filter paper (No1). 2ml of the extract was mixed with a dilute ferric chloride solution. A blue-green or black coloration was formed indicating the presence of phenols.

**Test for Anthocyanin:** 2 ml of concentrate was blended in with 1ml of 2N NaOH and boiled in a water bath for 5minutes. Perseverance of somewhat blue-green shading marks the presence of anthocyanin.

**Test for Phytosterol:** 5 ml of concentrate was treated with 3ml conc. H<sub>2</sub>SO<sub>4</sub> followed by 2ml of chloroform. The blend was permitted to rest briefly. The appearance of reddish-brown precipitate in the chloroform layer was noticed for the presence of phytosterol.

**Test for Steroids:** In a test tube, 1 ml of the sample was taken and mixed with 5 ml chloroform, at that point, an equivalent volume (5 ml) of concentrated sulphuric acid was carefully added through the sides of the test tube. If the upper layer transforms into a red tone and the sulphuric acid layer becomes a yellow tone with slight green fluorescence which shows the presence of steroids.

### RESULTS AND DISCUSSION

Phytochemical constituents such as tannins, flavonoids, alkaloids, and several other aromatic compounds or secondary metabolites of plants serve as a defense mechanism and curative properties against predation by many microorganisms, insects, and herbivores (10). The analysis of phytochemical screening of papaya seed was shown in Table 1. The different extractions (methanol, ethanol, and aqueous) revealed the presence and absence of phytoconstituents of the papaya seed

**Table-I: Qualitative phytochemical screening of different extracts of papaya seeds**

Sample	Phytochemical Substance	Methanol	Ethanol	Aqueous
Papaya Seeds	Alkaloids	+	+	+
	Flavonoids	+	+	+
	Tannin	+	++	+
	Saponins	-	+	+
	Terpenoids	+	-	+
	Phenols	++	++	-
	Anthro quinone	+	++	-
	Glycosides	-	++	-
	Phytosterol	-	+	-
	Steroids	++	+	+

Table I shows the phytochemical screening of Papaya seed seeds where, 7 out of 10 components such as Alkaloids, Flavonoids, Tannin, Saponin, Terpenoid, Phenol, Anthro quinone, and steroids were present with methanol solvent extraction; 9 out of 10 components such as Alkaloids, Flavonoids, Tannin, Saponins, Terpenoids, Phenol, Anthro quinone, Glycosides, Phytosterol, and steroids were present with Ethanol solvent extraction and 6 out of 10 components such as Alkaloids, Flavonoids, Tannin, Saponins, Terpenoids, and steroids were present with Aqueous extraction.

The presence of phytochemicals with biological activity can be beneficial and of great medicinal value. It is said that phytochemicals such as saponins, terpenoids, flavonoids, tannins, steroids, and alkaloids have anti-inflammatory effects (11,16). Glycosides, tannins, flavonoids, and alkaloids have hyperglycemic activities. Steroids and triterpenoids showed analgesic properties ( 12,17).

## CONCLUSION

Some of the plant seeds investigated for phytochemical constituents appeared to have the potential to improve user health as a source of useful medicines and in the presence of various compounds essential for health. From the foregoing, it can be concluded that phytochemical screening in methanolic, aqueous, and ethanolic extracts of papaya seeds revealed the presence of major phytochemical constituents such as saponins, tannins, flavonoids, alkaloids, phenolic compounds were high in the Ethanolic extract than methanolic and aqueous extracts comparatively. The phenol and flavonoid may be the potential chemo preventive and anticancer substances. It is, therefore, recommended that the cultivation of these oilseeds should be upgraded to enhance their wider utilization. Further study has to be encouraged on the effect of processing of these nutrient-rich seeds. Thus, the research focused on bringing to light their potential for commercial exploitation

## REFERENCES

- [1]. Rybarczyk, A. and Amarowicz, R. (2007). Silica gel column chromatography of phenolic compounds in sweet lupin seeds extract. *Bromatologia i Chemia Toksykologiczna*. 4: 375–379.
- [2]. Duenas, M., Hernandez, T., Estrella, I., and Fernandez, D. (2009). Germination as a process to increase the polyphenol content and antioxidant activity of lupin seeds (*Lupinus angustifolius* L.). *Food Chemistry*. 117: 599–607.
- [3]. Kavitha Vijayaraghavan, S.Mohamed Ali, and R.Maruthi. (2013). Studies On Phytochemical Screening And Antioxidant Activity Of *Chromolaena Odorata* And *Annona squamosa*. *International Journal of Innovative Research in Science Engineering and Technology*. 2 (12): 7315-7321
- [4]. Edeoga, HO, Okwu , DE and Mbaebie, BO(2005) Phytochemical constituents of some Nigerian medicinal plants, *African J. Biotech* 4(7): 685- 688
- [5]. Sood A, Uniyal PL, Prasanna R, Ahluwalia AS (2012) Phytoremediation potential of aquatic macrophyte, *Azolla*. *Ambio* 41:122–137
- [6]. Mallikharjuna P B, Rajanna L N, Seetharam Y N, Sharanabasappa G K. Phytochemical studies of *Strychnos potatorum*. *Lf-A medicinal plant E-J Chem*. 2007;4:510–518.
- [7]. Aravind G, Bhowmik D, Duraivel S, Harish G (2013) Traditional and medicinal uses of *Carica papaya*. *Journal of Medicinal Plants Studies* 1: 7-15.
- [8]. Ajayi IA, Ajibade O, Oderinde RA (2011) Preliminary phytochemical analysis of some plant seeds. *Res J Chem Sci* 1(3): 58-62
- [9]. Zhou K, Wang H, Mei W, Li X, Luo Y, et al. (2011) Antioxidant Activity of Papaya Seed Extracts. *Molecules* 16(8): 6179-6192.
- [10]. Devi P S S, Kumar N (2017) The surprising health benefits of papaya seeds: A review. 6: 424-429.
- [11]. Raaman N. *Phytochemical Techniques*. New India Publishing Agency, New Delhi, 2006, 19-24.
- [12]. Tiwari P, Kumar B, Kaur M, Kaur G, Kaur H. Phytochemical screening and Extraction: A Review. *Internationale Pharmaceutica Scientia*. 2011; 1(1):98-106
- [13]. Auwal MS, Saka S, Mairiga IA, Sanda KA, Shuaibu A and Ibrahim A. Preliminary phytochemical and elemental analysis of aqueous and fractionated pod extracts of *Acacia nilotica* (Thorn mimosa). *Veterinary Research Forum*. 2014; 5(2):95-100.
- [14]. Sofowra, A. 1993. *Medicinal Plants And traditional Medicine In Africa*. Spectrum Books Ltd., Ibadan, Nigeria, pp. 191-289.
- [15]. Trease, G.E., Evans, W.C. 1989. *Pharmacognosy*, 11th edn., Bailliere Tindall, London, pp. 45-50.
- [16]. Harborne, J.B. 1973. *Phytochemicals Methods*. Chapman and Hall Ltd., London, pp. 49-188.
- [17]. Nwofia GE, Ojmelukwe P, Eji C. 2012. Chemical composition of leaves, fruit pulp and seeds in some *Carica papaya* (L) morphotypes. *Int. J. Med. Arom. Plants*, 2: 200-206