

**GC- MS ANALYSIS FROM HYDROALCOHOLIC EXTRACT OF *SOALNUM*
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ABSTRACT

Herbal medicines have become more popular in the treatment of many diseases due to popular belief that green medicine is safe, easily available and with less side effects. This study will make a way for the production of herbal medicines for various ailments using *solanum erianthum* leaves. GC/MS an attractive technique used for the analysis of the hydroalcoholic extract of *solanum erianthum* leaves revealed the presence of 22 compounds. This study forms a basis for the biological activity of the compounds identified.

KEYWORDS: solanum erianthum, GC-MS analysis.**INTRODUCTION**

Plant products have been part of phytomedicines since time immemorial. These can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, seeds etc., i.e. any part of the plant may contain active components. Many plants are cheaper and more accessible to most people especially in the developing countries than orthodox medicine, and there is lower incidence of adverse effects after use. These reasons might account for their worldwide attention and use. The medicinal properties of some plants have been documented by some researchers. Medicinal plants constitute the main source of new pharmaceuticals and healthcare products. Extraction and characterization of several active phytochemicals from these green factories have given birth to some high activity profile drugs. Indeed, the market and public demand has been so great that there is a great risk that many medicinal plants today, face either extinction or loss of genetic diversity. Knowledge of the chemical constituents of plants is desirable because such information will be value for the synthesis of complex chemical substances. Such phytochemical screening of various plants is reported by many researchers. A growing body of evidence indicates that secondary plant metabolites play critical roles in human health and may be nutritionally important. It is believed that crude extract from medicinal plants are more biologically active than isolated compounds due to their synergistic effects. Phytochemical screening of plants has revealed the presence of numerous chemicals including alkaloids, flavonoids, tannins, steroids, glycosides and saponins. Secondary metabolites from

plant serve as defense mechanisms against predation by many microorganisms, insects and herbivores. So that this plant can be used as a therapeutic source for various human ailments. Hence it is obligatory to screen the secondary metabolites, the key factor in therapeutics. GC-MS is one of the best techniques to identify the bioactive constituents of long chain branched chain hydrocarbons, alcohols, acids, ester etc. To explore the medicinal importance the rhizomes of *solanum erianthum* were screened primarily for the phytochemicals present in it and was analyzed using GC-MS.

MATERIAL AND METHODS**Preparation of Extract**

Crude plant extract was prepared by soxhlet extraction method. About 20gm of powdered plant material was uniformly packed into a thimble and extracted with 250ml of acetone, ethyl acetate and hydroalcohol (methanol and distilled water 80:20) extract separately (5-times each). The process of extraction has to be continued for 24 hours or till the solvent in siphon tube of extractor become colourless. After that the extract was taken in a beaker and kept on hot plate and heated at 30-40 °C till all the solvent got evaporated. Dried extract was kept in refrigerator at 4°C till further use. Out of these extracts only hydroalcohol extract was considered for further examination.

Gas chromatography–mass spectrometry (GC-MS) analysis

The powdered plant material was analyzed using a Shimadzu gas chromatography apparatus (Model - TRACE ULTRA VER: 5.0) using a MS DSQ II capillary column (30m) equipped with QP MS detector (EI, 70 ev) with helium as a gas at a flow rate of 1ml/minute. The components were identified by computer search, followed by matching the mass spectral data with those held in the database library.

GC/MS combines the resolving capabilities of GC with the unique structural information from MS, making it the hybrid analytical method of choice for qualitative analysis of suitably volatile organic compounds.

Quantitative applications of GC/MS are more complicated and typically require internal standards. The ability to resolve the components of complex mixtures and yielding qualitative information about organic molecules.

RESULTS AND DISCUSSIONS

The GC separated compounds from the hydroalcoholic leaf extract of *S. erianthum* were identified from the recorded mass spectra by comparison with the mass spectra from the NIST library. The chromatograms obtained from the hydroalcoholic leaf extract of *S. erianthum* by GC-MS are presented below. *S. erianthum* has yielded 22 compounds were characterised by GC-MS analysis (Table .1).

