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Phytochemical evaluation of the endocarp of ripe Carica Papaya (Pawpaw) fruit

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Abstract

As an investigation into antimicrobial activity, the presence of phytochemicals in ripe endocarp of Carica papaya was evaluated using standard protocol. The results show the presence of glycosides, flavonoids, saponins, tannins and phenols. However, alkaloids and terpenoids were not detected. The presence of these phytochemicals is a reasonable explanation for the widely reported antimicrobial activity of Carica papaya ripe fruit.

Keywords: Phytochemica,l evaluation, endocarp, Carica Papaya, ripe, fruit.

Introduction

During the last few years, medicinal plants have attracted the attention of pharmaceutical and scientific communities and evidence has demonstrated the promising potential of anti-microbial plant-derived substances. The anti-microbial effect of plant oils and extracts has formed the basis of many applications, including raw and processed food preservation, pharmaceuticals, alternative medicine and natural therapies[1,2].

Plants are rich in several secondary metabolites and are a major source of chemical diversity making them potentials sources of drugs. Thus, innovative scientific methods for the discovery and validation of multi-component botanical therapeutics are important for the development of medicine and both the standardization of extracts and the identification of the efficient chemical and/or biological compounds[3,4].

Papaya is native to Central and South America but well distributed in the tropics. The different parts of the plant are said to be of medicinal benefits. It is said to ripen when it yields to gentle thumb pressure and the skin turns to orange with either pink or yellow hues. It has a deliciously sweet, musky taste with rich flavor. It is reported as a cure for rheumatism and to reduce urine acidity. It is also used in facial creams, salves and shampoos. It is said to reduce premature ageing and to eliminate dead skin cells. This accounts for its use as a face and hand mask and for the treatment of sunburns[5].

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The major classes of plant chemicals are: terpenoids, phenolic metabolites, flavonoids and alkaloids[2-4].

Materials and Methods

Test for alkaloids (Wagner's method): 3 drops of Wagner's reagent were added to the papaya extract in a test tube and allowed to stand. It was then viewed for a creamish, brown red or orange precipitate. A low reaction recorded was to be indicated by faint turbidity, moderate by light opalescence and high by heavy yellowish white precipitate[6].

Test for cardiac glycosides (Keller-Killani test): Extract was mixed with 1mL of glacial acetic acid containing a drop of ferric chloride solution. This was underlaid with 1 mL of concentrated tetraoxosulphate (VI) acid. A brown ring at the interphase was to indicate the deoxysugar-characteristic of cardenolides. The grading of the concentration of the cardiac glycoside was low – faint green blue, medium – moderate green blue colour and high - deep green blue colour[6].

Test for flavonoids: 1mL of ammonium solution (dilute) was added to the extract followed by 1mL of concentrated tetraoxosulphate (VI) acid. A yellow colouration appearing was to indicate the presence of flavonoids. The grading was as follows: low – pale yellow, moderate moderate yellow colour and high - deep yellow colour[7].

Test for saponins: 1 mL of distilled water was added to the extract and shaken to produce froth. Three drops of olive oil were added and shaken vigorously. The emulsion formed was measured. The grading was as follows: low concentration – height of 50 mm and less, moderate concentration – height of 0.6-1 cm and high concentration – height of 1 cm above[6].

Test for tannins: Few drops of 2% iron (III) chloride were added to the extract and viewed for colour change. A brownish green or blue black colouration was to be an indication of tannin with the grading as follows: low – light colour, moderate – moderate colour and high – deep colour[7].

Test for terpenoids (Salkowski Test): 2 mL of chloroform was added to the extract followed by 1mL of concentrated tetraoxosulphate (VI) acid. A reddish brown colouration at the interphase was to be an indication of terpenoids with the colour depth as the indicator of the grading[6].

Results and Discussion

Results are mention in Table-1,2,3,4,5 and 6.

Table-1: Test for Alkaloids.

