ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

GC MS PROFILING ON ETHANOLIC LEAF EXTRACT OF *CORDIA MONOICA* ROXB

Dhivya. A and Dr. R. Sivakumar*

Department of Biotechnology, SNR Sons College(Autonomous), Coimbatore 641 006. Tamilnadu, India.

Manuscript Info

Manuscript History:

Received: 15 July 2014
Final Accepted: 22 August 2014
Published Online: September 2014

Key words:
Cordia monoica, GC-MS analysis, Phytochemical, Nonacosane, Carotene, Hexadecanoic acid.

***Corresponding Author**

Dr. R . Sivakumar*

Abstract

Cordia monoica Roxb is popularly known as snot berry or sand sauce berry belongs to the family Boraginaceae. The present study deals with screening of the phytochemical compounds by GCMS analysis in the ethanolic extract of *Cordia monoica* leaves. In the result the presence of various compounds with different molecular formula and structure was identified and analysed. The major bioactive compounds included Nonacosane (30.07%) and Carotene (10.74%). Also significant amount of Tetracosahexane, Lycopene, Hexadecanoic acid, Neophytadiene and benzofuran were present. The presence of these bioactive compounds in the leaf extract of this plant has paved its major role in treatment of diseases.

Introduction

India is the country which is blessed with different medicinal practices like Ayurveda, Siddha and Unani. Plants have use in folk medicine and traditional system of medicine. Traditional medicine makes use of theories, beliefs and experience that helps to maintain health and also to protect from various ailments. Plants consist of various phyto pharmaceuticals which has led to its use in medicinal fields (Vinoth *et al.*, 2011)

Phytochemicals play an important role in the medicinal property of plants. They are basically divided into primary and secondary metabolites. The phytochemical metabolites obtained from the plant forms the base for the establishment of crude drugs. The most important of the plant secondary metabolites are phenolic compounds, tannins, steroids, and so on (Savithramma *et al.*, 2011). The phytochemical also have a protective role in many diseases such as cancer, cardiovascular problems and skin diseases (Sheeja *et al.*, 2007). Herbal drugs are having their own advantage than synthetic drugs as the phytochemical in the extract act on the biochemical pathway. As a result efforts were made to develop cheaper drugs from medicinal plants. Most of the plants still represent large structural novel compounds that develop into a novel drug (Zaidan *et al.*, 2005).

Gas chromatography- mass spectroscopy is a method that helps to identify different compounds within the sample by comparing with the reference spectra. The technique has its application in the field of drug detection, environmental analysis and in identification of unknown samples (Ronald Hites, 1997).

The Genus *Cordia monoica* Roxb belongs to Boraginaceae family. It is a much branched bush, shrub or tree with a height of 6-12m (Polhill, 1991; Bein *et al.*, 1996). It is commonly known as sand paper saucer-berry or Snot berry (Hyde *et al.*, 2014). The plant is widely distributed in South India (Nadkarni, 1976). The flowers are cream in color and turn brown on drying. The leaves of the plant have a texture of sand paper. The fruits are Orange in color and pulp is edible which is sweet and gummy (David *et al.*, 2002). The *Cordia monoica* roots are used in treating vomiting and malaria (Glover, *et al.*, 1966). In Siddha, the leaves are used to treat eye diseases (Bein, 1996; Umberto Quattrocchi, 2000). The whole plant is also used for virtual medicine (Umberto Quattrocchi, 2000.). The stem bark and leaves are also used in treatment of leprosy (Hedberg I *et al.*, 1982; Kokwaro, 1987 and Ruffo, *et al.*, 2002). The leaves are used in treatment of chest pain (Pradheeps and Poyyamoli, 2013). The leaves of the plant are

used to treat MICH, a febrile disease which has symptoms of fever, head ache, sweating (Giday, 2001).The fruits of the plant are edible and eaten raw (Ramachandran, 2007). The plant also used as fodder (Bussmann, 2006). The leaves and stem are also used to treat back aches, viral infections. (Wondimu Tigist, *et al.*, 2007 and Muthee, *et al.*, 2011)

The Present investigation was carried out to determine some of the bioactive components present in the ethanolic extract of *Cordia monoica* leaves by GC-MS method.

MATERIALS AND METHODS:

COLLECTION OF THE PLANT MATERIAL:

The leaves of the plant was Collected from The Nilgiris, India. It was identified and authenticated at Botanical Survey of India, Coimbatore.

PREPARATION OF LEAF POWDER:

Fresh leaves were collected and washed in water. It was dried at room temperature. The leaves were ground into powder and stored at room temperature in an air tight container.

