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# PHYTOCHEMICAL AND GC-MS ANALYSIS OF *CARDIOSPERMUM HALICACABUM LINN.LEAF*

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**Keywords:**

*Cardiospermumhalicacabum*, Ethanolic extract, Phytochemical compounds, GC-MS analysis, 3-O-methyl-d-glucose, Vitamin-E acetate

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## ABSTRACT

The aim of the study was to investigate the *Cardiospermumhalicacabum* leaf for phytochemical compounds and GC-MS analysis. The presence of phytochemical compounds was screened by qualitative method. The results showed the presence of phytochemical compounds of carbohydrates, protein, lipid, phenol, saponin, flavonoids, steroids,tannin and phlobatannins, terpenoids, cardiac glycosides were not detected. In GC-MS analysis, 15 bioactive phytochemical compounds were identified in the ethanolic extract of Cardiospermumhalicacabum the components were identified by comparing their relation indices and mass spectra Fragmentation patterns with those stored on the MS-Computer library and also form the published literatures. The major constituents were 3-O-methyl-d-glucose and Vitamin-E acetate, etc.

## INTRODUCTION

Plants are the traditional sources for many chemicals used as Pharmaceutical biochemicals, Fragrances, Food colours and Flavours[1] Medicinal plants are at great interest to the researcher in the field of Biotechnology, as most of the drug industries depend in part on plants for the production of pharmaceutical compounds. The use of plants in ethnomedicine is increasing around the world. The World Health Organization (WHO) has reported that approximately 80% of the world's population currently uses herbal medicines as teas, decocts or extracts with easily accessible liquids such as water, milk or alcohol[2].

*Cardiospermum halicacabum* Linn [*Sapindaceae*] common name Ballonvine. Tamil name mudakkathan. Annual climber, stems puberulous, tendrils present. Leaves biternate, essentially trifoliate with each part divided again into 3 leaflets, leaflets with coarse serrate teeth. Flowers in axillary heads, usually 3-Flowered by abortion, white with a yellowish centre. [3,4,5,6]. Hence in present study to perform phytochemical analysis(qualitative method), GC-MS analysis which is of great medicinal value.

## MATERIALS AND METHODS

***Collection of Plant Material:*** The leaves of*Cardiospermumhalicacabum* was collected from Thennilai, near Karur District in Tamilnadu.

**Preparation of Plant Extract:** The leaves of *Cardiospermumhalicacabum* was shade dried at room temperature. The dried material was then homogenized to obtain coarse powder and stored in air-tight bottles for further analysis. The shade dried, powdered leaves were extracted[7] with ethanol by hot extraction using soxhlet apparatus collected and stored in a vial for further analysis.

**Phytochemical Screening:** The ethanolic extract of leaf was subjected to qualitative phytochemical analysis [8,9].

**Gas Chromatography-Mass Spectrometry Analysis:** The Gas Chromatography-Mass Spectrometry (GC-MS) analysis of the extract was performed using a clarus 500 Perkin Elmer gas chromatography equipped with a Elite-5 capillary coloumn [5% Phenyl and 95% methyl Polysaccharides Siloxane] and mass detector turbomass gold of the compact which was operated in E1 mode. Elite wax (Polyethylene glycol) (30mmx0.25mm X0.25umdf) is a polar coloumn used in the estimation)

An insert gas such as Hydrogen or Nitrogen or Helium is used as a carrier gas at a flow rate 1ml/min, split 10:1. The components of test sample is evaporated in the injection part of the GC equipment and segregated in the coloumn by adsorption and desorption technique with suitable temperature programmes of the over controlled by software.Different components are eluted from based on the boiling point of the individual components [10].

The GC coloumn is heated in the oven between 110 °C to 280 °C. The time at which each component eluted from the GC coloumn is termed as retention time (RT). The total GC running time 36 min. The eluted component is detected in the mass detector. The spectrum of the known components stored in the NIST library and ascertains the name, molecular weight and structure of the components of the test material in GC-MS study.

Table 1: Qualitative Analysis of Phytochemical Components

| Sl.No | Phytochemical Components | Ethanol extract |
|---|---|---|
| 1 | Carbohydrates | + |
| 2 | Protein | + |
| 3 | Lipid | + |
| 4 | Phenol | + |
| 5 | Tannin | + |
| 6 | Saponin | + |
| 7 | Phlobatannins | - |
| 8 | Terpenoids | - |
| 9 | Flavonoids | + |
| 10 | Steroids | + |
| 11 | Cardiacglycosides | - |