Extract	Orange ppt	Remark
Ethanol	Absent	Alkaloid absent
Methanol	Absent	Absent
Methylated spirit	Absent	Absent
Ethanol-Water	Absent	Absent
Water	Absent	Absent

Table-2: Test for (Cardiac) Glycosides.

Extract	Brown ring	Remark
Ethanol	High concentration	Present
Methanol	Low concentration	Absent
Methylated spirit	High concentration	Absent
Ethanol-Water	Low concentration	Absent
Water	Low concentration	Absent

Table-3: Test for Flavonoids.

Extract	Yellow colouration	Remark
Ethanol	High concentration	Present
Methanol	Low concentration	Absent
Methylated spirit	Moderate concentration	Absent
Ethanol-Water	Moderate concentration	Absent
Water	Moderate concentration	Absent

Table-4: Test for Saponins.

Extract	Emulsion height	Remark
Ethanol	4	Low concentration
Methanol	3	Low concentration
Methylated spirit	4	Low concentration
Ethanol-Water	4	Low concentration
Water	5	Low concentration

Table-5: Test for Tannins and Phenols.

Extract	Brownish-green colouration	Remark
Ethanol	High concentration	Present
Methanol	Moderate concentration	Absent
Methylated spirit	Moderate concentration	Absent
Ethanol-Water	Moderate concentration	Absent
Water	Moderate concentration	Absent

Table-6: Test for Terpenoids.

Extract	Reddish-brown colouration	Remark
Ethanol	Absent	Absent
Methanol	Absent	Absent
Methylated spirit	Absent	Absent
Ethanol-Water	Absent	Absent
Water	Absent	Absent

Discussion: The results of the tests show the presence of glycosides, flavonoids, saponins, tanins and phenols. However, alkaloids and terpenoids were absent. The presence of phytochemicals is identified in this research, is in agreement with that of other researchers[8,9]. The presence of phytochemicals is also widely attributed to antimicrobial activity, for instance, flavonoids are referred to as nature's biological response modifiers because of strong experimental evidence of their inherent ability to modify the body's reaction to allergen, virus and carcinogen. They show anti-allergic, anti-inflammatory, antimicrobial and anti-cancers activities[10]. Similarly, tannins and saponins are best known to possess general antimicrobial and antioxidant activities[11].

Figure-1: Test for flavonoids.

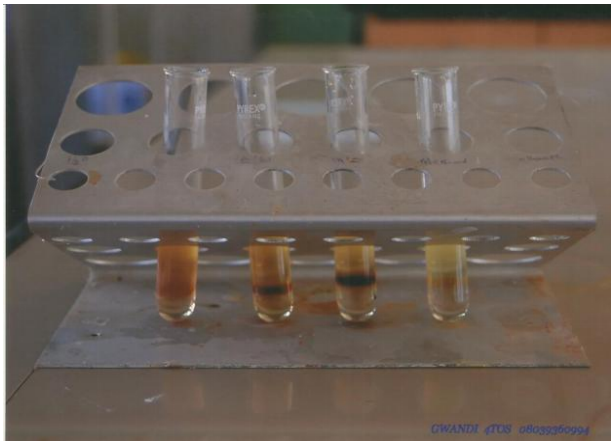

Figure-2: Test for glycosides.

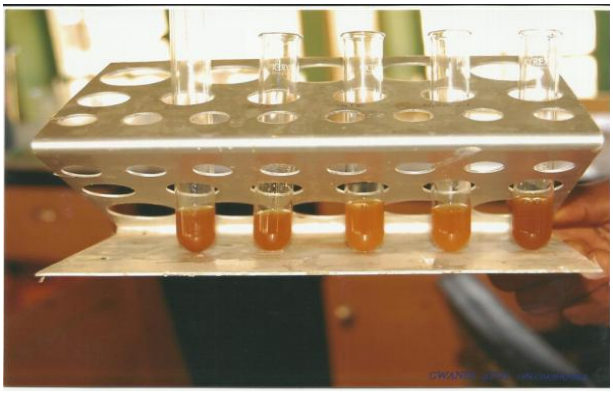

Figure-3: Test for tannins and phenols.

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