GC-MS ANALYSIS:

Gas Chromatography and Mass spectroscopic analysis was done at The South India Textile Research Association, Coimbatore. The method was carried out in Thermo GC- Trace Ultra, ver: 5.0, Thermo MS DSQ II. The powdered sample was dissolved in ethanol and 1µl was introduced into the Column ZB 5-MS Capillary standard non–polar column (30mtsX0.25mmX0.25µm). The temperature of the oven was programmed to 70° C and raised to 260° C at 6° C/min. The carrier gas Helium was passed through at a flow rate of 1.0ml/min. The run time was 0 to 37.32 minutes. The Compounds were identified with the help of Wiley and NIST Libraries based on their molecular mass.

RESULT AND DISCUSSION:

The Ethanolic extract of *Cordia monoica* leaves showed different peaks and the highest peak was obtained at retention time of 38.16 (Figure-I&II). The presence of bioactive compounds was identified after comparing with WILEY and NIST libraries. The compounds were eluted based on their retention time. The relative concentration of the compound was identified with their peak height. Mass Spectrophotometer helps to identify the compounds structure and its nature. From the result (Table-I), it was observed that Nonacosane, carotene and 2,7,12,17-tetrabrom-(allàs) cyclotetrathiophen (2,7,12,17-tetrabromcycloocta [1,2-b:4,3-b':5,6-b":8,7-b"'] tetrathiophen were the prevailing components. It also indicated the presence of Hydrocarbons, Triterpenoids, fatty acids, Phenolic compounds. The Presence of these phytochemical helps to evaluate the medicinal value of *Cordia monoica* leaves. The plant can be further subjected to isolation of these compounds and to discover a novel drug.

