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COMPARATIVE STUDIES ON PHYTOCHEMICAL AND GC-MS ANALYSIS OF *CASSIA AURICULATA LINN* & *CARDIOSPERMUM HALICACABUM LINN* LEAF EXTRACT-TRADITIONAL VALUABLE PLANTS

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ABSTRACT

The aim of the study was to investigate the *Cassia auriculata* and *Cardiospermum halicacabum* 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, phenol, lipid, protein, saponin, flavonoids and tannin. GC-MS analysis 13,15 bioactive phytochemical compounds were identified in the ethanolic extract of *Cassia auriculata* and *Cardiospermum halicacabum* respectively. 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.

INTRODUCTION

Medicinal plants are natural sources of compounds that can be used against many diseases today[1]. The medicinal values of these plants lie in bioactive phytochemical constituents that produce definite physiological actions on the human body. These bioactive phytochemical constituents in medicinal plant include alkaloids, flavonoids ,phenolic compounds, tannins, anthracine derivatives and essential oils[2]. The world is now looking towards india due to its rich biodiversity of medicinal plants and abundance of traditional medicine systems[3]. There is a need that the medicinal plants be evaluated for phytochemisry so as to determine the potentials of these indigenous sources of medicines. Therefore in present study two medicinal plants were selected for phytochemical analysis.

Plants have basic nutritional importance by their content of protein, carbohydrate, Fats and oils minerals, vitamins and water responsible for growth and development in man and animals. Much more than these, researchers have come up with the fact that some plant chemical which have been regarded as nutritional or anti-nutrients have Potentials in helping to reduce the risk of several deadly diseases in man [4,5,6]. Reports show that these phytochemical reduce LDL i.e. the Chloestrol involved in depositing fat in arteries prevent blood clotting which can reduce the risk For a heart attack or stroke [7].Sulphur compounds, which are examples of phytochemicals are known also to reduce the cholesterol production in the body and through that keep the blood pressure down [8].

MATERIALS AND METHODS

Collection of Plant Material

The leaves of *cassia auriculata*and *cardiospermumhalicacabum* was collected from Paramathy and Thennilai respectively near the Karur District in Tamilnadu.

Preparation of Plant Extract

The leaves of *cassia auriculata*and *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 [9] with ethanol solvent by hot extraction using soxhlet apparatus collected and stored in a vial for further analysis.

Phytochemical Screening

The ethanolicleaf extract was subjected for qualitative phyto chemical analysis [10,11].

Gas Chromatography-Mass Spectrometry Analysis: The Gas Chromatography-Mass Spectrometry (GC-MS) analysis of the extracts 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 compant 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 [12].

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 is 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.

Identification of components was based on comparison of their mass spectra with those of Wiley and NIST Libraries and as well as on comparison of their retention indices with literature [13, 14].

Table 1: Qualitative Analysis of Phytochemical Components (*Cassia auriculata*)

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

"+" Referred to Presence

"-" Referred to Absence

Table 2: Phyto compounds identified from the leaf of *Cassia auriculata*

Sl. No	RT	Name of the Compound	Molecular Formula	MW	Peak Area %
1	6.12	Resorcinol	C6H6O2	110	5.82
2	10.54	3-O-Methyl-d-glucose	C7H14O6	194	59.71
3	11.60	1,14-Teradecanediol	C14H30O2	230	1.49
4	12.09	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296	0.36
5	14.95	Phytol	C20H40O	296	0.28
6	17.41	2H-Cyclopropa[a]naphthalen-2-one, 1,1a,4,5,6,7,7a,7b-octahydro-1,1,7,7a-tetramethyl-, (1aa,7a,7aa,7ba)-	C15H22O	218	11.57
7	18.60	Azulene, 1,2,3,5,6,7,8,8a-octahydro-1,4-dimethyl-7-(1-methylethenyl)-, [1S-(1a,7a,8aa)]-	C15H24	204	10.80
8	20.88	1,2-Benzenedicarboxylic acid, diisooctyl ester	C24H38O4	390	2.95
9	23.24	Octadecane, 1-(ethenyloxy)-	C20H40O	296	0.44
10	24.81	Squalene	C30H50	410	1.18
11	26.09	1-Cyclohexylnonene	C15H28	208	1.44
12	28.04	E-10-Pentadecenol	C15H30O	226	1.46
13	29.24	1-4-[(2-Diethylamino]ethyl]amino]-6-methyl-2-pyrimidinyl]-3-[3,4,5-trimethoxyphenyl] guanidine	C21H33N7O3	431	2.51

