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GC-MS PROFILING OF BIOACTIVE COMPOUNDS FROM TALINUM PORTULACIFOLIUM (FORSSK.) ASCH. EX SCHWEINF. LEAF

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ABSTRACT

Talinum portulacifolium (Forssk.) Asch. ex Schweinf. is the valuable medicinal plant from the family portulacaceae. It is used as the common leafy vegetable in many countries. The present study aims to the Gas chromatography- Mass spectrum analysis of Ethanolic extract of *Talinum portulacifolium* leaf. It is used as antidiabetic, aphrodisiac and to cure mouth ulcers. Leaves are used to treat eye disorders. Root is used in treatment of cough, pulmonary tuberculosis and gastritis. The present study showed 30 important phytoconstituents like Isobutyl– (5- Morpholin- 4- Yl- 1,2,3,4- Tetrahydro- 7- Thia- 6,9,10,11- Tetraazabenzo[C]flu oren-8- Yl)- Amine, 6,7- Bis(trimethylsilyl)-4- methoxy- 1,3- diazobiphen and this GC-MS analysis give ideas to isolate the chemical compounds effectively.

KEYWORDS: *Talinum portulacifolium*, portulacaceae, GC-MS, phytoconstituents, chromatogram, 6,7-Bis(trimethylsilyl)-4-methoxy-1,3-diazabiphenylene, Squalene, Neophytadiene, Misenine.

INTRODUCTION

Medicinal plants have a strong linkage with human health. Indian system of medicine like Ayurveda, Yunani and Sidha depend on medicinal plants for herbal drugs. Traditionally used medicinal plants produce a variety of compounds of known properties.[1] World health organization estimates that up to 80% of the world's population relies mainly on herbal medicine for primary health care. Herbal medicine, which is also known as folk medicine, is known from every continent.[2] Medicinal plants are an important element of indigenous

medical systems in all over the world. The ethno botany provides a rich resource for natural drug research and development.[3]

Talinum portulacifolium (Forssk.) Asch. Ex Schweinf is one of the medicinal plant under the family Portulacaceae. This family is cosmopolitan and has 19 genera and it is distributed from Rajasthan to the peninsular region.[4,5] It is used in the treatment of arthritis, backache, diarrhoea and sexually transmitted diseases like syphilis.[6] It is also used as a medicine for constipation and ulcer.[7] The green leafy vegetables rich in antioxidants and contain varying amount of phytochemicals like vitamin C, flavonoids and carotenoids. The leafy vegetables are having rich chlorophyll content and it has been proved to build red blood cells and help to decrease the risk of heart disease, stroke, and certain cancers.[8]

The knowledge of chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies.[9] Gas Chromatography Mass Spectroscopy, a hyphenated system which is a very compatible technique and the most commonly used technique for the identification and quantification purpose. The unknown organic compounds in a complex mixture can be determined by interpretation and also by matching the spectra with reference spectra.[10] The objective of the present study deals with the isolation of the chemical compounds from the ethanolic extract of *Talinum portulacifolium* leaf.

MATERIALS AND METHODS

Collection and identification

The fresh plant material was collected from Pungambadi, Erode District, Tamilnadu, India. The plant material was identified by using the local floras.[11,12] The plant was confirmed with the help of type specimens available in the Herbarium of Botanical Survey of India, Southern region center, Coimbatore, Tamil Nadu. The Herbarium number in BSI is **BSI/SRC/5/23/2016/Tech./1358**. The herbarium was deposited in the Vellalar College for Women (Autonomous) Herbarium, Erode 638 012, Tamilnadu.

Gass Chromatography-Mass Spectrometry Analysis

GC-MS analysis of Ethanolic extract of the leaf of *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf. was performed using a GC-MS (Model; Thermo Trace GC Ultra Ver.5.0) equipped with a DB-35MS fused silica capillary coloum (30 m length X Outside diameter 0.25 mm X internal diameter 0.25 µm) and gas chromatogram interfaced to a Mass selective detector (MS-DSQ- II) with XCALIBUR software. For GC-MS detection, an electron

ionization system with ionization energy of -70eV was used. Helium gas was used as a carrier gas at a constant flow rate of 1ml/min and the sample injected was 1µl; Injector temperature was 250ºC; Ion source temperature was 200ºC. The oven temperature was programmed from 70º to 200ºC at the rate of 10ºC/min, held isothermal for 1 minutes and finally raised to 250ºC at 10ºC/min. Interface temperature was kept at 250ºC. The relative percentage of each extract constituent was expressed as percentage with peak area normalization.