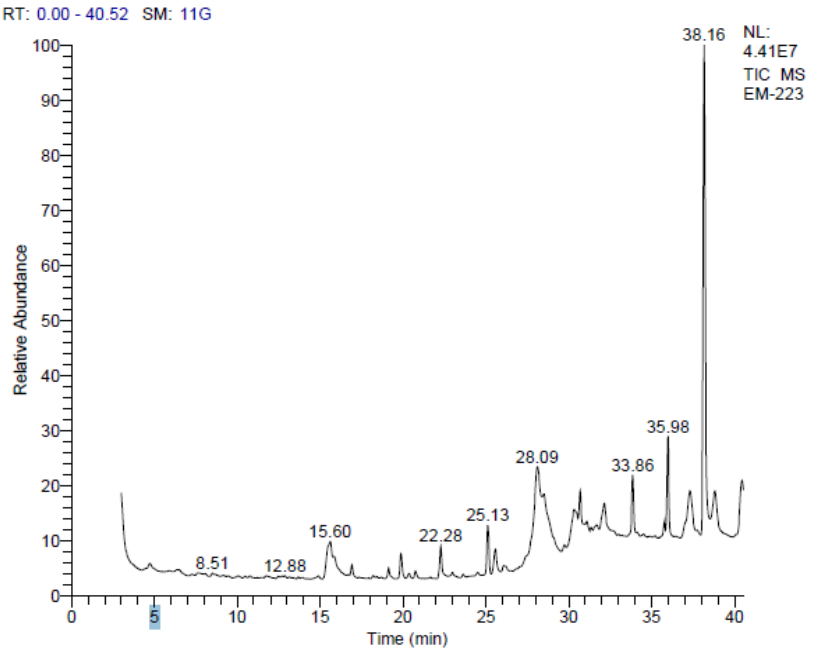


FIGURE I
GC MS PROFILE OF ETHANOLIC EXTRACT OF *CORDIA MONOICA* LEAVES

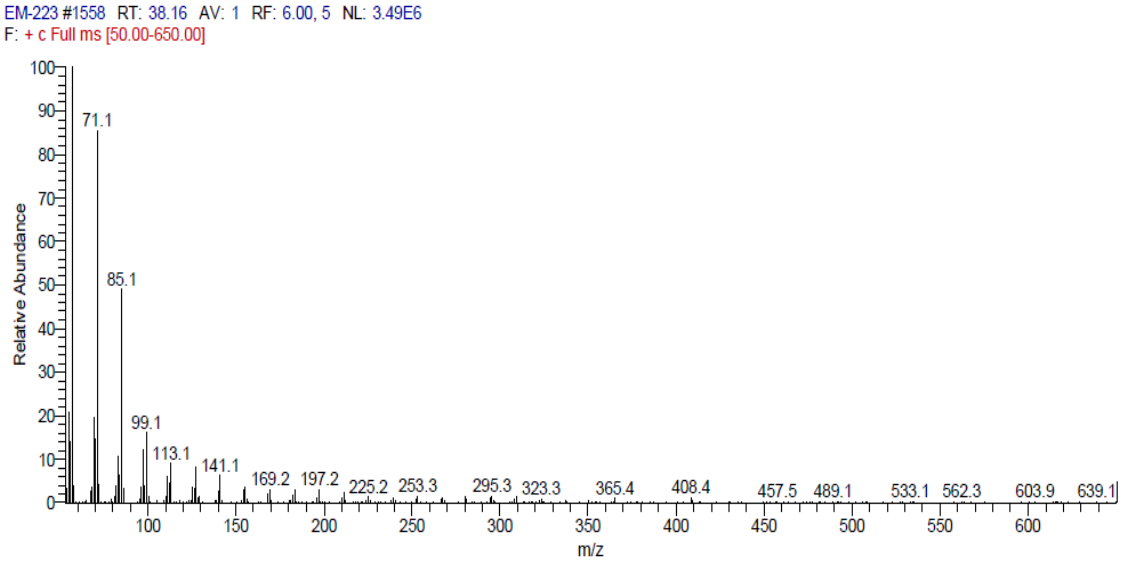
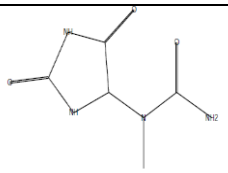
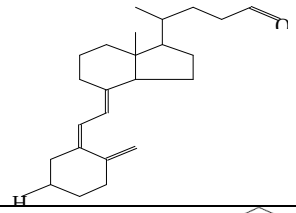
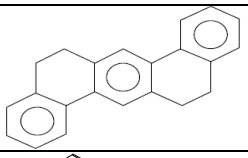
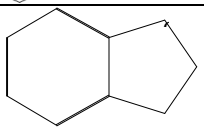
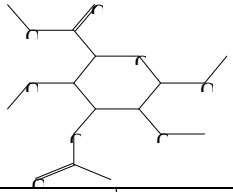
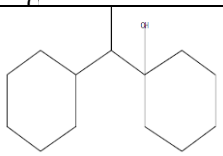
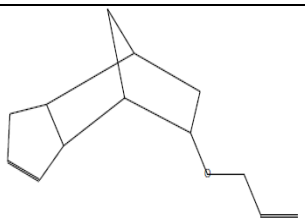
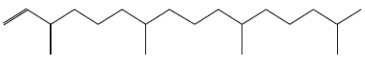
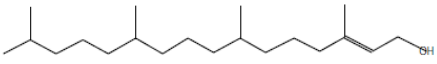
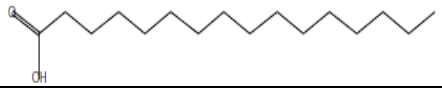
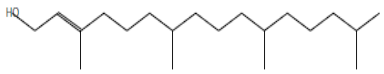
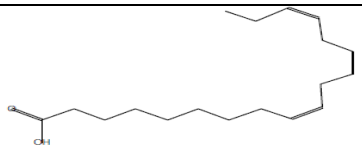
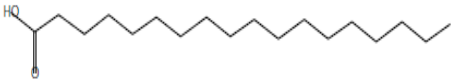
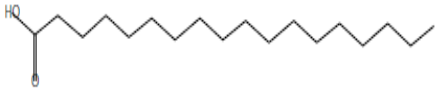
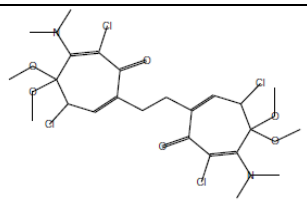
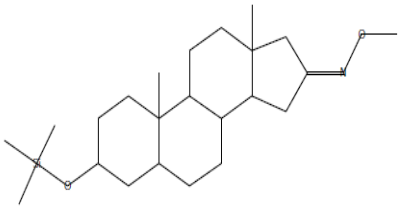
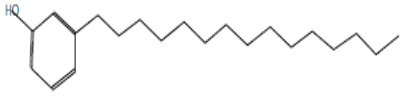
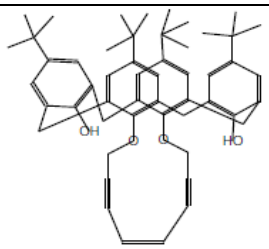
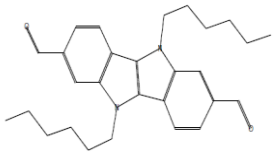
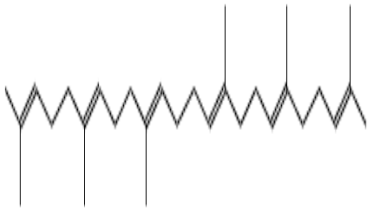
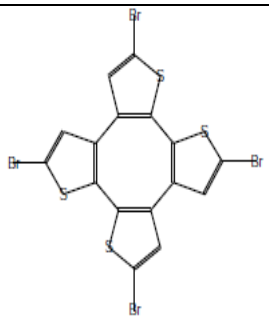
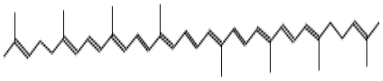
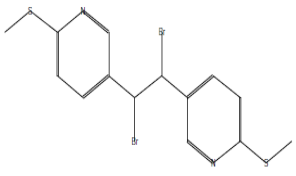


