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PHYTOCHEMICAL STUDIES ON *CARICA PAPAYA* LEAF JUICE

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ABSTRACT: Whole plant parts, fruits, roots, bark, peel, seeds and pulp of *Carica papaya* are known to have medicinal properties. It has been used for treatment of numerous diseases like warts, corns, sinuses, eczema, cutaneous tubercles, blood pressure, dyspepsia, constipation, amenorrhoea, general debility, expel thread worms and stimulate reproductive organs. Ayurvedic literature reveals that papaya leaf extract has haemostatic properties and recent studies revealed its ability on platelet augmentation in cyclophosphamide induced thrombocytopenia rat model. Pilot studies done in dengue patients with leaf juice revealed the effect of leaf juice on elevating white blood cells, platelet count and recovery without hospital admission. Hence, in the current study, an effort was taken to study the phytochemical profile of papaya leaf extract using Liquid Chromatography-Mass Spectroscopy (LCMS). Aqueous extract of young leaves were taken and subjected to LCMS analysis for phytochemical profiling using Water and acetonitrile as mobile phase. On LCMS analysis followed by integrated library search, 21constituents were identified and it included pharmacologically active phyto compounds, alkaloids, phenolics, flavonoids and also, amino acids. Further studies can be done on these constituents to identify and isolate the most active bio constituent attributing platelet augmentation, anticancer property, anti acne activity, easing menstrual pain and relieving nausea.

INTRODUCTION: Papaya, a tropical fruit, often seen in orange- red, yellow green and yellow orange hues with a rich orange pulp. Whole plant parts, fruits, roots, bark, peel, seeds and pulp are known to have medicinal properties. It has been used for the treatment of numerous diseases like warts, corns, sinuses, eczema, cutaneous tubercles, blood pressure, dyspepsia, constipation, amenorrhoea, general debility, expel thread worms and stimulate reproductive organs.

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It also effectively treats and improves all types of digestive and abdominal disorders [1, 2, 3, 4]. Leaves of papaya, one of the plant part with numerous medicinal value has the history of steaming and eating with spinach in Asia. It has found to have significant effect on various tumor cell lines and the tea extract of leaves found to have antimalarial and antispasmodic activities. It has found to increase the appetite, ease menstrual pain and relieve nausea.

Most important traditional use of leaf juice is its capability to increase white blood cells & platelets, normalizes clotting and also repairs the liver [5, 6]. Ayurvedic literature reveals that papaya leaf extract has haemostatic properties and recent studies on ability of *C. papaya* leaf aqueous extract on platelet augmentation in cyclophosphamide induced thrombocytopenia rat model was studied and found

significant effects [7, 8]. Pilot studies done in dengue patients with leaf juice revealed the effect of leaf juice on elevating white blood cells, platelet count and recovery without hospital admission [9]. This demand the need for the phytochemical profiling of the leaf juice to identify the bioactive constituents attributing significant activity [10].

Hence, in the current study, an effort was taken to study the phytochemical profile of papaya leaf extract using advanced chromatographic technique, Liquid Chromatography-Mass Spectroscopy (LCMS).

MATERIALS AND METHODS:

Plant material:

Young leaves of papaya was collected from manarkad region, Kottayam district, aunthentified and the voucher specimen was deposited in Department of Pharmaceutical Sciences, Regional Institute of Medical Sciences and Research, Kottayam.

Extraction of papaya leaves: [11]

Young leaves of papaya were size reduced and was triturated with minimum quantity of water in a mortar. The obtained extract was filtered to get the leaf juice.

LCMS analysis of sample:

Leaf extract was subjected to chromatographic separation on Phenomonex Phase C-18 columns (25cm x 2.5mm) using water: acetonitrile in the ratio 80:20 and operated at a column temperature of 25oC at a flow rate of 1.5ml/min. Electronic spray ionization mode was used and m/z range was 50-1000. Software used was Class V P integrated and identification of isolated constituents was based on the comparison of the mass spectral data with Wiley 275 and in house mass spectral library built from pure substances.

RESULTS:

The leaf aqueous extract was obtained and on LCMS analysis followed by integrated library search, 21constituents were identified and the compounds are listed below in the table: 1 with their molecular mass. The LCMS spectra of both positive mode and negative mode are included as **Figure 1** and **Figure 2** respectively.