Identification of compounds

The identity of the compounds in the extract was assigned by the comparison of their retention time and mass spectra fragmentation patterns with those stored on the computer library and also with published literatures. NIST[13], WILEY[14] library sources were also used for matching the identified compounds from the plant material.

RESULTS

The GC-MS analysis of ethanolic extract of *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf. revealed the presence of thirty compounds. The GC-MS running time was 40.51 minutes. The GC-MS chromatogram of *Talinum portulacifolium* is presented in Fig.1. The active principles with their Retention Time (RT), Molecular formula, Molecular weight (MW) and Peak area are presented in the Table.1. The spectra of the compounds are matched with Wiley 9.0 and NIST libraries.

The most prevailing major compounds of *Talinum portulacifolium* are Isobutyl-(5-morpholin-4-yl-1,2,3,4-tetrahy dro-7-thia-6,9,10,11-tetraaza-benzo[c]flu oren-8-yl)-amine (13.11%), 6,7-Bis(trimethylsilyl)-4-methoxy-1,3-diazabiphenylene (11.64%), 2,8-Dimethyl-2-(4,8,12-trimethyltridecyl) -6-chromanol (11.41%), Methyltris (trimethylsiloxy) silane (8.95%), Phytol (6.64%), Cyclohexane, 1,1',1",1'"-(1,6-hexanediylidene)tetrakis(CAS) (5.18%), Neophytadiene (5.14%), Squalene (4.23%), Misenine (4.18%). 4,8,12,16-Tetramethylheptadecan-4-olide (0.41%), (E,E)-Farnesylacetone (0.43%), 11,13-Tetradecadien-1-ol acetate (0.48%), Dinaphtho[2,1-b:1',2'-d]thiophene (CAS) (0.50%), Lucenin 2 (0.58%), Silane, triethoxymethyl- (CAS) (0.62%) are also detected in minor amount.

