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Phytochemical and Proximate Analysis of Papaya (*Carica papaya*) Leaves

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Abstract: In this study, Papaya leaves were collected in order to investigate the presence of phytochemical composition and proximate constituent. Phytochemical analysis revealed the presence of bioactive compound saponin and tannin. Results showed that the plant leaves contained Dry Matter 89.60%, Crude Protein 13.1%, Crude Fat 3.5%, Crude Fibre 1.95%, Total Ash 18.3%, NFE 63.1%, Acid Insoluble Ash 4.4%, Ca 2.49% and Phosphorous 0.41% and it is also contain tannin and saponin.
Keywords: Papaya leaves, phytochemical and proximate analysis

INTRODUCTION

Papaya is not a tree but an herbaceous succulent plants that posses self supporting stems. [1]. *Carica papaya* belonging to the genus Carica. *Carica papaya* contains the enzyme papain, which is present in the fruits, stem and leaves [2]. It contains biologically active compounds such as chymopain and papain which aids in digestion [3]. Every part of *Carica papaya* is of economic value and its use ranged from nutritional to medicinal. The leaf tea or extract has a reputation as a tumor destroyer agent. The fresh green tea is an antiseptic whilst, the brown dried pawpaw leaves are best served as a tonic and blood purifies [4]. Papaya contains a broad spectrum of phytochemicals including enzymes (in the latex), carotenoids (in fruits and seeds), alkaloids (in leaves), phenolics (in fruits, leaves, and shoots), and glucosinolates (in seeds and fruits). The aim of this study was to determine the proximate constituent and phytochemicals that are present in *Carica papaya* leaves. This will help in determining of its medicinal value which may be useful in pharmaceutical industry.

MATERIAL METHODS

Apparatus

Spatula, Filter Paper, Water bath, Oven, Beaker, Test tubes, Sieve, Funnel, Measuring cylin der, Hand grinder, Sample bottle, Detergent and Aluminium foil.

Sample Collection:

The fresh leaves of *Carica papaya* were collected from various parts of Assam.

Sterilization of Glass Wares

All glass ware used in this research work were washed with detergent, rinse with distilled water and air dried. They were also sterilized on a hot air oven and each material was wrapped with aluminium foil before sterilization.

Sample preparation:

The plant materials were shade dried until all the water molecules evaporated and plants became well dried for grinding. After drying, the plant materials were ground well using mechanical blender into fine powder and transferred into airtight containers with proper labelling for future use.

For proximate analysis, standard techniques of AOAC [5] were followed. The proximate analyses (moisture [6] fibre, ash, fats, proteins and carbohydrates) of all the samples were determined in three replications. Briefly, the moisture and ash were determined using weight difference method. Fibre content was estimated from the loss in weight of the crucible and its content on ignition. The nitrogen value, which is the precursor for protein of a substance, was determined by micro Kjeldahl method, involving digestions, distillation and finally titration of the sample [7]. The nitrogen value was converted to protein by multiplying a factor of 6.25. Ether extract (crude fat) was determined by the Soxhlet apparatus. Extraction was done in petroleum ether having boiling point 400C-600C.All the proximate values are presented in percentage [5,8].The sum of total crude protein, ether extract, crude fibre and total ash was subtracted from 100. Total ash content was determined by heating the ground material in a dry crucible on a low flame and then it was heated in muffle furnace at 600^0C for 3- 4 hours Calcium and Phosphorus contents were determined from the ash samples.

Phytochemical Screening of the *Carica papaya*

Total phenolic content

The amount of phenol in the methanolic extract was determined by Folin-Ciocalteu reagent method with some modifications. 2.5ml of 1N Folin-Ciocalteu reagent, 10ml of 17% solution of Na2CO3 and 20ml of distill water were added to 1ml of plant extract in 50ml volumetric flask. The mixture was made up to mark with distill water and was allowed to stand for 20 min when bluish green colouration was developed. Standard tannic acid solutions of range 0-10ppm were treated similarly as 1ml of sample above. The absorbances of tannic acid standard solution as well as sample were read after colour development on spectrophotometer at 760nm.[9]

Saponin estimation:

The Spectrophotometric method described by Brunner was used for saponin analysis [10]. 1g of finely ground sample was weighed into a 250ml beaker and 100ml Isobutyl alcohol was added. The mixture was filtered through Whatman No. 1 filter paper into 100ml beaker and 20 ml of 40% saturated solution of Magnesium carbonate added. The mixture obtained with saturated MgCO3 was again filtered through a Whatman No 1 filter paper to obtain a clear colourless solution. 1 ml of the colourless solution was pipette into 50 ml volumetric flask and 2 ml of 5% FeCl3 solution was added and made up to mark with distilled water. It was allowed to stand for30 min for blood red colour to develop. 0-10 ppm standard saponin solutions were prepared from saponin stock solution. The standard solutions were treated similarly with 2 ml of 5% FeCl solution as done for 1 ml sample 3 above. The absorbances of the sample as well as standard saponin solutions were read after colour development on a Spectronic 2lD Spectrophotometer at a wavelength of 380 nm. The percentage saponin was also calculated.

STATISTICAL ANALYSIS

All the experiments were performed in triplicate and the results were expressed as mean±SD (Standard Error). Statistical analysis was performed using MS-Excel 2007.

RESULTS AND DISCUSSION

The concentration of phytochemical and the proximate constituent of papaya leaves are presented in Table 1and 2 respectively. In our studies, papaya leaves were found to be rich in proteins and ash. Dry matter content was also very high. Crude fat and Crude Fibre content were found to be very low. The phytochemical analysis of the leaves showed that the leaves contained tannin and saponins. The result showed that the levels of tannin and saponin in the plant extracts tested are 2.65% and 3.57mg/ml respectively. Tannins bind to produce rich protein and interfere with protein synthesis. They are known to exert anti-microbial activities by iron deprivation, hydrogen bounding or specific interactions with vital proteins such as enzymes in microbial cells [11]. They are also observed to have remarkably activity in cancer prevention [12, 13] Showed tannins to be useful in treatment of inflamed or ulcerated tissues. The presence of saponins supports the fact that pawpaw leaf has cytotoxic effects such as permealization of the intestine as saponins are cytotoxic [14]. Since it contains tannin and saponin, workers [15] have found antimethanogenic activity in the papaya leaves. Tannin and saponin are responsible for reducing methanogenesis in rumen liquor.

Table 1: Concentration of phytochemicals of papaya leaves

Name of plant	Total Phenol (%)	Non tannin Phenol (%)	Tannin (%)	Saponin(mg/ml)
Papaya	2.866	0.210	2.656	3.57

Table 2: Proximate analysis of Papaya Leaves

Name of the plants	DM	CP	CF	EE	TA	NFE	AIA	Ca	P
Papaya	89.60±0.03	13.1±0.03	1.95±0.02	3.5±0.31	18.3±0.26	63.1±0.09	4.4±0.32	2.49±0.34	0.41±0.05

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