Fig-1 GC-MS chromatogram of *Cassia auriculata* leaf extract

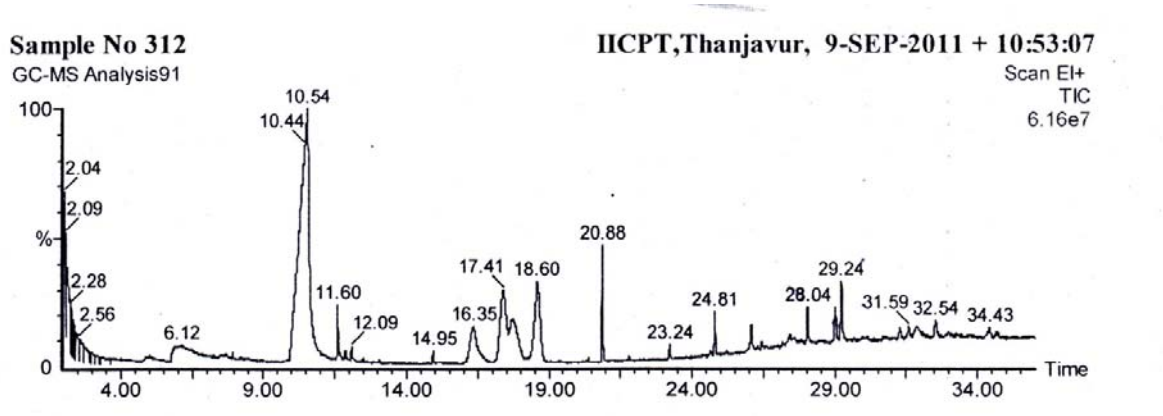


Table 3: Qualitative Analysis of Phytochemical Components (*Cardiospermum halicacabum*)

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

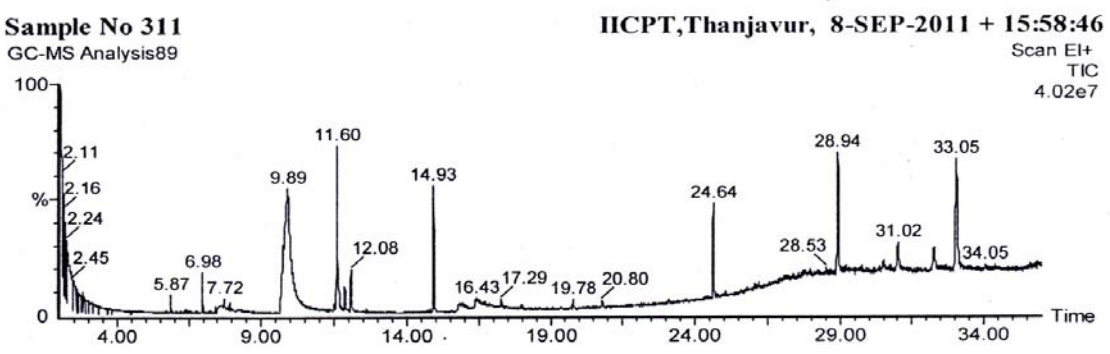
"+" Referred to Presence

"-" Referred to Absence

Table 4: Phyto compounds identified from the leaf of *Cardiospermum halicacabum*

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-2 GC-MS chromatogram of *Cardiospermum halicacabum* leaf extract



RESULTS AND DISCUSSION

The present study was carried out in the ethanolic extract of *Cassia auriculata* and *Cardiospermum halicacabum* leaves. Phytochemical screening of the ethanolic extract indicated the presence of carbohydrates, protein, lipid, phenol, saponin, flavonoids and tannin (Table-1,3).

In the GC-MS analysis, bio active phytochemical compounds were identified in the ethanolic leaf extract of *cassia auriculata* and *cardiospermumhalicacabum*(Table-2,4). The identification of phytochemical compounds is based on the peak area, molecular weight and molecular formula(Fig-1,2). This study has revealed the presence of many secondary metabolites and bioactive phytocomponents in the leaf of*cassia auriculata* and*Cardiospermumhalicacabum* which might be of a very important medicinal value and further plan of study include isolation and purification of bioactive phyto components [15]

It has been reported that the presence of bioactive substances in plants play a role in preventing colorectal carcinoma, hyperchloestrolcamia and renal calculi[16].

It is documented that the presence of saponins can control human cardiovascular disease and reduce cholesterol , also tannins may provide protection against microbiological degradation of dietary proteins in the semen[17].

Generally, woody plants are versatile plant materials having a wide range of local therapeutic applications, the leaves , roots, barks and seeds are found to be antipyretic, laxative, analgesic, antifungal, antibacterial and non inflammatory[18,19]

Plants in all fact of life have served a valuable starting material for drug development[20]. Antibiotics or antimicrobial substances like saponins, glycosides, flavonoids and alkaloids etc are found to be distributed in plants, yet these compounds were not well established due to the lack of knowledge and techniques[21]. From this phyoconstituents, saponins have been reported to exhibit hemolytic and foaming activity[22], antifungal[23], anti-inflamatory[24],fungistatic[25],molluscidal[26].

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