Table 1: Active principles identified in the hydroalcoholic *S. erianthum* leaf extract.

No.	RT	Name of the compound	Molecular Formulae	MW	Peak Area %	Compound Nature	**Activity
1.	10.51	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C ₂₀ H ₄₀ O	296	3.89	Terpene alcohol	Antimicrobial Anti-inflammatory
2.	10.95	E-7-Tetradecenol	C ₁₄ H ₂₈ O	212	1.10	Unsaturated alcoholic compound	No activity reported
3.	12.33	9,9-Dimethoxybicyclo[3.3.1]nona-2,4-dione	C ₁₁ H ₁₆ O ₄	212	3.80	Ketone compound	No activity reported
4.	13.54	Phytol	C ₂₀ H ₄₀ O	296	5.46	Diterpene	Antimicrobial Anti-inflammatory Anticancer Diuretic
5.	14.41	7-Hexadecenal, (Z)-	C ₁₆ H ₃₀ O	238	1.68	Aldehyde compound	Antimicrobial Anti-inflammatory
6.	15.67	Dodecanoic acid, 2-penten-1-yl ester	C ₁₇ H ₃₂ O ₂	268	1.49	Lauric acid ester	Antiviral Antibacterial COX 1 And 2 inhibitor Candidicide Hypercholesterolemic
7.	16.97	Nonadecane	C ₁₉ H ₄₀	268	1.11	Alkane	No activity reported
8.	18.30	Methoxyacetic acid, 3-tridecyl ester	C ₁₆ H ₃₂ O ₃	272	2.13	Acetic acid compound	Antimicrobial
9.	19.64	Methoxyacetic acid, 3-tetradecyl ester	C ₁₇ H ₃₄ O ₃	286	1.62	Acetic acid compound	Antimicrobial
10.	20.99	9-Methyl-Z-10-pentadecen-1-ol	C ₁₆ H ₃₂ O	240	1.94	Unsaturated alcoholic compound	No activity reported
11.	22.30	7-Oxabicyclo[4.1.0]heptane, 1-methyl-4-(2-methyloxiranyl)-	C ₁₀ H ₁₆ O ₂	168	2.16	Alkane compound	No activity reported
12.	23.60	9-(3,3-Dimethyloxiran-2-yl)-2,7-dimethylnona-2,6-dien-1-ol	C ₁₅ H ₂₆ O ₂	238	3.82	Oxiran compound	No activity reported
13.	25.30	cis-Z-à-Bisabolene epoxide	C ₁₅ H ₂₄ O	220	1.57	Sesquiterpene oxide	Anti-tumor, Analgesic, Antibacterial, Antiinflammatory, Sedative, Fungicide.
14.	25.66	7-Methyl-Z-tetradecen-1-ol acetate	C ₁₇ H ₃₂ O ₂	268	2.29	Acetate compound	No activity reported
15.	26.14	Cholestan-3-ol, 2-methylene-, (3à,5à)-	C ₂₈ H ₄₈ O	400	21.38	Steroid	Antimicrobial Anticancer

