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Screening of phyto constitutes of *Calotropis gigantea* root using gas chromatography-mass spectroscopy (GC-MS) technique

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Abstract- *The phyto-components of Calotropis gigantea Linn.root were screened by gas chromatography-mass spectroscopy (GC-MS) analysis. Methanolic extract was prepared by soxhletexract from root of C. gigantea. GC-MS running time for methanol extract of root of C. gigantea was 45 min. The total number of compounds identified in methanolic extract was 56. The major phytoconstituents present in methanolic extract were alpha-amyrin (40.83), beta-amyrin(21.94)and Oxacyclohexadecan-2-one (6.61).Somephytosterols were also present such as Ergasterol(0.94), Stigmasterol(0.91) etc. These constituents may be responsible for pharmacological activities*

Key words: *Phyto-components, GC-MS, Calotropis gigantea, Methanolic extract*

I. Introduction

The Indian subcontinent is rich in medicinal plants and is one of the richest countries in terms of genetic diversity of medicinal plants. It exhibits a wide range in topography and climate. Moreover the agro climatic conditions are conducive for introducing and domesticating new exotic plant varieties (Mitchell and Cotran 2000)1. *Calotropis*(Family-Asclepiadaceae) is represented in India by two species viz. *C. procera* and *C. gigantea*. In ancient ayurvedic medicine the plant *C. gigantea* is known as "SwetaArka" and *C. procera* as "RakthaArka". Both of them are often similar in their botanical aspects and also have similar pharmacological effects (Gamble 1935)6. *C. gigantea* is a xerophytic, erect shrub (Watkins et al 2005)[31]. It is a weed of roadsides and watercourses and commonly invades old cultivated land and heavily grazed areas where there is little competition from grass. It is drought resistant, salt tolerant to a relatively high degree (Sharma and Tripathi, 2009)[32]. It contains many phytochemicals with potential pharmacological activities. Roots of *C. gigantea* exhibitantipyretic activity (Chitme et al. 2005)138, anti-diarrohoeal activity (Singh et al. 1980),hepatoprotective activity (Argal and Diwivedi 2010). Therefore, we focus on isolation of majorphyto-constituents from roots of *C. gigantea*through GC-MS.

II. Material and Methods

2.1 Plant Material

Roots of *C. gigantea* were collected from local area of Jaipur city, Rajasthan, India. They were authenticated from Herbarium, Department of Botany, University of Rajasthan, Jaipur.

2.2 Extraction

Roots were subjected to shade drying (22ºC) for two weeks and then processed at laboratory mill. Air dried coarse powder thus obtained (1 kg) was extracted with methanolic in soxhlet extractor by continued successive hot extraction method. Finally the marc was collected and concentrated.

2.3 Parameters of GC-MS Analysis

GC-MS model: Perkin Elmer Autosystem XL with Turbomass, Column type: PE-5MS, Column Material: 5% Phenyl polysiloxane, Column Length: 30 meters, Column inner diameter: 0.250 mm, Flow rate (N_2): 1 ml/min, Temperature of injector: 250℃, Temperature of detector: 280℃, Temperature of source: 280℃, Temperature of transfer: 280℃, Programming rate: Starting from 78℃ for 5min. Increasing temperature with rate 10℃/min up to 280℃ and hold for 20min. Retention time: 45min.

III. Result and Discussion

GC-MS running time for methanolic extract of roots of *C. gigantea*was 45 min. The total number of compounds identified in methanolic extract was 56. The GC-MS retention time (RT) and percentage peak of the individual compounds were demonstrated in Table 1, Fig.1. The identification ofphytochemical compounds is based on the peak area, molecular weight and molecularformula.The major phytoconstituents present in methanolic extract were alpha- amyrin (40.83), beta-amyrin(21.94)and Oxacyclohexadecan-2-one (6.61). Some phytosterols were also present such as Ergasterol(0.94), Stigmasterol(0.91) etc.

IV. Conclusion and Significance

The results reveal that the extracts have a quite number of chemical constituents, which may be responsible for many pharmacological activities. Alpha-amyrin is apentacyclictriterpenoidwhich shows topical anti-inflammatory, antinociceptiveand antihyperglycaemic activities. Beta amyrin shows antituberculosis activity. Investigations of mixtures of alpha and beta amyrins established their gastro protective, contraceptive, antipruitic and hepatoprotective behavior againstactoaminophen-induced hepatotoxicity. Further studies are needed on these extracts in order to isolate, identify, characterize and elucidate the structure of these compounds.

