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## Phytochemical analysis of the leaves of *Benincasa hispida*

**Rajalakshmi C****Abstract**

*Benincasa hispida* commonly called ash gourd belongs to the family Cucurbitaceae. It is a popular vegetable crop, especially among Asian communities both for nutritional and medicinal purposes. The plant was used medicinally in various complaints like gastrointestinal problems, respiratory diseases, heart diseases, diabetes mellitus and urinary diseases. The present study was carried out to identify the phytochemicals present in the methanolic extract of the leaves of *Benincasa hispida* by GC MS analysis. From the GC MS analysis eighteen compounds were identified.

**Keywords:** *Benincasa hispida*, cucurbitaceae, phytochemicals, GC ms analysis

**1. Introduction**

*Benincasa hispida*, which is commonly called ash gourd, winter melon, winter gourd, wax gourd etc. belongs to the family Cucurbitaceae<sup>[1]</sup>. It is a popular vegetable crop, especially among Asian communities both for nutritional and medicinal purposes<sup>[2]</sup>. The Cucurbitaceae family is mostly distributed around the tropical regions<sup>[3]</sup>. Index of Nutritional Quality [INQ] data shows that the *Benincasa hispida* is valued as a high quality vegetable<sup>[4]</sup>.

In Ayurvedic system of medicine, ash gourd pulp is employed as a main ingredient, which has potential application for neuro degenerative disorders and to improve immunity<sup>[5]</sup>. It is also used medicinally in various ailments such as gastrointestinal problems, respiratory diseases, heart diseases, diabetes mellitus and urinary diseases<sup>[3]</sup>. Fruits were traditionally used as a laxative, diuretic, tonic, aphrodisiac, cardio tonic, urinary calculi, blood disease, insanity, epilepsy, schizophrenia and other psychologic disorders, jaundice, dyspepsia, fever, and menstrual disorders<sup>[6, 7]</sup>. The major constituents of *Benincasa hispida* fruits are volatile oils, flavonoids, glycosides, sacchrides, proteins, carotenes, vitamins, minerals, beta sitosterin and uronic acid. The pharmacological studies revealed that the plant exerted many pharmacological any pharmacological activities, including central nervous effects (anxiolytic, muscle relaxant, antidepressant, in the treatment of Alzheimer's disease and to minimize opiates withdrawal signs), anti-oxidant, anti-inflammatory, analgesic, anti-asthmatic, diuretic, nephron protective, antidiabetic, hypolipidemic and antimicrobial effects<sup>[8]</sup>.

The present study deals with the GC MS analysis of phytocomponents present in the methanolic extract of leaves of the *Benincasa hispida*.

**2. Materials and methods**

The leaves of *Benincasa hispida* were collected from pathanamthitta district, Kerala. Leaves were thoroughly washed and dried in shade for 10 days. Dried leaves were made into coarse powder using mechanical blender and stored in an air tight container till further use. The coarsely powdered leaves of *Benincasa hispida* were extracted with methanol. This methanolic extract was used for GC MS analysis.

**3. GC MS Analysis**

The analysis of samples were carried out on GC/MS 7890 A Agilent GCMS instrument with DB wax column Rtx – 5ms (30m x 0.25mm x 0.25µm). The carrier gas used was Helium and the flow rate of the carrier gas was 0.8 ml/min. Injection volume was 1 µl at a concentration of 1mg/ml of the sample. The injector temperature and detector temperature was maintained at 250 °C and 200 °C and the split ratio was 25:1. The initial oven temperature was 80 °C for 2 min and then increased by 10 °C/min (i.e. 80 °C to 200 °C). This temperature was gradually increased by 4 °C/min (i.e. between 200 °C and 270 °C). The Mass Spectra ionization voltage was 70 eV and the total time taken for the analysis was 47 min. Each peak in the chromatogram was identified based on the retention index and also by comparing the fragmentation pattern of the compounds with the mass spectra in the NIST data base (Adams 2012).