							Antiasthma Diuretic Hepatoprotective Anti-inflammatory
16.	27.04	E-8-Methyl-9-tetradecen-1-ol acetate	$C_{17}H_{32}O_2$	268	15.99	Acetate compound	No activity reported
17.	28.18	Geranyl isovalerate	$C_{15}H_{26}O_2$	238	3.02	Sesquiterpene alcohol	Anti-tumor, Analgesic, Antibacterial, Antiinflammatory, Sedative, Fungicide.
18.	28.75	Disulfide, di-tert-dodecyl	$C_{24}H_{50}S_2$	402	6.47	Sulfur compound	Antimicrobial
19.	29.94	1-Heptatriacotanol	$C_{37}H_{76}O$	536	2.98	Alcoholic compound	Antimicrobial
20.	31.24	9,12,15-Octadecatrienoic acid, 2-(acetyloxy)-1-[(acetyloxy)methyl]ethyl ester, (Z,Z,Z)-	$C_{25}H_{40}O_6$	436	10.83	Linolenic acid ester compound	Antiinflammatory, Hypocholesterolemic Cancer preventive, Hepatoprotective, Nematicide Insectifuge, Antihistaminic Antieczemic, Antiacne, 5-Alpha reductase inhibitor Antiandrogenic, Antiarthritic, Anticoronary, Insectifuge
21.	32.41	9-Octadecenoic acid (Z)-, phenylmethyl ester	$C_{25}H_{40}O_2$	372	3.34	Oleic acid ester	Anti-inflammatory Insectifuge Antiandrogenic Cancer preventive Flavor Perfumery Alpha reductase inhibitor Dermitogenic Allergenic Anemiagenic
22.	33.61	á-D-Mannofuranoside, farnesyl-	$C_{21}H_{36}O_6$	384	1.93	Sugar moiety	Preservative

**Source: - Dr.Duke's Phytochemical and Ethnobotanical Databases.

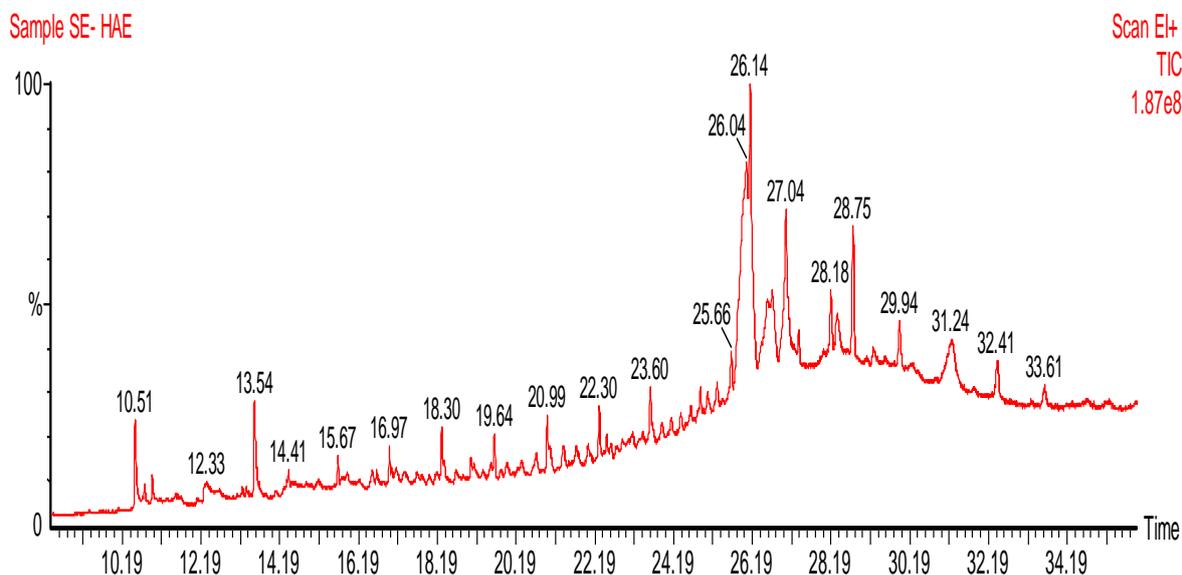


Figure 1. Chromatogram for hydroalcoholic leaf extract of *S. erianthum*.

