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GC-MS Analysis of Fruits of *Calotropis procera*: A Medicinal Shrub

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Abstract

The phyto-components of Calotropis procera Linn. Fruits were screened by gas chromatography-mass spectroscopy (GC-MS) analysis. Benzene extract was prepared by soxhlet exract from the fruits of C. procera. GC-MS running time for benzene extract of fruits of C. procera was 45 min. The total number of compounds identified in benzeneic extract was 39. The major phytoconstituents present were Lupenol (12.10), n-Hexadecanoic acid (12.07), Thymol (9.86), Tetratetracontane (6.88) and Linoleic acid (6.74) Many phytosterols were also present such as Stigmasterol (0.70), beta–sitosterol (0.54) and Campesterol (0.31)

Keywords: Phyto-components, GC-MS, calotropis procera, benzene extract.

Introduction

Plants have been a rich source of medicines because having potential bioactive molecules, most of which probably participated as a chemical defense against predation or infection[1]. *Calotropis* belongs to *Asclepiadaceae* or Milkweed or Aak family, contains many phytochemicals with potential pharmacological activities. In India *C. procera* has a great value because of its other uses and economical importance. Arka (*C. procera*) is using as drug of Ayurveda from the ancient time. The ancient name of the plant in Vedic literature was Arka alluding to the form of leaves which was used in sacrificial rites. All plant parts, viz. root, stem, leaf, flowers and fruits of *C. procera* are generally use in indigenous system of medicine[2,3]. It shows anticancer, antifungal[4] and insecticidal activities[5]. Fruits of *C. procera* exhibit antimicrobial[6] and antioxidant activity[7]. Therefore, in the present study the major fruit constituents were separated and identified through GC-MS analysis.

Material and Methods

Plant Material: Fruits of *C. procera* were collected from local area of Jaipur city, Rajasthan, India. They were authenticated from Herbarium, Department of Botany, University of Rajasthan, Jaipur. Voucher spaciman no. 9146 was deposited in the university.

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

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°C, temperature of detector: 280°C, temperature of source: 280°C, temperature of transfer: 280°C, programming rate: starting from 78°C for 5min. Increasing temperature with rate 10°C/min up to 280°C and hold for 20min. Retention time: 45min.

Results and Discussion

GC-MS running time for benzene extract of fruits of *C. procera* was 45 min. The total number of compounds identified in benzene extract was 48. The GC-MS retention time (RT) and percentage peak of the individual compounds were demonstrated in table-1, figure-1. The major phytoconstituents present in benzene extract were Lupenol (12.10), n-Hexadecanoic acid (12.07), Thymol(9.86), Tetratetracontane (6.88) and linoleic acid (6.74) Many phytosterols were also present such as stigmasterol (0.70), beta–sitosterol (0.54) and Campesterol (0.31)

Conclusion

The results reveal that the extracts have a quite number of chemical constituents, which may be responsible for many pharmacological activities. For instance, Lupenol shows anti-inflammatory, anti arthritic activity and wound healing activity[8], anti-cancer activity[9]. Thymol shows strong antimicrobial activities when used alone or with other biocides such as carvacrol. Thymol can also reduce bacterial resistance to common drugs such as penicillin[10] and also exihibts antioxidant properties[11,12]. Thymol and carvacrol reduce bacterial resistance to antibiotics through a synergistic effect,[10] and thymol also act as an effective fungicide[13]. Thymol also exhibits strong antimutagenic effect[14]. In addition, it has antitumor properties[15]. Linoleic acid is using in the beauty products industry. Linoleic acid shows anti-inflammatory, acne reductive, and moisture retentive properties on the skin[16,17,18] . Further studies are needed on these extracts in order to isolate, identify, characterize and elucidate the structure of these compounds.

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

Peak#	R.Time	Area	Area%	Name
1	6.774	15747413	9.86	Thymol
2	8.540	530898	0.33	BICYCLO[7.2.0]UNDEC-4-ENE, 4,11,11-TRIMETHYL-8-
3	10.709	131507	0.08	Isotetradecane
4	11.475	129474	0.08	Cyclopentaneacetic acid
5	11.880	633600	0.40	Dotriacontane
6	12.982	590830	0.37	Tetradecane
7	13.744	265853	0.17	Araldite
8	14.024	442101	0.28	Nonadecane
9	14.317	4759207	2.98	Hexadecanoic ACID, Methyl Ester
10	14.924	19283635	12.07	n-Hexadecanoic acid
11	15.957	6208576	3.89	Methyl Linolelaidate
12	16.017	9938878	6.22	Methyl elaidate
13	16.235	258950	0.16	Methyl isostearate
14	16.563	10767781	6.74	Grape seed oil/ Linoleic acid
15	16.720	536566	0.34	Stearic acid
16	17.728	2659304	1.66	Octacosane
17	17.993	268519	0.17	Methyl Icosanoate
18	18.259	237844	0.15	Heptacosanol
19	18.592	462387	0.29	Docosane
20	19.334	763942	0.48	Muscalure
21	19.609	5410795	3.39	Eicosane
22	19.979	239461	0.15	Methyl heneicosanoate
23	20.116	632172	0.40	Dinopol NOP
24	20.684	682643	0.43	Benzyl undecanoate
25	20.820	726075	0.45	Pentatriacontane
26	21.957	2875177	1.80	Behenic Alcohol
27	22.365	6192149	3.88	Eicosane
28	23.548	1283605	0.80	Benzyl Myristate
29	23.989	606614	0.38	Cetane
30	24.918	5504226	3.45	9-Hexacosene
31	25.170	10988698	6.88	Tetratetracontane
32	26.200	150287	0.09	Calciferol
33	26.275	216306	0.14	Hexadecane
34	26.530	237095	0.15	Retinol
35	27.291	2159155	1.35	17-Pentatriacontene
36	27.595	5833002	3.65	Nonacosane
37	29.859	500866	0.31	Campesterol
38	30.340	1111204	0.70	Stigmasterol
39	30.989	432963	0.27	Tetratriacontane
40	31.566	826771	0.52	.beta.-Sitosterol
41	32.359	656752	0.41	Methyl Commate C
42	33.465	809809	0.51	Methyl Commate D
43	34.437	6995138	4.38	Methyl Commate A
44	35.688	5547375	3.47	Methyl Commate D
45	38.328	3119371	1.95	Lupeol acetate
46	38.831	19336700	12.10	Lupenol
47	43.922	1134662	0.71	Beta Amyrene
48	46.149	917572	0.57	Urs-12-ene
		159743908	100.00	