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Figure1 : GC-MS Chromatogram of methanolic extract of root of *C. gigantea.*

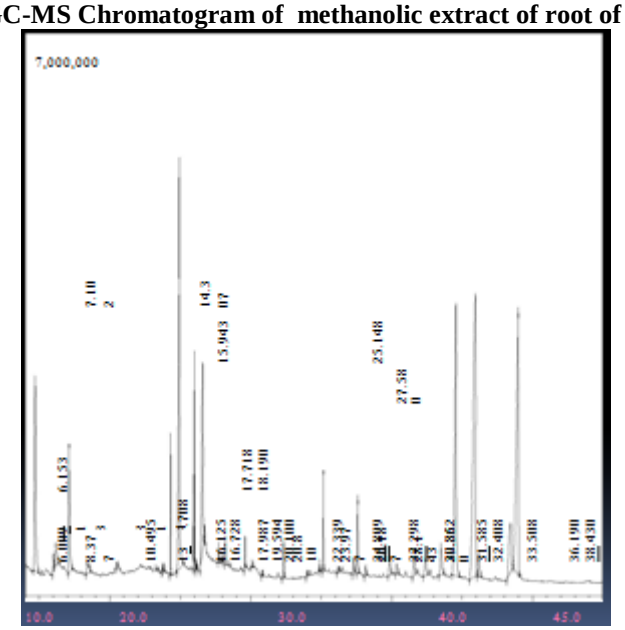

Table 1:Chemical constituents present in the methanolic extract using GC-MS analysis.

Peak#	R.Time	Area	Area%	Name
1	3.993	12031613	0.78	Glycerol
2	5.009	1398140	0.09	Proceroside
3	5.785	1479495	0.10	Undecane
4	5.894	417677	0.03	Nonanal
5	8.692	2075511	0.13	1,4-dihydroxy-p-menth-2-ene
6	8.928	2254080	0.15	Trans Linalool oxide
7	9.074	2560241	0.17	2,4,6-trimethylanisole
8	9.579	1890716	0.12	Alpha.-nicotine
9	10.256	2782310	0.18	Isovanillin
10	10.502	2970139	0.19	Furfuryl alcohol, tetra
11	10.973	985944	0.06	6-Methyl-1,6-heptanediol
12	11.946	2652984	0.17	2,5-dibutylfuran)
13	12.154	1575638	0.10	Dodecanoic acid
14	12.218	1320302	0.09	(-)-Mellein
15	12.339	3676553	0.24	4-methyl-2,5-dimethoxybenzaldehyde
16	12.629	3192748	0.21	Xylitol
17	14.362	15959110	1.03	4-((1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol
18	15.487	1703791	0.11	Pentadecanoic acid
19	15.739	1449425	0.09	2-Amino-6-methoxybenzothiazole
20	16.101	1486527	0.10	Metholene
21	16.169	4758820	0.31	Hexadecanoic acid, methyl ester
22	16.564	77481262	5.01	L-(+)-Ascorbic acid 2,6-dihexadecanoate
23	16.638	26067550	1.69	1-ethylAnthraquinone
24	17.411	2384897	0.15	2h-1-benzopyran-2-one, 3,4,7-trimethoxy-
25	17.515	7075080	0.46	[1,1'-Biphenyl]-2-ol, 5-(1,1-dimethylethyl)-
26	17.830	3356879	0.22	N-Propyl linoliate
27	17.878	7109325	0.46	Oleic acid, ethyl ester
28	17.990	2478390	0.16	Cedran-diol, (8S,14)-
29	18.086	2569571	0.17	Heptadecanoic acid, 10-methyl-, methyl ester
30	18.262	102227872	6.61	Oxacyclohexadecan-2-one
31	18.426	10097404	0.65	Octadecanoic acid
32	18.623	9013321	0.58	9,12-octadecadienoic acid
33	18.976	6040498	0.39	Cis,cisLinolic acid
34	19.563	1865458	0.12	Nonadeacanol
35	19.950	1080771	0.07	Cetane
36	20.315	2119340	0.14	2H-Pyran-2-one, tetrahydro-6-tridecyl-
37	21.079	2314742	0.15	Octadecanal
38	21.895	5338569	0.35	2Octyl banzoate
39	22.188	7589299	0.49	Alpha monopalmitate
40	22.818	2191887	0.14	1,2-benzenedicarboxylic acid
41	24.807	4060651	0.26	1,1'-Biphenyl-3,4,4'-trimethoxy-6'-formyl-
42	25.121	9595323	0.62	Oleoyl chloride
43	26.719	15887909	1.03	Squalene
44	28.534	2215122	0.14	Testoviron
45	29.610	1874617	0.12	15Alpha-hydroxyprogesteron
46	33.133	24077267	1.56	Lichesterol
47	33.611	14610418	0.94	23 R methylcholesterol

48	34.350	14041805	0.91	Stigmasterol
49	35.877	38951917	2.52	Stigmast-8(14)-en-3-beta -ol
50	36.890	26931653	1.74	.beta.-Amyrin
51	37.114	10034903	0.65	Cholest-4-en-3-one
52	38.064	9470624	0.61	Spinasterone
53	38.259	46332313	2.99	.alpha.-Amyrin
54	40.267	339348046	21.94	.beta.-Amyrin
55	41.264	10954686	0.71	Lupeol
56	41.939	631593983	40.83	.alpha.-Amyrin
		1547005116	100.00	