ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 1, Nov 2022

SCREENING OF PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY OF *CARICA PAPAYA* PLANT LEAF AND SEED EXTRACT

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ABSTRACT

The present study was designed for the evaluation of phytochemical and antioxidant activity of *carica papaya* leaf and seed extracts. Bioactive compounds of the leaves and seed of papaya were extracted using petroleum ether, chloroform and ethyl acetate for phytochemicals investigation. Most of the the extract revealed the presence of alkaloid, flavonoid, phenol, carbohydrate, tannin, glycosides, saponin, anthraquinine, protein and aminoacids. The carbohydrate and phenol content value were maximum. The results of free radicle scavenging potential of the different extracts tested by DPPH assay, a stable free radicle has charecteristics of absorption at 695 nm. The reduction capability of the DPPH radicles was determined by the decrease in absorbance at 695 nm, where a change in colour to yellow denotes quenching of free radicles by plant extracts. DPPH radicles react with suitable reducing agents, during which the electrons become paired off and the solution losses colour depending on the number of electrons taken up. Highest activity was exerted in ethyl acetate extract of papaya. Papaya seed has more total antioxidant activity than leaf.

Key word: *Carica papaya*, phytochemical, bioactive compound

INTRODUCTION

Plants have been used for a long time for their medicinal properties. Plant derived products viz., gums, resins, oils and extracts have been used for therapeutic purpose since ages. Systematic screening of folk medicinal plants has resulted in the discovery of novel effective compounds against harmful organisms (Tomoko *et al*., 2002)

Phytochemicals are the compound that occur naturally in plants. The term phytochemical refers to a wide variety of chemicals found in plants. Phytochemicals are bioactive substances of plants that have been associated in the protection of human health against chronic degenerative diseases (Fukumoto and Muzza, 2000). Phytochemicals are nonnutritive plant chemicals that have protective or disease preventive properties (Ahamed and Urooj, 2010). Antioxidants are substances that prevent oxidative damage to the target molecule. An antioxidant can scavenge features. In recent days, the usage of synthetic antioxidants has been taken over by natural antioxidants as it could be safer without any side effects (Felix et al., 2016). In recent decades, due to the various pharmacological actions of the medicinal plants, many researchers are showing interest in studying the antioxidant

ISSN PRINT 2319 1775 Online 2320 7876

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phytochemicals such as phenols, flavonoids, and tannins which have been recognized for their potential role in preventing human diseases (Esther *et al.,* 2016).

MATERIAL AND METHODS

Material The experimental material selected for the present study is *Carica papaya* Wild belongs to the family caricaceae it was subjected to the phytochemical screening and antioxidant activity studies. Mature and healthy plant was collected and dried at room temperature (25-300C), for about two weeks. About 30gms of plant powder of each plant species were taken in a digestion flask and fitted to the Soxhlet apparatus and was separately extracted with petroleum ether, chloroform, and Ethyl acetate. The aqueous extract was prepared from directly boiling the powder with distilled water. These extracts were concentrated and kept in brown bottles used for the phytochemical screening. The extracts were tested for alkaloids, starch, sugar, phenolic groups, tannin and amino acid. Biochemical analysis: The protein, phenol, starch, sugar, amino acids and carbohydrates are found to be essential bio chemicals for any plants to regularize the activity of the plant. Hence, the present study was also carried out for the analysis of protein, phenol and carbohydrate

Total anti-oxidant activity by phospho molybdenum method

The total antioxidant capacity of the extract was evaluated by the phosphomolybdenum method, according to the procedure described by Prieto *et al.,* (2003). A 0.3 mL of extract was combined with 3 mLof reagent solution (0.6 M sulfuric acid, 28 mm sodium phosphate and 4 mM ammonium molybdate). The tubes containing the reaction solution were incubated at 95°C for 90 min. Then, the absorbance of the solution was measured at 695 nm using a UV-VIS spectrophotometer (UVmini-1240) against blank after cooling to room temperature. Methanol (0.3 mL) in the place of extract was used as the blank. The total antioxidant activity is expressed as the number of gram equivalent of ascorbic acid. The calibration curve was prepared by mixing ascorbic with methanol.

ANTIOXIDANT ACTIVITY BY DPPH ASSAY

Ascorbic acid was used as a reference standard and dissolved in distilled water to make the stock solution with the concentration (1mg/1000µl). The solution of DPPH in methanol 60µM was prepared fresh daily before UV measurements. This solution (3.9ml) was mixed with 100µl of test solution at various concentrations (200, 400, 600, and 800µg). The samples were kept in the dark for 15 minutes at room temperature and the decrease in absorbance was measured. The experiment was carried out in triplicate. Control sample was prepared containing the same volume without any extract and reference ascorbic acid. 95% methanol was used as blank. Radical scavenging activity was calculated by the following formula.

% Inhibition = (Absorbance of Control at 0 minute - Absorbance of Test) / Absorbance of Control at 15 minutes x 100

RESULT AND DISCUSSION

Phytochemical screening of papaya shows the presence or absence of alkaloid, flavonoid, phenol and tannin (Table 1&2). Petroleum ether extract exhibit positive result for flavonoid and phenol in seed but leaf present all compounds. Chloroform extract shows positive result for alkaloid, flavonoid, tannin and phenol for leaf and seed. Ethyl acetate extract exhibit

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positive result for alkaloid, flavonoid, tannin and phenol. In papaya leaf all phytochemicals are present in all extract.

