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Asian Journal of Plant Science and Research, 2013, 3(4):42-46

ISSN : 2249-7412
CODEN (USA): AJPSKY

GC-MS analysis of *Caralluma truncato-coronata* (Sedgw.) Gravely & Mayur

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ABSTRACT

Caralluma truncato-coronata is an indigenous succulent plant belonging to the sub family Asclepiadoideae. The whole plants of C.trancato-coranata are used as appetite suppressant and weight loss promoter. The present research was design to investigate acetone extract of C. trucato-coronata showed the existence of various pharmaceutically important chemical compounds with different chemical structure. The presence of various bioactive compounds confirms the application of this plant for various ailments by traditional practitioners.

INTRODUCTION

Plants have been used as healers and health rejuvenators since time immemorial. Medicinal plants are expensive gift from nature to human. The approval of traditional medicine as an alternative form of health care and the improvement of microbial resistant to the existing antibiotics has lead researchers to scrutinize the antimicrobial compounds [1]. Herbal medicines are safer than synthetic medicines because the phytochemical in the plant extracts target the biochemical pathway. WHO recognizes that medicinal plants plays an important role in the health care of about 80 percent of world population in developing countries and depend largely on traditional medicines, of which herbal medicines constitutes the most prominent part[2]. The rest of the 20% also depend substantially on the plant-based medicines. Plant – based natural constituents can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, and seeds etc. Medicinal plants have become the focus of intense study in terms of conservation and as to whether their traditional uses are supported by actual pharmacological effects or merely based on folklore[3].

Caralluma is a xerophytic genus includes about 120 taxa, with a wide African, Asian, South African and Southeast European distribution[4]. It belongs to subtribe stapeliinae (tribe *Ceropegiae*, sub family Asclepiadoideae and family Apocyanaceae), which has its center of origin in East Africa[5]. About 13 species and seven varieties of *Caralluma* occur in India. Out of the thirteen species, eleven species are solely endemic to south India[6].

The photochemistry of genus *Caralluma* is characterized by many pregnane glycosides. *Caralluma* extracts have also been found to be appetite suppressant a property which is well known to Indian tribal and hunters. *C. sinaica* in different doses to healthy animals can cause significant decrease in glucose level[7]. *C. truncato-coronata* (Sedgw.) Gravely & Mayur., belongs to the family sub Asclepiadoideae is an important indigenous endemic medicinal herb distributed in Coimbatore. Due to uniqueness of curing different ailments this whole plant was selected to analyze the potent bioactive compound from *C.truncato- coronata* by GC-MS.

MATERIALS AND METHODS

COLLECTION AND PREPARATION OF PLANT MATERIAL

Collection of plant materials

The taxonomically identified *C. truncato-coronata* (Sedgw.) Gravely & Mayur Syn, *Boucerosia truncato-coronata* were collected from the natural habitats of Madukarai ,Coimbatore district, Tamil Nadu, India and certified by Botanical Survey of India (BSI), Coimbatore, India (Certificate No. BSI/SRC/5/23/2012-13/Tech.1375). The voucher specimen was deposited in the Department of Botany, Government Arts College (Autonomous) Coimbatore.

Extraction of Dried Plant: The fresh whole plants were carefully washed with tap water to remove soil particles and adhered debris, rinsed with distilled water, and air-dried for 1 hour. Then it was cut into small pieces and dried in room temperature for two weeks. Then they were ground into powder with the help of Hand mill and stored in room temperature.

Preparation of extract

The whole plant of *C. truncato-coronata* were shade dried and pulverized well. About 20 grams of the powered whole plant were soaked in 100 ml of acetone it was left for 24 hrs and filtered through Whatmann (no 1) filter paper and the residues was removed ,extracts were concentrated using a rotary evaporator at a maximum temperature of 45 ^{o} C and stored in a vial for further GC-MS analysis.

