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GC-MS ANALYSIS OF METHANOLIC EXTRACT OF *PROSOPIS SPICIGERA*

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ABSTRACT

The investigation was carried out to determine the possible chemical components of *Prosopis spicigera L*. The GC-MS analysis of methanolic extract of *P.spicigera* was performed using a GC–MS equipment Thermo GC-TRACE ultra ver., 5.0, Thermo MS DSQ II. Experimental conditions of GC-MS system were as follows: TR 5-MS capillary standard non-polar column, dimension: 30Mts, ID: 0.25 mm, Film: 0.25µm was used and flow rate of mobile phase (carrier gas: He) was set at 1.0 ml/min. Crude samples which dissolved in methanol were run fully at a range of 50-650 m/z and the results were compared by using Wiley Spectral library search programme. Whole plant using GC-MS analysis of Methanolic extract which led to identification of 31 compounds viz. Octacosyl pentafluoropropionate (25.46%), Myo-Inositol, 2-C-methyl-(20.98%), Methane, dichloronitro-(19.41%),17-Pentatriacontene (6.93%), Rhodoxanthin(3.16%) etc. Not much information available on phytochemcial components of *P.spicigera*. This is the first attempt to investigate the GC-MS analysis of methanol extract of this plant.

Key words: *P.spicigera*, GC-MS Analysis, Methanolic extract.

INTRODUCTION

Plants have long been a source of therapeutic agents used by man. Some 80% of the world's populations still rely upon plants for prime health care; even today in Western medicine, and despite progress in synthetic chemistry, some 25% of prescription medicines are still derived either directly or indirectly from plants. This means that about 3.5 to 4 billion people in the world rely on plants as sources of drugs. For the most plant, the discovery of the drugs can be possible from traditional knowledge that plant parts or extracts can be used to treat one or more diseases in humans. The more interesting of the extracts are then subjected to pharmacological and chemical tests to determine the nature of the active components. Therefore, it should be of interest to ascertain just how important plant drugs are used in the form of crude extracts throughout the world. There is a great deal of interest in support for the search for new and useful drugs from higher plants in countries such as the India, People's Republic of China, Japan, USA, and the Federal Republic of Germany. Virtually every country of the world is active in this search to a limited degree (Farnsworth *et al*., 1980; Duke *et al*., 1985; Tyler *et al*., 1987).

Prosopis spicigera Linn. (Syn. *Prosopis cineraria* (L.) Druce.) belonging to the family Fabaceae, is a moderate sized evergreen thorny tree, with slender branches armed with conical throns and with light yellowish-green foliage. Prosopis cineraria tree occurs in the dry and arid regions of India. It is one of the chief indigenous trees of the plains of the central and southern India. Leaves are eaten as a fodder by cattle. Smoke of leaves good for eyes. The stem is often rich in tannin sacs and gum passages; they are used as fodder due to presence of rhamnose, sucrose and starch. Stem portion and wood are generally used as good fuel for the tribal people. The Bark is thick, dark brown in color and hard. It is available in the form of single quill and pieces. Liver-warts and lichens are located on the surface of bark. Stem

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bark is recommended for snake bite. The flowers are small in size and yellowish in colour, appear from March to May after the new flush of leaves. Flowers are mixed with sugar and used during pregnancy as safeguard against miscarriage. Fruits are legume and sweet in taste. Fleshy pods are sickle shape which are10 to 20 cms long and contain sweetish mucilaginous pulp. Pods are mature in May-June before the onset of the rain. Seeds are dark brown in color packed in brown pulp. Seeds contain fixed oil, those are major part of cattle feed (Chowdary *et al*., 1997; Handa, 1995). The determination of phytoconstituents is largely performed by the relatively expensive and often laborious techniques such as Gas chromatography (GC) and Liquid chromatography (LC) combined with specific detection schemes (Eisenhauer *et al*., 2009). In the last few years, GC-MS has become firmly established as a key technological metabolic profiling in both plant and non plant species (Kell *et al*., 2005; Janakiraman *et al*., 2012; Sahaya *et al*., 2012).The literature search reveals that still no work have been done on this plant. And nobody has isolated this crude extracts from methanolic solvent and analyse the crude extract by GC-MS. With this knowledge the present study was intended to determine the phytochemical profile of the extract of *Prosopis spicigera* using GC-MS.