FIGURE II - MASS SPECTRA AT (RETENTION TIME: 38.16)

TABLE: I PHYTOCOMPONENTS IDENTIFIED IN *CORDIA MONOICA* BY GC-MS

S.No	RT	Compound Name	Molecular Formula	MW	Peak area	Structural Formulae
1	4.20	5-(N-Methylureido)-2,4-imidazolidinedione	C5H8N4O3	172	0.97	
2	6.51	25,26,27-TRISNORCHOLECALCIFER-24-AL	C24H36O2	356	0.46	
3	7.68	Dibenz[a,h]anthracene, 5,6,12,13-tetrahydro-	C22H18	282	0.33	
4	8.08	Benzofuran, 2,3-dihydro-(CAS)	C8H8O	120	0.31	
5	15.62	Methyl(methyl3-O-acetyl-2,4-di-O-methyl-à-D-mannopyranoside)uronate	C12H20O8	292	6.27	
6	16.91	Methanone, (1-hydroxycyclohexyl) phenyl-	C13H16O2	204	0.69	
7	19.13	4,7-Methano-1H-indene, 3a,4,5,6,7,7a-hexahydro -5-(2-propenyloxy)-	C13H18O	190	0.60	
8	19.87	Neophytadiene	C20H38	278	1.39	
9	20.37	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296	0.36	

10	22.28	n-Hexadecanoic acid	C16H32O2	256	2.14	
11	24.49	Methyl 13c Hexadecadienoate	C17H30O2	266	0.23	NIL
12	25.11	2-Hexadecen-1-ol, 3,7,11,15-tetramethyl-,[R-[R*,R*-(E)]]- (CAS)	C20H40O	296	2.45	
13	25.55	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-	C18H30O2	278	2.00	
14	26.06	Octadecanoic acid (CAS)	C18H36O2	284	0.31	
15	28.09	Carotene	C40H56	536	10.74	
16	28.50	1,2-Bis(3,6-dichloro-4,4-dimethoxy5-methylamino-7-oxo-1 ,5-cycloheptadienyl)ethane	C24H32Cl4N2O6	584	5.20	
17	29.72	Androstan-16-one, 3-[(trimethylsilyl)oxy]-, O-methyloxime, (3á,5à)-	C23H41NO2Si	391	0.28	
18	30.32	N-Ethyl-N-(2-cyanoethoxycarbonylethyl)-3-methyl-4-(2,6-dichloro-6-nitrophenylazo)-aniline	C21H21Cl2N5O4	477	5.00	NIL
19	30.68	Phenol, 3-pentadecyl-	C21H36O	304	3.03	

20	30.78	26,28-Dihydroxy-25,27-dioxaocta-4-ene-2,6-diynyl-p-tert-butylcalix[4]arene	C52H60O4	748	1.94	
21	31.66	5b,6,12b,13-Tetrahydro-6,13-dibromopentaleno[1,2-b :4,5b']diquinoline	C22H14Br2N2	464	0.59	NIL
22	32.15	5,10-Dihexyl-5,10-diihydroindolo[3,2-b]indole-2,7-dicarbaldehyde	C28H34N2O2	430	2.93	
23	33.84	Heptacosane (CAS)	C27H56	380	3.14	
24	35.98	2,6,10,14,18,22-Tetracosahexaene, 2,6,10,15,19,23-hexamethyl-, (all-E) (CAS)	C30H50	410	5.65	
25	37.30	2,7,12,17-tetrabrom-(all às)cyclotetrathiophen (2,7,12,17-tetrabromcycloocta[1,2-b:4,3-b':5,6-b'':8,7-b''']tetrathiophen	C16H4Br4S4	640	6.32	
26	38.16	Nonacosane (CAS)	C29H60	408	30.07	
27	38.83	Lycopene 7	C40H56	536	3.89	
28	40.40	(E)-1,2-Dibromo-1,2-bis(6-methylthio-3-pyridyl)ethane	C14H14Br2N2S2	432	1.95	

CONCLUSION:

The Gas Chromatography-Mass Spectroscopic analysis concluded the presence of bioactive phytochemical compounds in the plant. It justifies the use of *Cordia monoica* leaves as an anti-oxidant, anti-inflammatory and anti-cancer agent in herbal medicine. It can be concluded that in future *in vitro* and *in vivo* studies on biological systems can find a new way for drugs that can be employed in clinical trials.

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