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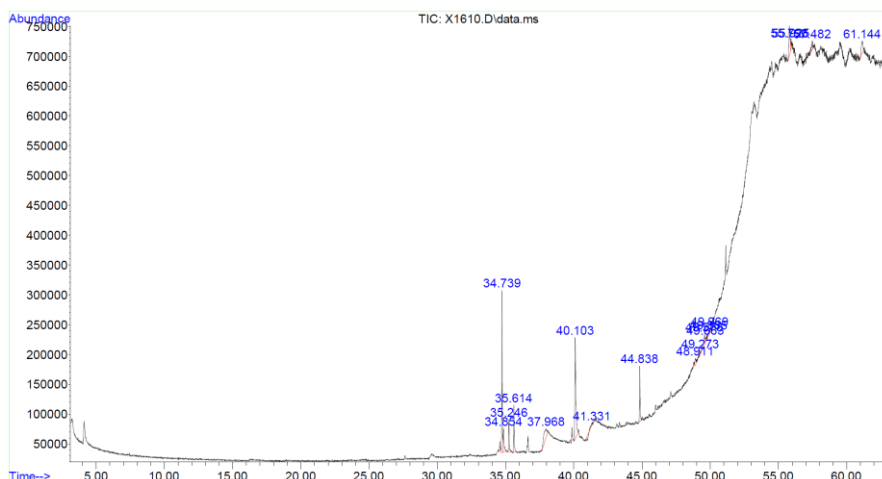
#### 4. Results and Discussions

GC MS analysis was carried out in methanolic extract of *Benincasa hispida*. Eighteen phytochemicals were detected. The 18 compounds along with their retention time and peak area are given in the table 1. From the GC MS study, the

compounds that are present in larger amounts are phytol (23.94%), 1- $\alpha$ , 2- $\beta$ , 5- $\alpha$ , 2,6,6-trimethyl bicyclo[3.1.1]heptane (21.80%), erythro-9,10-dibromopentacosane (7.79%), hexanedioic acid, bis(2-ethylhexyl)ester (7.76%).

Table 1

S. No	Name of The Compound	Peak Area (%)	Retention Time
1	Bicyclo[3.1.1]heptane,2,6,6-trimethyl-,(1.alpha.,2.beta.,5.alpha.)	21.80	34.74
2	1,2-diethyl cyclohexadecane	4.88	34.85
3	1,4-Eicosadiene	4.81	35.25
4	1-ethynyl-Cyclohexanol	6.75	35.61
5	n-Hexadecanoic acid	7.15	37.97
6	phytol	23.94	40.10
7	Oleic acid	0.075	41.33
8	Hexanedioicacid, bis (2-ethylhexyl)ester	7.76	44.84
9	Cis-Vaccenic acid	1.69	48.91
10	1-Nonadecene	0.47	49.27
11	Estra-1,3,5(10)-trien-17.beta.-ol	3.45	49.58
12	1-Pentadecene	0.61	49.66
13	2-methyl-Z,Z-3,13-Octadecadienol	1.36	49.89
14	9-Octadecenoic acid (Z)-,2,3- didydroxypropyl ester	0.40	49.96
15	Erythro-9,10-Dibromopentacosane	7.79	55.79
16	Eicosane	1.08	55.93
17	Octatriacontyl pentafluoropropionate	2.54	57.48
18	Octacosane	4.30	61.14



#### 5. Conclusion

GC MS is a valuable tool for reliable and novel identification of phytochemical compounds. In the present study 18 compounds have been identified from the methanolic extract of the leaves of *Benincasa hispida* by GC MS analysis. But till date there are few reports on GC MS analysis of leaves of *Benincasa hispida*. Thus this type of GC MS analysis is the first step towards understanding the nature of active principles in this plant and this type of study is helpful for further detailed study. An extensive research and development work should be undertaken on the plant and its products for better economic and therapeutic utilization. The present study is a preliminary step towards understanding the phyto-constituents in the leaves of the plant. These identified phytochemicals presumed to be responsible for proving the medicinal value of the *Benincasa hispida*.

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