TABLE 1: COMPOUNDS IDENTIFIED IN PAPAYA LEAF AQUEOUS EXTRACT

SI No.	Compond name	Molecular mass
1.	Tocopherol	430.72
2.	Ascorbic acid	176.13
3.	Carpaine	466.71
4.	Deoxykaempferol	270.25
5.	Kaempferol	286.24
6.	Deoxyquercetin	286.25
7.	Quercetin	302.24
8.	Dicoumarol	336.31
9.	Coumaroylquinic acid	338.32
10.	Coumarin	146.15
11.	Folic acid	441.41
12.	Cystine	121.16
13.	Homocysteine	135.19
14.	Cysteine sulphoxide	177.22
15.	L Glutamic acid	147.13
16.	p- Coumaroyl alcohol	150.18
17.	dimethoxy phenol	154.17
18.	umbelliferone	162.15
19.	phenylalanine	165.19
20.	Caffeoyl alcohol	166.18
21.	Methyl nonyl ketone	170.30

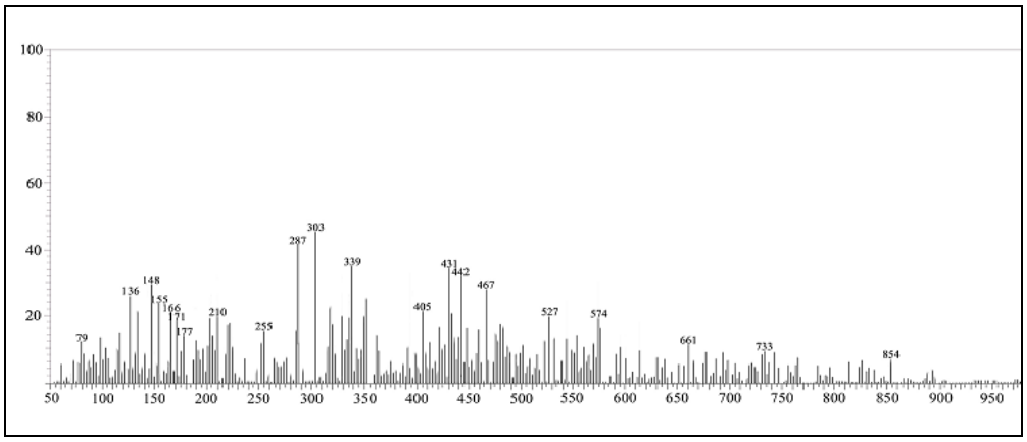

FIGURE 1: LCMS SPECTRUM (POSITIVE MODE)

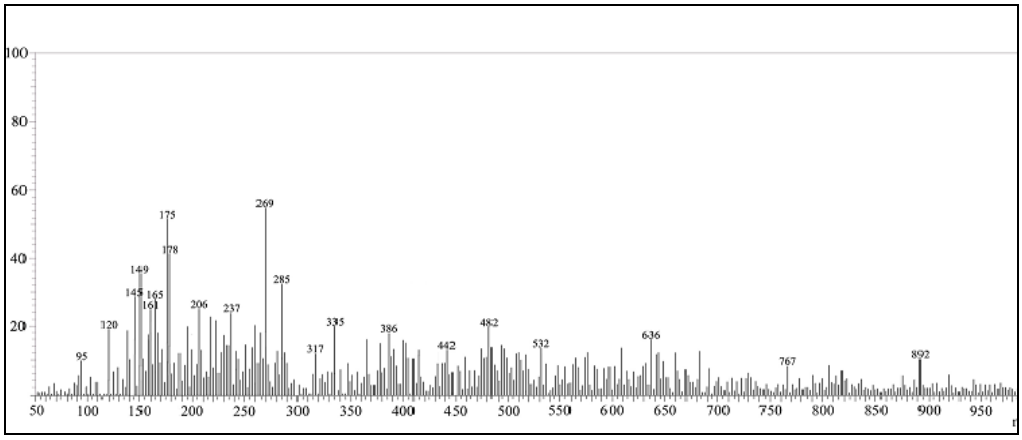

FIGURE: 2 LCMS SPECTRUM (NEGATIVE MODE)

DISCUSSION: *Carica papaya* leaves belonging to caricaceae family has traditionally used for many ailments and the nutritional benefits also reported. On comparing the green, yellow and brown leaves, green leaves were found to have best nutritional value and health benefits. Hence, in the present study, aqueous extract of young leaves were taken and subjected to LCMS analysis for phytochemical profiling. Using Water and acetonitrile as mobile phase, 21 constituents were identified and it showed the presence of pharmacologically active phyto compounds, alkaloids, phenolics, flavonoids and also, aminoacids [12, 13, 14].

CONCLUSION: Phytochemical profiling of young leaves of *Carica papaya* revealed the presence of pharmacologically active phyto compounds, alkaloids, phenolics, flavonoids and also, aminoacids. Further studies can be done on these constituents to identify and isolate the most active bioconstituent attributing platelet augmentation, anticancer property, anti acne activity, easing menstrual pain and relieving nausea.

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