"+"Referred to Presence

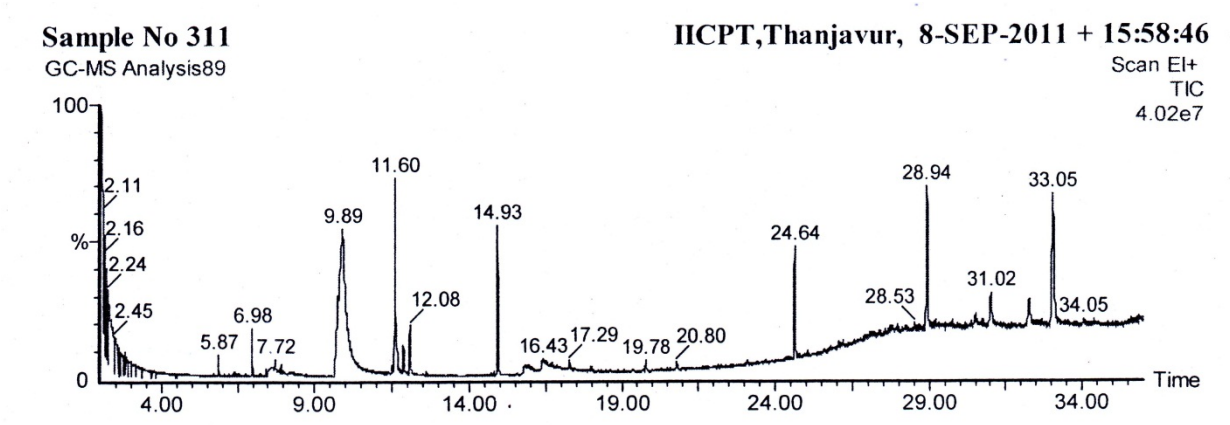
"-" Referred to Absence

Table 2: Phyto compounds identified from the leaf of *Cardiospermumhalicacabum*

| Sl.No | RT | Name of the Compound | Molecular Formula | MW | Peak Area% |
|---|---|---|---|---|---|
| 1 | 5.87 | Aceticacid [(2,4,6-triethylbenzoyl) thio]- | C15H2003S | 280 | 0.62 |
| 2 | 6.98 | 1,6,10-Dodecatriene, 7,11, dimethyl-3-methylene-(E)- | C15H24 | 204 | 1.31 |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 7.72 | Cyclohexene, 3-(1,5-dimethyl 4-hexenyl)-6-methylene-,[S-(R*,S*)]- | C15H24 | 204 | 1.62 |
| 4 | 7.91 | Phenol, 2,6-bis (1,1-dimethylethyl)-4-methyl-methylcarbamate | C17H27NO2 | 277 | 0.39 |
| 5 | 9.89 | 3-O-methyl-d-glucose | C7H14O6 | 194 | 47.41 |
| 6 | 11.60 | 1,14-Tetradecanediol | C14H30O2 | 230 | 9.19 |
| 7 | 12.08 | 3,7,11,15-Tetramethyl-2-hexadecen-1-ol | C20H40O | 296 | 2.08 |
| 8 | 14.93 | Phytol | C20H40O | 296 | 6.10 |
| 9 | 17.29 | Pseudoephedrine,(+)- | C10H15NO | 165 | 0.62 |
| 10 | 19.78 | 2-Propenamide, N-[2-(dimethylamino)ethyl]- | C7H14N2O | 142 | 0.54 |
| 11 | 20.80 | E-2-Octadecadecen-1-ol | C18H36O | 268 | 0.39 |
| 12 | 24.64 | Squalene | C30H50 | 410 | 5.25 |
| 13 | 28.94 | Vitamin E acetate | C31H52O3 | 472 | 8.80 |
| 14 | 31.02 | Silane, 1,4,-Phenylenebis[trimethyl]- | C12H22Si2 | 222 | 2.93 |
| 15 | 33.05 | α-Amyrintrimethylsilyl ether | C33H58OSi | 498 | 12.74 |

**Fig-1 GC-MS chromatogram of *Cardiospermumhalicacabum*leaf extract**




## RESULTS AND DISCUSSION

The present study was carried out in the ethanolic extract of *Cardiospermum halicacabum* leaves.

Phytochemical screening of the ethanolic extract indicated the presence of carbohydrates, protein, lipid, phenol, saponin, flavonoids,steroids and tannin (Table-1).

In the GC-MS analysis, 15 bio active phytochemical compounds were identified in the ethanolic extract in this plant (Table-2). The identification of phytochemical compounds is based on the peak area, molecular weight and molecular formula. The results indicated that the compound,3-0-methyl-d-glucose with molecular formula C7 H14O6with RT 9.89 min has high peak area 47.41%,followed by α-Amyrintrimethylsilyl ether with molecular formula C33 H58 OSi with RT 33.05 min has peak area 12.74%(Fig-1). This study has revealed the presence of many secondary metabolites and bioactive phytocomponents in the leaf of *Cardiospermumhalicacabum* which might be of a very important medicinal value and further plan of study include isolation and purification of bioactive phyto components [13].

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