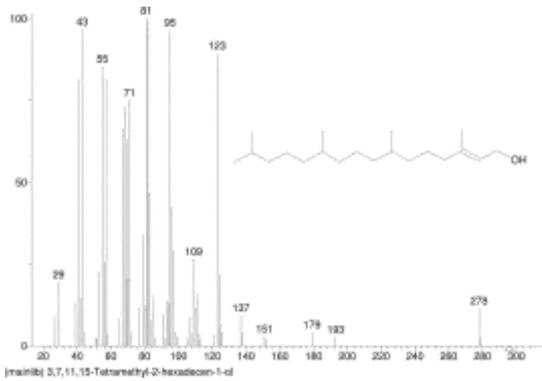


Figure 1a. Mass spectrum for 3,7,11,15-Tetramethyl-2-hexadecen-1-ol.

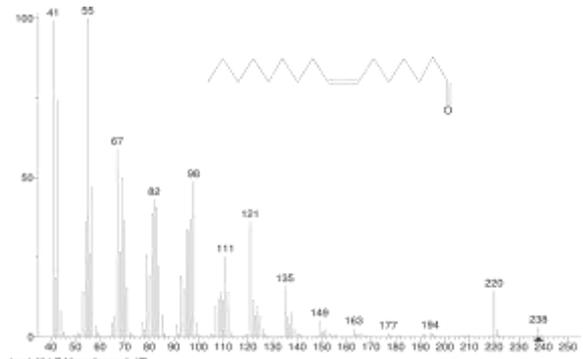


Figure 1e. Mass spectrum for 7-Hexadecenal, (Z)-

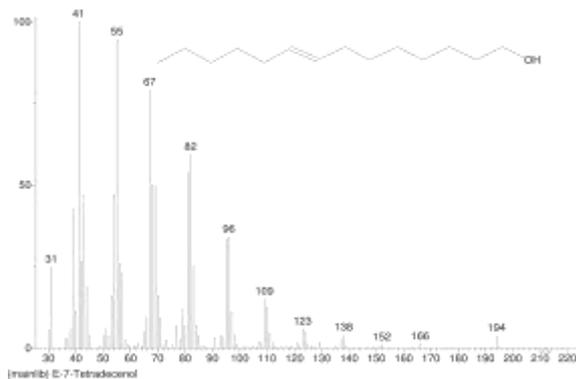


Figure 1b. Mass spectrum for E-7-Tetradecenol

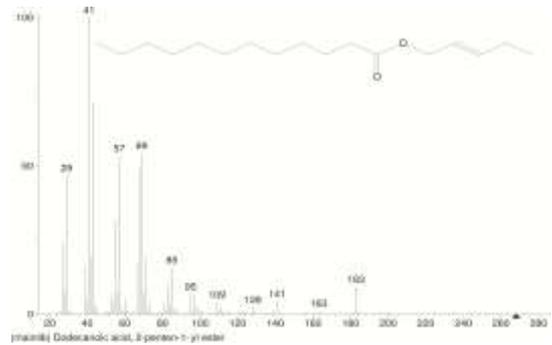


Figure 1f. Mass spectrum for Dodecanoic acid, 2-penten-1-yl ester.