MATERIALS AND METHODS

Collection of the plant material

The plant *Prosopis spicigera* was collected from the Thoothukudi Dist, Tamil Nadu, India in the month of December 2012. The plant materials was identified and authenticated by Dr. V. Chelladurai, Retired Research officer-botany, Central Council For Research In Ayurveda and Sidha (C.C.R.A.S). Govt.of India, Tiruneveli. The collected plant material was free form disease and also free from contamination of other plants.

Preparation of plant extract

100 gms of *Prosopis spicigera* air dried and coarsely powdered aerial (small branches and leaves) plant material was extracted with 500 ml methanol by using Soxhlet extractor. The sample was kept in dark for 72 hrs with intermittent shaking. Then the solvent was evaporated under reduced pressure using rotary evaporator and to obtained viscous semi solid masses (g).

GC-MS analysis

The GC-MS analysis of methanolic crude extract of *Prosopis spicigera* was performed using a GC–MS equipment Thermo GC-TRACE ultra ver: 5.0, Thermo MS DSQ II. Experimental conditions of GC-MS system were as follows: TR 5-MS capillary standard non-polar column, dimension: 30Mts, ID: 0.25 mm, Film: 0.25µm was used and flow rate of mobile phase (carrier gas: He) was set at 1.0 ml/min. In the gas chromatography part, temperature programme (oven temperature) was 40 ^{0}C raised to 250 ^{0}C at 5 ^{0}C/min and injection volume was 1 micro litre. Samples which dissolved in chloroform were run fully at a range of 50-650 m/z and the results were compared by using Wiley spectral library search programme.

Table 1. Compound present in methanolic extract of *Prosopis spicigera* using GC-MS analysis

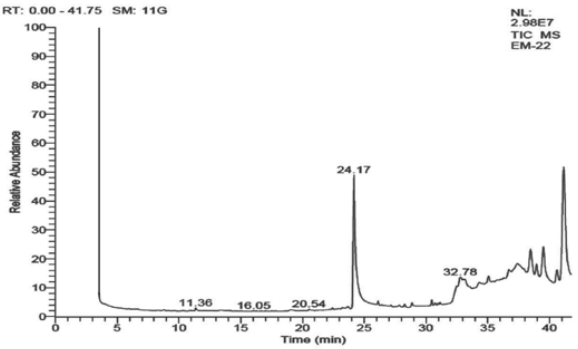
No.	RT	Name of the Compound	MF	MW	Peak area %
1	3.08	Methane, dichloronitro-	CHCl2NO2	129	19.41
2	8.80	Cyclotetrasiloxane, octamethyl-	C8H24O4Si4	296	0.21
3	11.36	Benzaldehyde, 2-methyl-	C8H8O	120	0.47
4	19.04	2,7-Anhydro-l-galacto heptulofuranose	C7H12O6	192	0.22
5	22.43	Ethanol, 2-(9-octadecenyloxy)-, (E)-	C20H40O2	312	0.21
6	23.68	Dasycarpidan-1-methanol, acetate (ester)	C20H26N2O2	326	0.30
7	24.17	Myo-Inositol, 2-C-methyl-	C7H14O6	194	20.98
8	26.12	Hexadecanoic acid, methyl ester	C17H34O2	270	0.56
9	27.17	3-Butylindolizidine	C12H23N	181	0.23
10	27.84	à-D-Glucofuranose, 6-O-(trimethylsilyl)-, cyclic 1,2:3,5-bis(butylboronate)	C17H34B2O6Si	384	0.22
11	28.28	1,3-Cyclohexanedione, 2-methyl-2-(3-oxobutyl)-	C11H16O3	196	0.50
12	28.87	Diphenyldimethylsilane	C14H16Si	212	0.54
13	30.47	Dibutyl phthalate	C16H22O4	278	0.78
14	30.75	Phytol	C20H40O	296	0.31
15	30.95	Oleic acid, eicosyl ester	C38H74O2	562	0.20
16	31.14	Cephalotaxine, 3-deoxy-3,11-epoxy-, (3à,11à)-	C18H19NO4	313	0.30
17	32.46	2,2,4-Trimethyl-4-(4'-rimethylsilyloxyphenyl)chromane	C21H28O2Si	340	1.37
18	32.77	5-Nitro-2-furaldehyde	C15H11N5O4	325	1.81
19	33.18	Norcannabinol-9-carboxylic acid,11-	C21H24O4	340	1.13