Table 1 Qualitative analysis of phytochemicals

Sl.no	chemicals	leaf			seed		
		PE	CL	EA	PE	CL	EA
1	Alkaloid	+	+	+	_	+	+
2	Flavonoid	+	+	+	+	+	+
3	Tannin	+	+	+	_	+	+
4	Phenol	+	+	+	+	+	+

Phytochemicals (from the Greek word phyto, meaning plant) are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and Antioxidants are substances that prevent oxidative damage to the target molecule. An antioxidant can scavenge the free radicals because of their singlet oxygen quenching and redox hydrogen donating features. In recent days, the usage of synthetic antioxidants has been taken over by natural antioxidants as it could be safer without any side effects. In recent decades, due to the various pharmacological actions of the medicinal plants, many researchers are showing interest in studying the antioxidant phytochemicals such as phenols, flavonoids, and tannins which have been recognized for their potential role in preventing human diseases**Results and discussio**

Biochemical analysis

Biochemical studies reveal that, the extract has carbohydrate, amino acids, starch and sugar. It was found that the leaf contains maximum carbohydrates (2.5mg/g/fw), protein (1.2mg/g/fw), amino acids(0.95mg/g), starch (0.05 and sugar(2.42mg/g/fw). Seed contains carbohydrates (2.3mg/g/fw), protein (0.96mg/g/fw), amino acids(0.25mg/g), starch (2.3 and sugar(2.02mg/g/fw).

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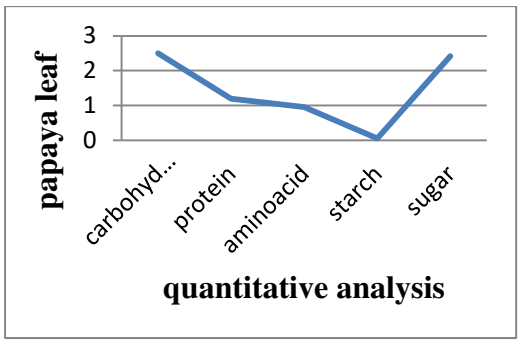
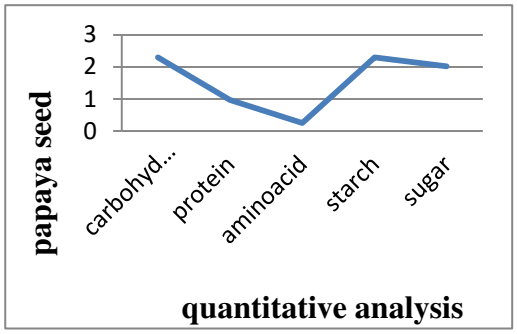
Table 2 quantitative analysis

SL.NO	Biochemicals	Papaya leaf	Papaya seed
1	Carbohydrate	2.502mg/g	2.30 mg/g
2	protein	1.20 mg/g	0.962 mg/g
3	amino acid	0.954 mg/g	0.25 mg/g
4	Starch	0.053 mg/g	2.3 mg/g
5	sugar	2.42 mg/g	2.02 mg/g

Papaya leaf was found to be rich in carbohydrates, starch, sugar, protein. The fat content of the papaya was negligible, making it's good constituent in functional foods which can be consumed safely without any concern of health risk of fat free diet.





Antoxidant activity

DPPH radicles react with suitable reducing agents, during which the electrons become paired off and the solution losses colour depending on the number of electrons taken up. Highest activity was exerted in ethyl acetate extract of papaya. In the experiment, the solution progressively reduced to a yellow-coloured product, Diphenylpiery hydrazine with the addition of the extracts in concentration depend manner. High activity of ethyl acetate extract may be due to the presence of high hydroxyl groups free radicles act as trigger to a number of degenerative diseases. Therefore, sample having free radicle scavenging activity can be to potential medicinal importance. The significance increases of DPPH free radicle scavenging power of extracts were observed in a concentration depend fashion confirming the radicle scavenging activity of papaya.

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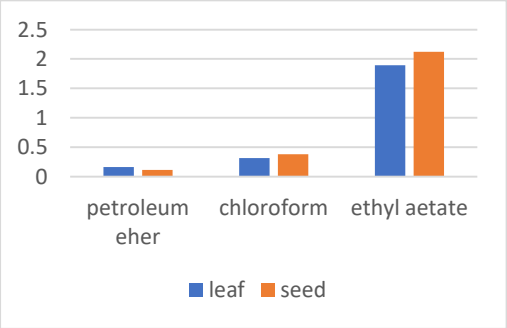
Table 3 Total anti-oxidant activity of papaya leaf and seed

Sample	SL.NO:	Extract	OD at 695 nm	Concentration of ascorbic acid in µg / mg of extract
PL	1	Petroleum ether	0.160	20
	2	Chloroform	0.315	39.37
	3	Ethyl acetate	1.892	236.5
PS	1	Petroleum ether	0.117	14.62
	2	Chloroform	0.380	47.5
	3	Ethyl acetate	2.122	265.2



Therefore, papaya leaf and seed could be used in balanced diets and functional food which can be consumed safely without any concern of health risk. This study helps in promoting increased consumption of papaya leaf and seed by general public and offers opportunity to develop value added products from them.

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