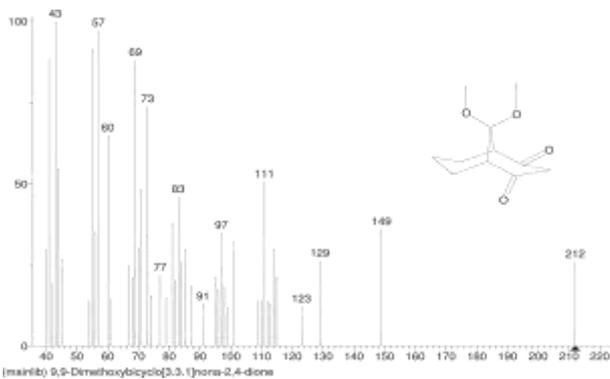


Figure 1c. Mass spectrum for 9,9-Dimethoxybicyclo[3.3.1]nona-2,4-dione

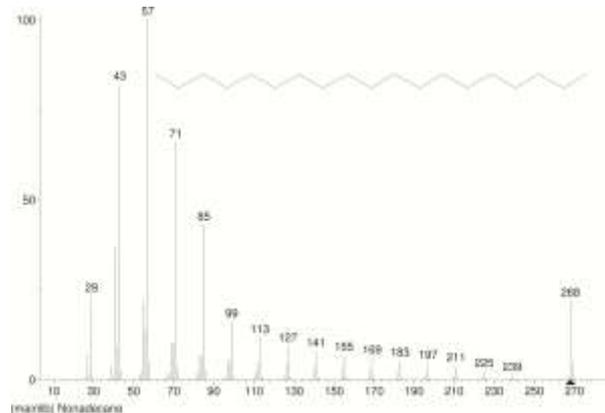


Figure 1g. Mass spectrum for Nonadecane

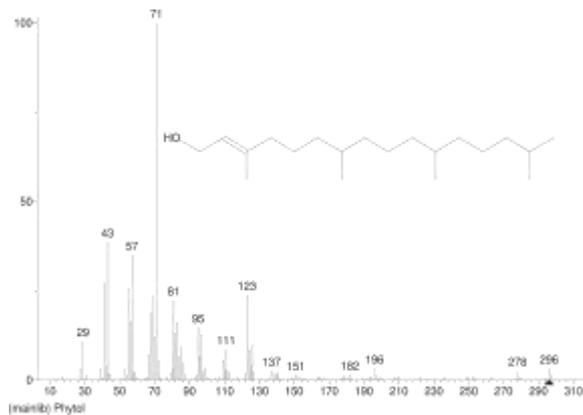


Figure 1d. Mass spectrum for Phytol

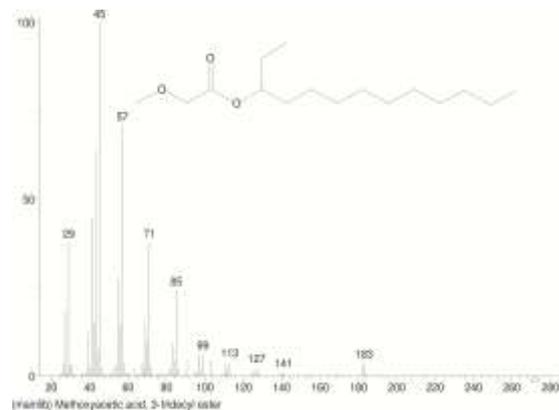


Figure 1h. Mass spectrum for Methoxyacetic acid, 3-tridecyl ester

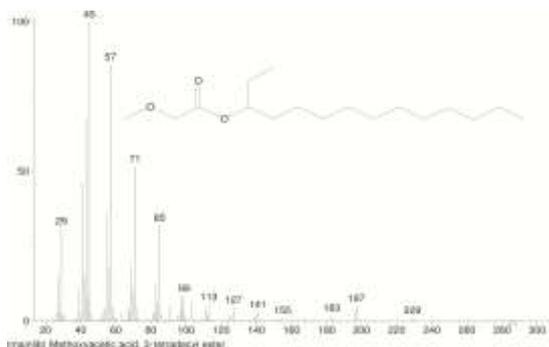


Figure 1i. Mass spectrum for Methoxyacetic acid, 3-tetradecyl ester