20	34.31	Dotetracontane	C42H86	590	1.49
21	35.07	Squalene	C30H50	410	1.42
22	35.75	9-Hexadecenoic acid, 9-octadecenyl ester, (Z,Z)-	C34H64O2	504	0.32
23	36.31	Phenol, 4,4'-(1methylethylidene)bis-	C15H16O2	228	0.20
24	36.71	Rhodopin	C40H58O	554	1.17
25	37.41	N-[4-(Tributylstannyl)butyl]-3-tributylstannylpropionamide	C31H67NOSn2	709	2.00
26	38.47	17-Pentatriacontene	C35H70	490	5.60
27	38.96	13-Docosenamide, (Z)-	C22H43NO	337	2.50
28	39.51	17-Pentatriacontene	C35H70	490	6.93
29	40.61	Rhodoxanthin	C40H50O2	562	3.16
30	41.15	Octacosyl pentafluoropropionate	C31H57F5O2	556	25.46

RESULTS AND DISCUSSION

The results pertaining to GC-MS analysis led to the identification of number of compounds from the GC fractions of methanolic extract of *Prosopis spicigera*. These compounds were identified through mass spectrometry attached with GC. The results of present study were tabulated in Table 1. The results exposed that the presence of 30 different phytocompounds namely Methane, dichloronitro- (19.41%), Cyclotetrasiloxane, octamethyl-(0.21%), Benzaldehyde, 2-methyl- (0.47%), 2,7-Anhydro-l-galacto-heptulofuranose-(0.22%), Ethanol, 2-(9-octadecenyloxy)-, (E) - (0.21%), Dasycarpidan-1-methanol, acetate (ester)- (0.30%), Myo-Inositol, 2-C-methyl-(20.98%), Hexadecanoic acid, methyl ester-(0.56%), 3-Butylindolizidine-(0.23%), à-D-Glucofuranose, 6-O-(trimethylsilyl)-, cyclic1,2:3,5-bis(butylboronate)-(0.22%), 1,3-Cyclohexanedione, 2-methyl-2-(3-oxobutyl)-(0.50%), Diphenyldimethylsilane-(0.54%), Dibutyl phthalate-(0.78%), Phytol-(0.31%), Oleic acid, eicosyl ester-(0.20%), Cephalotaxine, 3-deoxy-3,11-epoxy-, (3à,11à)-(0.30%), 2,2,4-Trimethyl-4-(4'-trimethylsilyloxyphenyl)chromane-(1.37%), 5-Nitro-2-furaldehyde- (1.81%), Norcannabinol-9-carboxylic acid, 11-(1.13%), Dotetracontane- (1.49%), Squalene-(1.42%), 9-Hexadecenoic acid, 9-octadecenyl ester, (Z,Z) - (0.32%), Phenol, 4,4'-(1-methylethylidene)bis - (0.20%), Rhodopin - (1.17%), N-[4-(Tributylstannyl)butyl] -3-tributylstannylpropionamide - (2.00%), 17- Pentatriacontene - (5.60%), 13- Docose namide, (Z) - (2.50%), 17-Pentatriacontene - (6.93%), Rhodoxanthin - (3.16%), Octacosyl pentafluoropropionate - (25.46%). The GC-MS spectrum confirmed that the presence of 30 major components with the retention time 3.08, 8.80, 11.36, 19.04, 22.43, 23.68, 24.17, 26.12, 27.17, 27.84, 28.28, 28.87, 30.47, 30.75,30.95, 31.14, 32.46, 32.77, 33.18, 34.31, 35.07, 35.75, 36.31, 36.71, 37.41, 38.47, 38.96, 39.51, 40.61, 41.15 respectively (figure 1). The name, molecular weight, molecular formula and structure of the component of the test materials were ascertained. The relative percentage amount of each component was calculated by comparing its average peak area to the total areas.

Fig 1. GC-MS Chromatogram of methanolic extract of *Prosopis spicigera*



CONCLUSION

In the present study, the GC-MS analysis of methanolic extract of *Prosopis spicigera* revealed the presence of thirty compounds. Thus, this type of GC-MS analysis is the first step towards understanding the nature of active principles in this medicinal plant and this type of study will be helpful for further detailed study.

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