GC-MS analysis

The GC – MS analysis was carried out using a Clarus 500 Perkin – Elmer (Auto system XL) Gas Chromatograph equipped and coupled to a mass detector Turbo mass gold – Perkin Elmer Turbomass 5.2 spectrometer with an Elite – 5MS (5% Diphenyl / 95% Dimethyl poly siloxane), 30m x 0.25 µm DF of capillary column. The instrument was set to an initial temperature of 110ºC, and maintained at this temperature for 2 min. At the end of this period the oven temperature was rose up to 280ºC, at the rate of an increase of 5ºC /min, and maintained for 9 min. Injection port temperature was ensured as 200 ºC and Helium flow rate as one ml/min. The ionization voltage was 70eV. The samples were injected in split mode as 10:1. Mass spectral scan range was set at 45-450 (m/z).Using computer searches on a NIST Version –Year 2011 were used MS data library and comparing the spectrum obtained through GC – MS compounds present in the plants sample were identified.

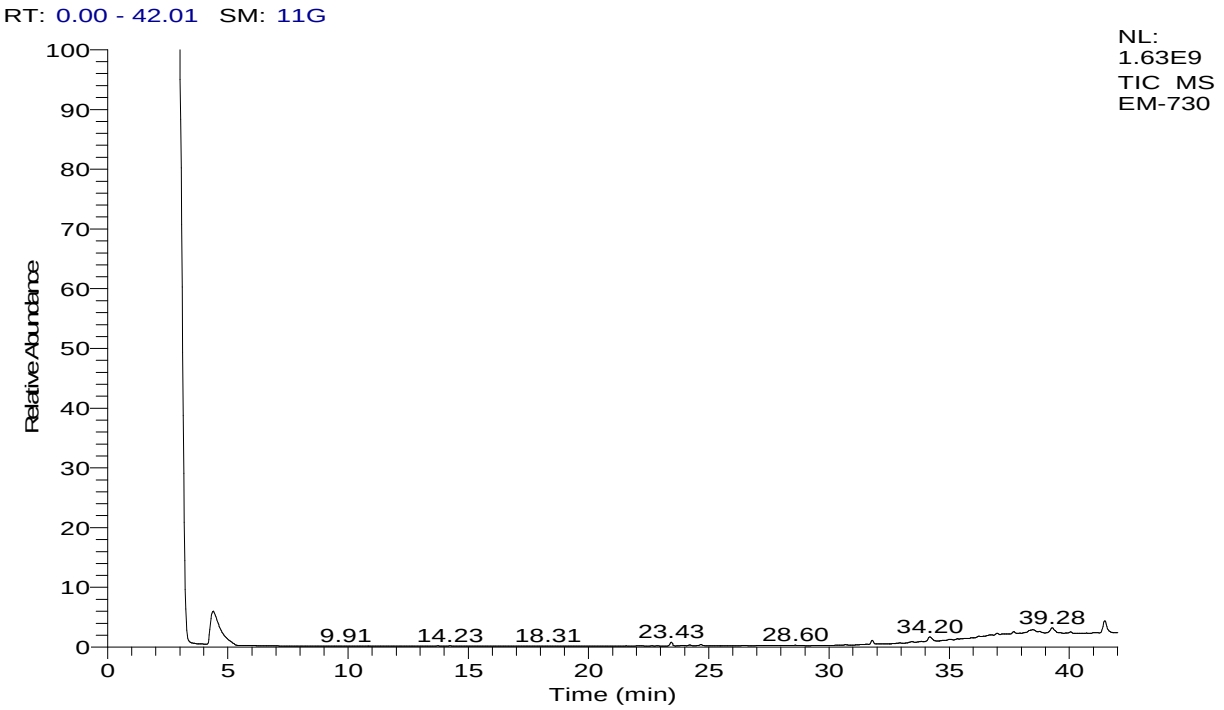
RESULTS

The result pertaining to GC-MS analysis led to the identification of number of compounds from the GC fractions of acetone extract of *Caralluma truncato-coronata*. These compounds were identified through Mass spectrometry attached with GC. The GC-MS analysis was carried out using a Clarus 500 Perkin – Elmer (Auto system XL) Gas chromatograph equipped and coupled to a mass detector Turbo-mass gold – Perkin Elmer Turbo mass 5.2 spectrometer with an Elite – 5MS (5% Diphenyl , 95% Dimethyl polysiloxne) 30m x 0.25µm DF of capillary column. The chromatogram shows 49 prominent peak in the retention time range 4.39 - 40.99 the peak at 4.39 retention time is having the peak area 46.65. This largest peak is due to the presence of 2-pentanone, 4-hydroxy-4-methyl- (cas). The second less prominent peak at 41.48 retention time has the peak area 12.36 is due to the presence of Hexatriacontane. The third less significant peak at 38.48 retention time with the peak area 8.21is characteristics of lucenin 2. The fourth less prominent peak at 39.28 retention time with the peak area 6.05 is characteristics of 2,7-di-tert-butyl-3,6-diphenylbiphenylene. The other less promint peak at other retention times are given in Table 1.

TABLE 1. The Compounds present in the Acetone extract of *Caralluma truncato-coronata* by GC-MS.

S. No	RT	Compound name	Probability	Molecular formula	Molecular weight	Peak area %
1	4.39	2-pentanone, 4-hydroxy-4-methyl- (cas)	72.37	C6H12O2	116	46.65
2	13.74	3-hydroxymyristic acid	10.40	C14H28O3	244	0.38
3	14.23	Propanoic acid, 2-methyl-, 2-ethyl-3-hydroxyhexyl ester	17.23	C12H24O3	216	0.30
4	22.05	Bis(trimethylsilyl)methyl 5-(trimethylsilyl)-2-thienyl sulfide	16.96	C14H30S2SI3	346	0.29
5	23.43	Neophytadiene	24.10	C20H38	278	2.66