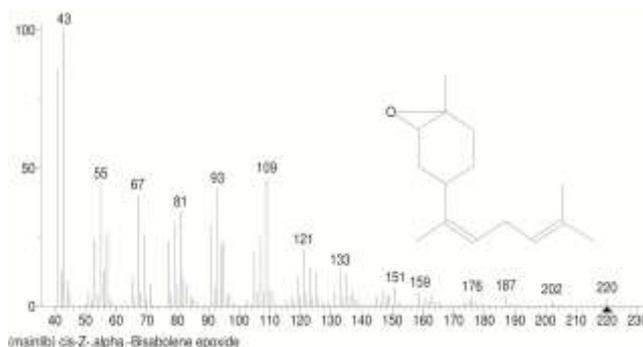


Figure 4.11m. Mass spectrum for cis-Z-à-Bisabolene epoxide

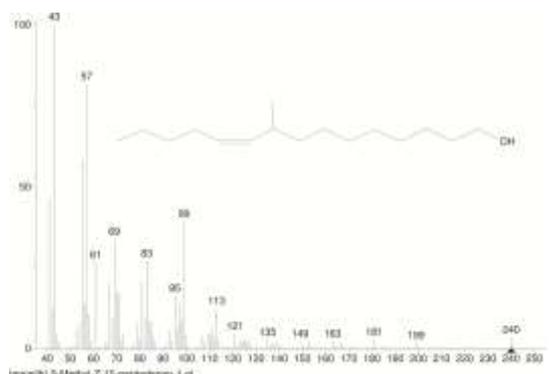


Figure 1j. Mass spectrum for 9-Methyl-Z-10-pentadecen-1-ol

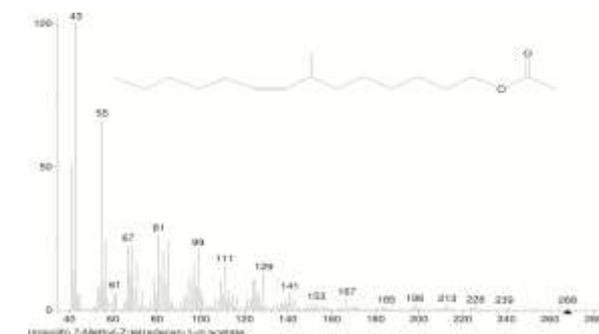


Figure 4.11n. Mass spectrum for 7-Methyl-Z-tetradecen-1-ol acetate

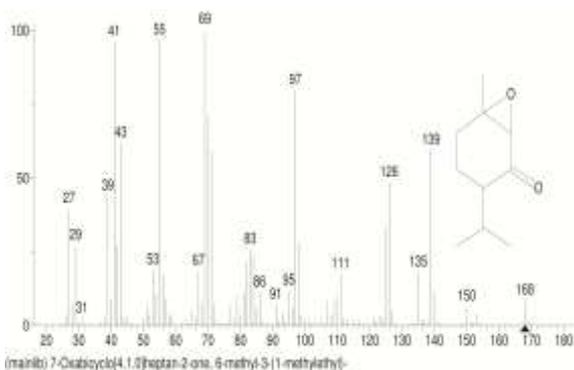


Figure 1k. Mass spectrum for 7-Oxabicyclo[4.1.0]heptane, 1-methyl-4-(2-methyloxiranyl)-