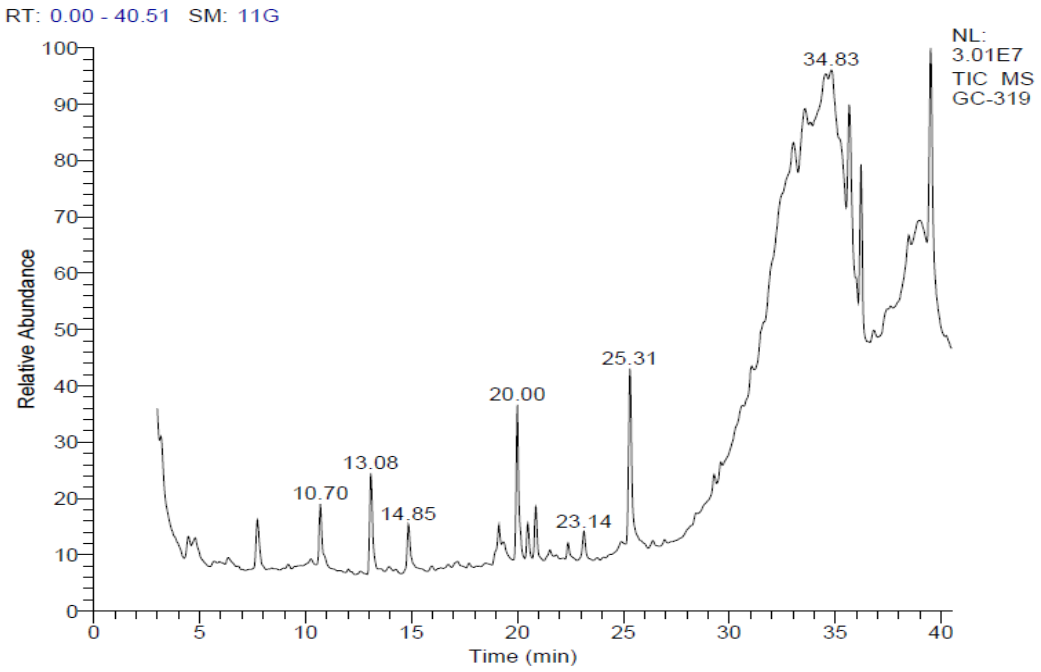


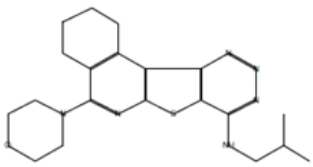
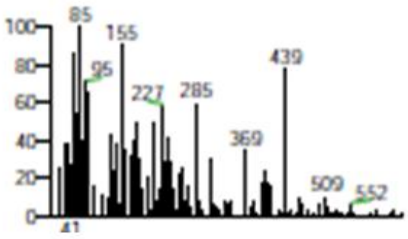
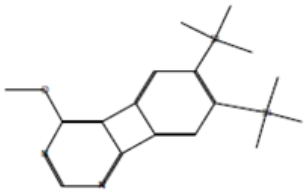
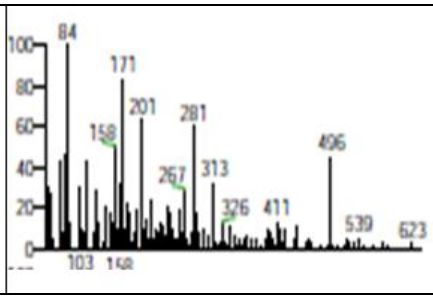
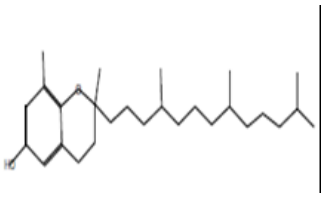
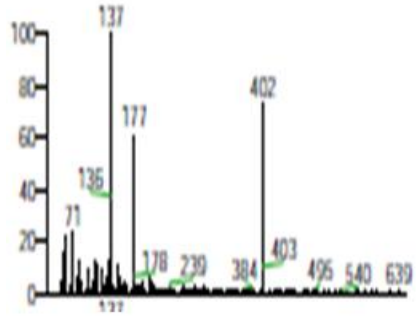
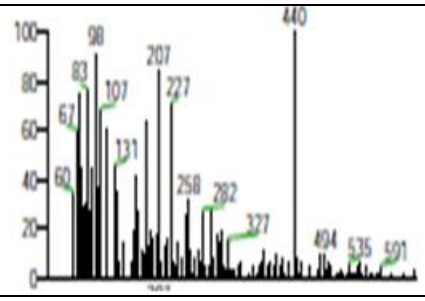
Figure 1: Chromatogram of Ethanolic Extract of *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf.

Table 1: Phytocomponents Identified In the Ethanolic Extract of *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf. LEAF.

S.NO.	R.T	COMPOUND NAME	MOLECULAR FORMULA	MOLECULAR WEIGHT	AREA %
1	3.19	Silane, triethoxymethyl- (CAS)	C7H18O3Si	178	0.62
2	4.47	4-Isopropoxy-5-methoxybenzo[b]furan	C12H14O3	206	0.89
3	4.78	Silane, diethoxydimethoxy-	C6H16O4Si	180	1.31
4	7.73	2-Methylenecyclohexan-1-carboxylic acid	C14H15ClO2	250	2.02
5	10.70	Tetradecene	C14H28	196	2.23
6	13.08	2-tert-Butyl-4-isopropyl-5-methylphenol	C14H22O	206	3.61
7	14.85	Cetene	C16H32	224	1.80
8	19.13	5-Octadecene, (E)-	C18H36	252	2.20
9	20.00	Neophytadiene	C20H38	278	5.14
10	20.50	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296	1.02
11	20.86	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296	1.70
12	21.54	11,13-Tetradecadien-1-ol acetate	C16H28O2	252	0.48
13	22.39	Methyl 1,3-dihydro-2H-isobenzofuran-4-carboxylate	C10H10O3	178	0.56
14	23.14	Hexadecanoic acid, ethyl ester (CAS)	C18H36O2	284	1.03
15	25.31	Phytol	C20H40O	296	6.64
16	29.29	4,8,12,16-Tetramethylheptadecan-4-olide	C21H40O2	324	0.41
17	29.59	(E,E)-Farnesylacetone	C18H30O	262	0.43
18	30.56	Dinaphtho[2,1-b:1',2'-d]thiophene (CAS)	C20H12S	284	0.50
19	31.04	1-Dodecanol (CAS)	C12H26O	186	0.68
20	31.48	Lucenin 2	C27H30O16	610	0.58
21	32.42	Methyltris(trimethylsiloxy)silane	C10H30O3Si4	310	8.95
22	32.99	2,3,9,10-Tetramethoxy-6,13-dithia-5,7,12,14-tetraazap	C20H16N4O4S2	440	3.23
23	33.54	(5E)-2,2,7-Trimethyl-4-oxaocta-5,7-dienal	C10H16O2	168	3.19