6	24.21	2-hexadecen-1-ol, 3,7,11,15-tetramethyl-, [r-[r*,r*-(e)]]- (cas)	30.88	C20H40O	296	0.78
7	24.68	2,6-diisopropylnaphthalene	29.72	C16H20	212	1.48
8	27.16	Prostaglandin f-2 à-tetratms	43.56	C32H66O5SI4	642	0.35
9	28.60	(3r*,4s*)-3-(2-nitro-4-methoxyphenyl)-4-(4-hydroxyphenyl)hexane	21.25	C19H23NO4	329	0.45
10	32.95	Octadecane, 1-[2-(hexadecyloxy)ethoxy]- (cas)	17.44	C36H74O2	538	0.59
11	33.44	2,6,10,14,18,22-tetracosahexaene, 2,6,10,15,19,23-hexamethyl- (cas)	20.88	C30H50	410	0.97
12	34.20	Squalene	28.26	C30H50	410	5.00
13	35.02	03027205002 flavone 4'-oh,5-oh,7-di-o-glucoside	43.65	C27H30O15	594	0.83
14	36.22	Stigmast-5-en-3-ol, (3á,24s)- (cas)	28.05	C29H50O	414	0.67
15	36.69	Milbemycin b, 13-chloro-5-demethoxy-28-deoxy-6,28-epoxy-5-(hydroxyimino)-25-(1-methylethyl)-, (6r,13r,25r)-	42.81	C33H46CLNO7	603	1.41
16	36.99	Ethyl (1'-phenyl-3'-nitro-2'-oxo-1',2'-dihydroquinolin-4'-yl)-cyanoacetate	23.62	C20H15N3O5	377	1.33
17	37.69	Dotriacontane (cas)	21.86	C32H66	450	1.59
18	38.48	Lucenin 2	24.04	C27H30O16	610	8.21
19	39.28	2,7-di-tert-butyl-3,6-diphenylbiphenylene	86.69	C32H32	416	6.05
20	40.70	Dimethoxyglycerol docosyl ether	19.33	C27H56O5	460	0.69
21	41.48	Hexatriacontane	23.04	C36H74	506	12.36
22	14.23	Butanoic acid, hexyl ester	2.25	C10H20O2	172	0.30
23	14.23	Butanoic acid, octyl ester	1.61	C12H24O2	200	0.30
24	23.98	9-eicosyne	3.03	C20H38	278	0.42
25	24.21	Ethyl linoleate	1.04	C20H36O2	308	0.78
26	24.21	Oleyl alcohol	0.84	C18H36O	268	0.78
27	27.16	Physodalin	0.82	C26H30O8	470	0.35
28	23.43	Phytol	22.23	C20H40O	296	2.66
29	22.05	3-phenyl-3h-pyrrolizine-2-carbonic acid-ethylester	3.34	C16H15NO2	253	0.29
30	27.16	Holothurinogenin	0.45	C30H46O4	470	0.35
31	28.6	1,2-benzenedicarboxylic acid, dibutyl ester (cas)	15.43	C16H22O4	278	0.45
32	30.68	Lycopene	7.78	C40H56	536	0.39
33	30.68	cholic acid	2.62	C24H40O5	408	0.39
34	31.79	(+)-isomenthol	4.66	C10H20O	156	2.68
35	32.95	14-á-h-pregna	3.10	C21H36	288	0.59
36	33.83	Phytofluene	3.03	C40H62	542	0.36
37	35.02	Stigmasterol	1.38	C29H48O	412	0.83
38	34.20	Farnesol	1.60	C15H26O	222	5.00
39	36.69	ergosta-5,7,22-trien-3-ol, (3á,22e)- (cas)	12.59	C28H44O	396	1.41
40	33.83	10,13-dioxatricyclo[7.3.1.0(4,9)]tridecan-5-ol-2-carboxylic acid, 4-methyl-11-(1-propenyl)-, methyl ester	0.77	C17H26O5	310	0.36
41	32.95	8-norurs-9(11)-en-12-one-28-oic acid, 3-acetoxy-, methyl ester (14á,20á)	13.70	C32H48O5	538	0.59
42	35.63	Koellikerigenin	0.58	C30H46O4	470	0.54
43	36.99	estra-5(10)-en-3-one-17-ol, acetate	0.65	C20H28O3	316	1.33
44	41.48	nonacosane (cas)	5.53	C29H60	408	12.36
45	37.69	1-hexacosanol	1.88	C26H54O	382	1.59
46	40.70	isochiapin b %2<	3.85	C19H26O6	584	0.69
47	39.28	ç-tocopherol	0.96	C28H48O2	416	6.05
48	40.05	4á,5á-epoxy-3à-hydroxycholestan-6-one	0.27	C27H44O3	416	1.43
49	40.99	quercetin 7,3',4'-trimethoxy	6.80	C18H16O7	344	0.38