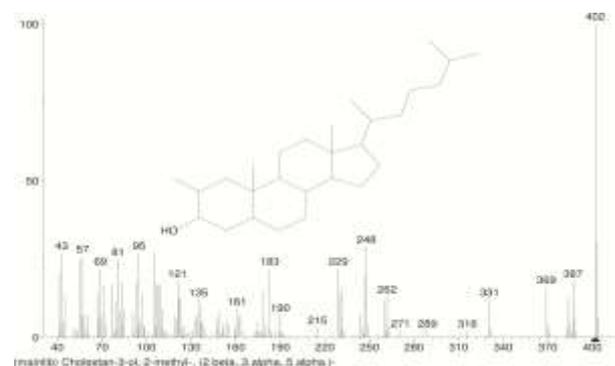


Figure 1o. Mass spectrum for Cholestan-3-ol, 2-methylene-, (3á,5à)-

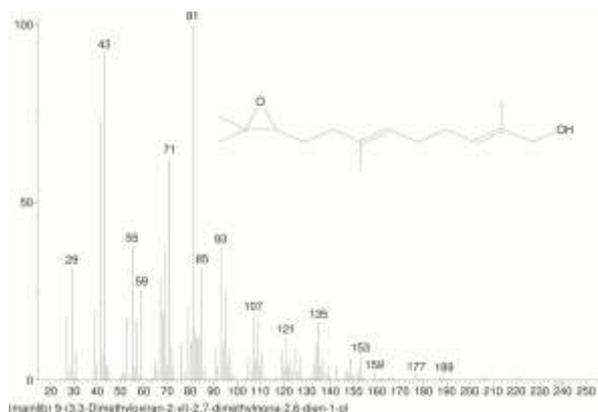


Figure 4.11l. Mass spectrum for 9-(3,3-Dimethyloxiran-2-yl)-2,7-dimethylnona-2,6-dien-1-ol