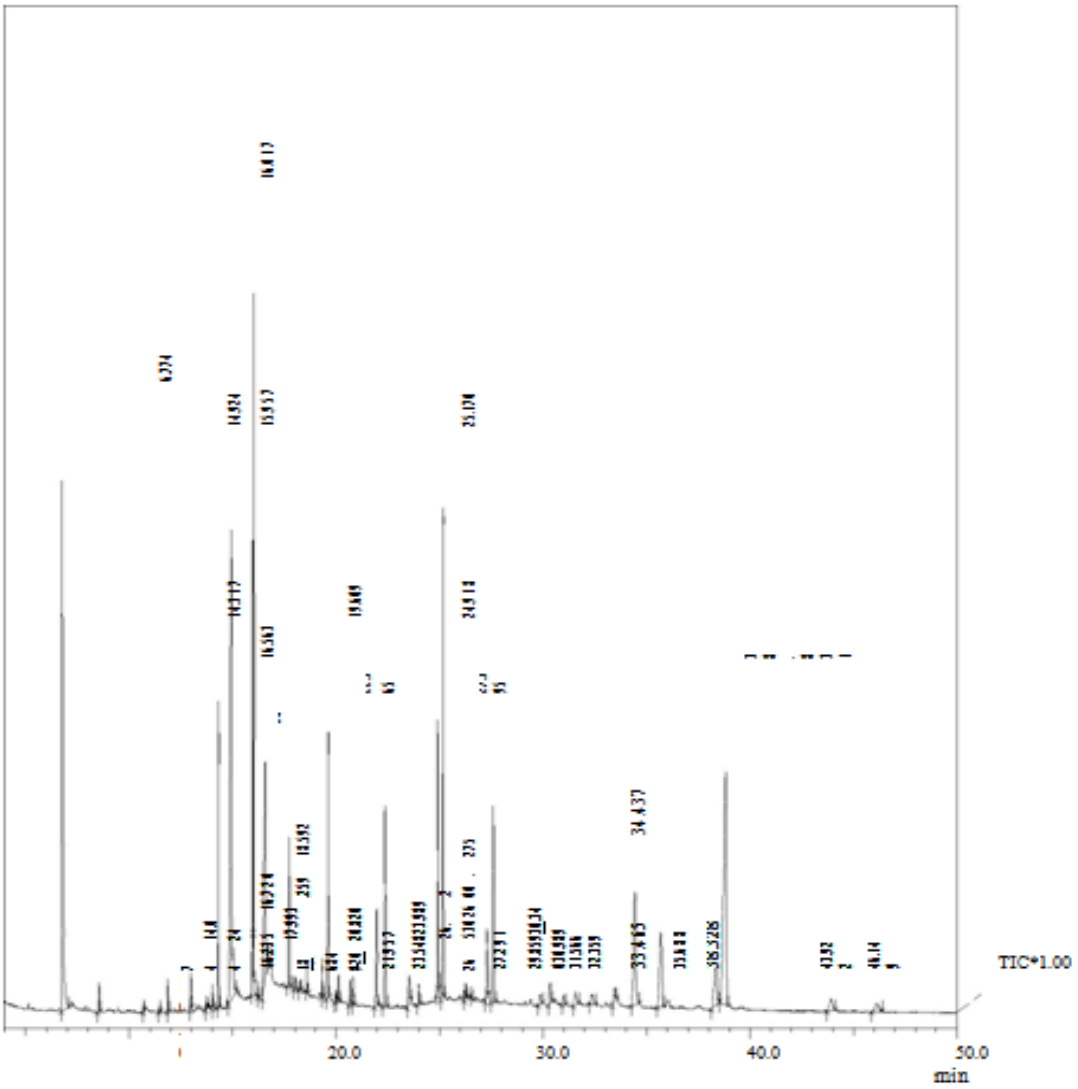

Figure-1
GC-MS Chromatogram of Benzene extract of fruits of *C. procera*

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