24	34.85	Isobutyl-(5-morpholin-4-yl-1,2,3,4-tetrahy dro-7-thia-6,9,10,11-tetraaza-benzo[c]flu oren-8-yl)-amine	C20H26N6OS	398	13.11
25	35.68	Cyclohexane, 1,1',1",1'"-(1,6-hexanediylidene)tetrakis(CAS)	C30H54	414	5.18
26	36.21	Squalene	C30H50	410	4.23
27	37.41	(22R,24S0-24,25-epoxy-22-acetoxy-7à-hydroxyergosta-1,4-dien-3-one	C30H44O5	484	1.03
28	38.47	Misenine	C33H54N2O	494	4.18
29	39.00	6,7-Bis(trimethylsilyl)-4-methoxy-1,3-diazabiphenylene	C17H24N2OSi2	328	11.64
30	39.51	2,8-Dimethyl-2-(4,8,12-trimethyltridecyl) -6-chromanol	C27H46O2	402	11.41

Table 2: Structure and Hit Spectrum of some important Biocompounds.

S.No	Compound name	Structure	Hit Spectrum
1.	Isobutyl-(5-Morpholin-4-Yl-1,2,3,4-Tetrahy Dro-7-Thia-6,9,10,11-Tetraaza-Benzo[C]Flu Oren-8-Yl)-Amine		
2.	6,7-Bis(trimethylsilyl)-4-methoxy-1,3-diazabiphenylene		
3.	2,8-Dimethyl-2-(4,8,12-Trimethyltridecyl) -6-Chromanol		
4.	Methyltris (trimethylsiloxy) Silane		

The highest peak area percentage of 13.11% was obtained by Isobutyl-(5-morpholin-4-yl-1,2,3,4-tetrahy dro-7-thia-6,9,10,11-tetraaza-benzo[c]flu oren-8-yl)-amine. Lowest peak area

percentage was obtained by 4,8,12,16-Tetramethylheptadecan-4-olide (0.41%). Some important biocompounds structure and hit spectrum are displayed in the Table.2.

DISCUSSION

The important phytoconstituent phytol present in the present study was also reported in *Talinum paniculatum* (jacq.) Gertn.[15] The GC-MS analysis of *Talinum portulacifolium* was studied and the major chemical constituents from the coloumn fraction were Dodecane, Tetradecamethyl cycloheptasiloxane, Hexadecanoic acid (methyl ester), cyclopentadiene.[16]

The important biocompounds were reported in the GC-MS analysis of the whole plant *Hydrocotyle javanica* like 3,7,11,15- Tetramethyl-2-hexadecen-1-ol, Phytol, Squalene.[17] These same compounds were identified in the present study. Important biocompound Octadecane was identified in the GC-MS analysis of *Portulaca oleracea*. The same compound was identified in the present analysis.[18]

CONCLUSION

The present study showed the GC-MS analysis of the ethanolic extract of *Talinum portulacifolium* leaf. There were thirty compounds present in the extract. These compounds are the reason for the biological activity of the plant. These bioactive compounds may be responsible for their efficacy and the healing property of various diseases.

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Conflict of Interest

Declared none.

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