Fig.1. GC-MS chromatogram of *Caralluma truncato-coranata* acetone extract



DISCUSSION

Holothurinogenin is used to treat and controlled chronic viral hepatitis[8]. 3-(2-nitro 4 methoxy phenyl)- 4- (4-hydroxy phenyl) hexane ($C_{19}H_{23}NO_4$) is an opioid drug used for constipation and respiratory depression[9].

Stigmast 5-EN 3- Ol alone and it combination with similar phytosterols reduces Blood levels of cholesterols[10]., Stigmast -5 En-3-Ol- beta sitosterol is one of the several phyto sterols. It reduces blood levels of cholesterols and in some times used in treating hyper cholestrolemia[11]. Lycopene is a poly unsaturated hydrocarbon and it may be act as an antioxidant[12]. Cholic acid has many uses in traditional Chinese medicine. Its main use is an ingredient in the manufacture of artificial gall stones[13]. Phytofluene is a carotenoid pigment protects skin by several mechanisms. It act as a UV absorber, as anti oxidants, as anti inflammatory agent [14]. GC-MS analysis of acetone extract of *C. trucato-coronata* showed the existence of various pharmaceutically important chemical compounds with different chemical structure. The presence of various bioactive compounds confirms the application of *C. truncato -coronata* for various ailments by traditional practitioners. However isolation of individual phytochemical constituents may proceed to find a drug.

CONCLUSION

GC-MS analysis showed the existence of various compound with different chemical structures. The presence of various bioactive compounds confirms the application of *C.truncato-coronata* for various ailments by traditional practitioners. However, isolation of individual phytochemical constituents may proceed to find a novel drugs.

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