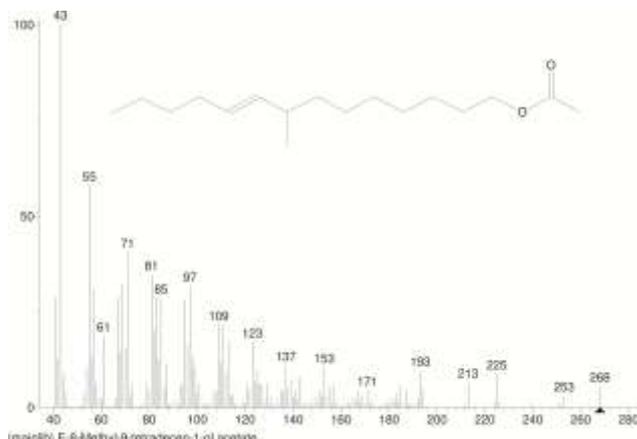


Figure 1p. Mass spectrum for E-8-Methyl-9-tetradecen-1-ol Acetate

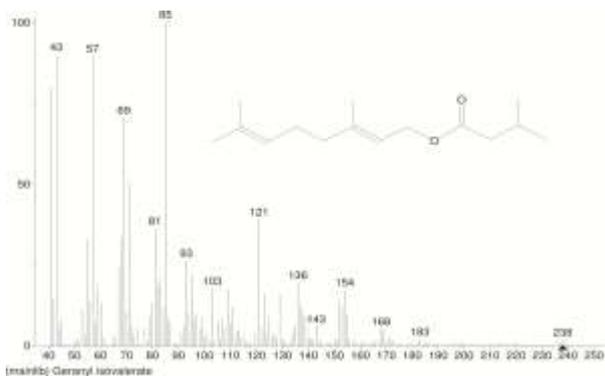


Figure 4.11q. Mass spectrum for Geranyl isovalerate

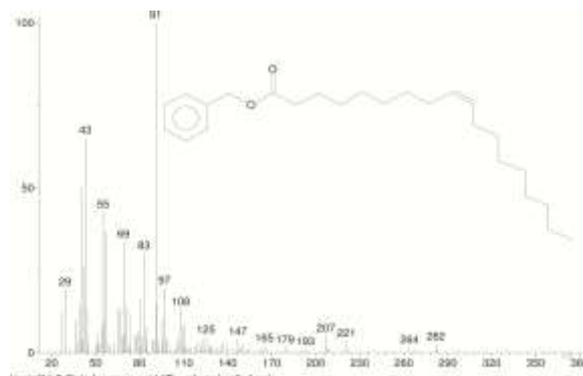


Figure 4.11u. Mass spectrum for 9-Octadecenoic acid (Z)-, phenylmethyl ester

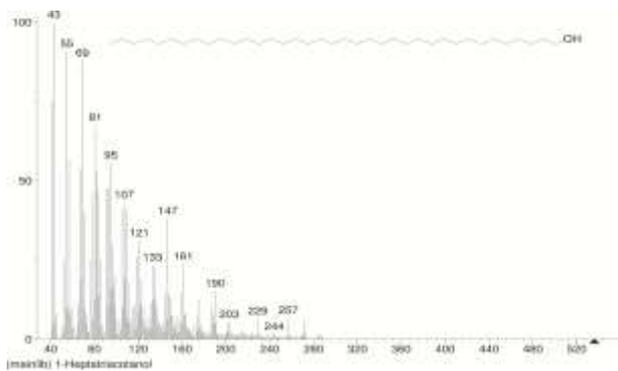


Figure 4.11r. Mass spectrum for Disulfide, di-tert-dodecyl

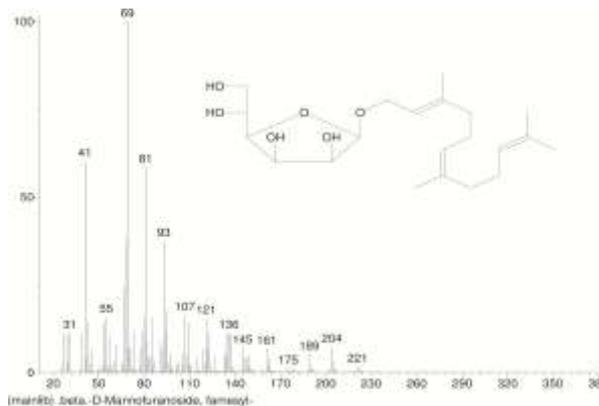


Figure 1v. Mass spectrum for α-D-Mannofuranoside, farnesyl-

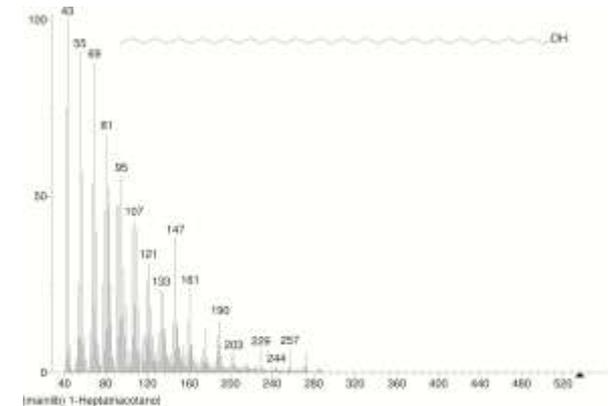


Figure 4.11s. Mass spectrum for 1-Heptatriacotanol

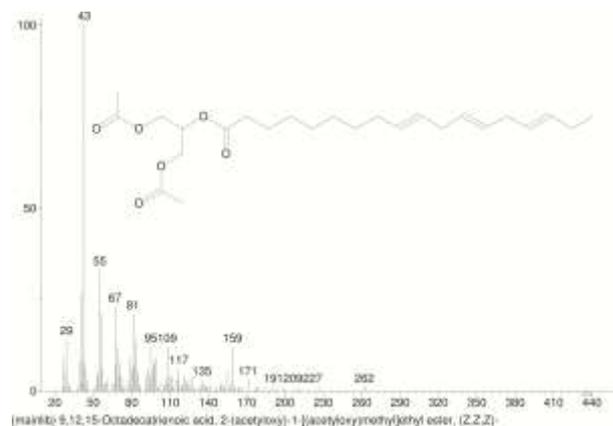


Figure 4.11t. Mass spectrum for 9,12,15-Octadecatrienoic acid, 2-(acetyloxy)-1-[(acetyloxy)methyl]ethyl ester, (Z,Z,Z)-

CONCLUSION

GC-MS analysis of the hydroalcoholic extract of leaves of *Solanum erianthum* reveals the presence of medicinally valued bioactive components. But till date, there are few reports on chromatographic analysis of hydroalcoholic extract of the plant. This study gives the information on nature of active principles present in the medicinal plants. The work is in progress to ascertain its biological activity and brighten the pharmacological profile of it in the arena of traditional medicine.

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