Nat. Volatiles & Essent. Oils, 2021; 8(4): 6371-6378

NVEO
Natural Volatiles &
Essential Oils

'The Gc Ms Analysis Of Ethyl Acetate Extract Of One Herbal Plant, 'Spermacoce Hispida L'

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ABSTRACT

The present study deals with the GC MS analysis of one medicinal plant, **'**Spermacoce hispida L**'.**This plant has wide application in ethnomedical practice. It is used to cure stomach ailments, dandruff, boils and swellings. This plant was collected from nearby hills of Chengalpattu, Tamilnadu. The ethyl acetate extract of the aerial parts of the plant was subjected to GC MS study following standard protocols. It was observed that some very important molecules such as n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Squalene, .gamma.-Tocopherolm, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol, E,E,Z-1,3,12-Nonadecatriene-5,14-diol. The medicinal roles of these molecules could contribute to the medicinal roles of the plant as claimed by ethno-medicinal practice.

Keywords : GC MS, Spermacoce hispida , Ethyl acetate, n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Squalene, .gamma.-Tocopherol, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol,

INTRODUCTION

The present works deals with the GC MS analysis of the whole plant of Spermacoce hispida. This plant has wide application in ethno-medical practice. It is used to cure stomach ailments and dandruff. The flowers are used to treat boils and swellings. The seed extracts are used to treat internal injuries of nerves and kidney. It purifies blood and improves vigour of the body(Meti et al, 2013).Anupriya et al, 2016 have reported the GC MS studies on different extracts of Spermacoce hispida L.Anantharaman and Krishnamoorthy, 2017 and Dhevi and Elango, 2015 have reported the

GC MS studies of the chloroform extracts of the seeds of Spermacoce hispida L. The leaves of Spermacoce hispida L have been reported to have cancer therapeutic role by Rathi et al, 2011.This work is in continuation of our work to establish the efficacy of the herbal plants, Ayurvedic and Sidhha medicines. (Priyadarshini et al, 2017; Jayakumari et al, 2017; Rao et al, 2018; Vijayalakshmi and Rao, 2019; Yuvaraj et al, 2019; Muttevi et al, 2019, Rao et al, 2019; Muttevi et al, 2020; Vijayalakshmi and Rao, 2020; Janaki et al, 2021)

MATERIALS AND METHODS

The plant Spermacoce hispida was collected from the nearby hills at Chengalpattu, Tamil Nadu. The plant was identified by a qualified botanist at Chennai. The ethyl acetate extract of the shade dried whole plant was collected after 48 h of soaking. The extract was evaporated and the dried powder was used for GC-MS analysis by standard procedures.

GC-MS Procedure

Instrument: GC (Agilent: GC: (G3440A) 7890A. MS/MS: 7000 Triple Quad GCMS) was equipped with MS detector.

Sample Preparation

About 100 ml sample was dissolved in 1 ml of suitable solvents. The solution was stirred vigorously using vortex stirrer for 10 s. The clear extract was determined using GC for analysis.

GC-MS Protocol

Column DB5 MS (30 mm × 0.25 mm ID ×0.25 µm, composed of 5% phenyl 95% methylpolysiloxane), electron impact mode at 70 eV; helium (99.999%) was used as carrier gas at a constant flow of 1 ml/min injector temperature 280°C; auxilary temperature: 290°C ion-source temperature 280°C.

The oven temperature was programmed from 50°C (isothermal for 1.0 min), with an increase of 40°C/min, to 170°C C (isothermal for 4.0 min), then 10°C/min to 310°C (isothermal for 10 min) fragments from 45 to 450 Da. Total GC running time is 32.02 min. The compounds are identified by GC-MS Library (NIST and WILEY).

RESULTS AND DISCUSION

The results of the GC-MS analysis of the whole plant ethyl acetate extract, along with the possible medicinal role of each molecule ofSpermacoce hispida extract are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Spermacoce hispida. The identification of metabolites was accomplished by comparison of retention time and fragmentation pattern with mass spectra in the NIST spectral library stored in the computer software (version 1.10

beta, Shimadzu) of the GC-MS along with the possible pharmaceutical roles of each bio molecule as per Dr. Duke's Phytochemical and ethnobotanical data base (National Agriculture Library, USA) and others as shown in Table 1.n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Squalene, .gamma.-Tocopherol, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol, E,E,Z-1,3,12-Nonadecatriene-5,14-diol etc. These molecules are known to have far reaching medicinal roles as mentioned in Table 1 which corroborate well the medicinal roles of this plant.

CONCLUSION

From the above mentioned resultsit is clear that Spermacoce hispidahas some important medicinal roles. Further work in this regard is warranted.

ACKNOWLEDGMENTS

The authors express their sincere thanks to all who have helped in this project.

REFERENCES

1. Meti, V., Chandrasekhar, K., Mishra, S. (2013) Pharmacological activities of Spermacoce hispidaL.-A review. IJRAP, 4(1), 18-22.

2. Anupriya, S., Elangovan, K., Murugesan, K. (2016) Multiple screening of phytochemicals from different plant extracts of Spermacoce hispida l., by GC- MS method. IJPDT, 6 (2), 71-79.

3. Anantharaman, G. K., Krishnamoorthy, G. (2017) Preliminary phytochemical analysis and gas chromatography mass spectrometry spectra of chloroform extract from Spermacoce hispida L. Seed. Asian Journal of Pharmaceutical and Clinical Research, 10(6),331

4. Dhevi, R., Elango, V. (2015) GC MS evaluation of bioactive compounds from the seeds of Spermacoce hispida linn. World Journal of Pharmaceutical Research, 4(2), 1171-1180.

5. Rathi, M. A., Meenakshi, P., Kumar, G. D., Raj, A. C., Sunitha, M., Gopalakrishnan, V. K. (2011) Leaves of Spermacose hispida L as a novel cancer therapeutic- An in vitro study. Res J Pharm. Tech, 4(8),1288-1291.

6. Gomathi Priyadarshini, Arul Amutha Elizabeth, Jacintha Anthony, Mudiganti Ram Krishna Rao, Prabhu. K., Aiswarya Ramesh, Vani Kri,shna. (2017) The GC MS analysis of one medicinal plant, Premna tomentosa. Journal of Pharmaceutical Sciences and Research, **9(9),** 1595-1597

7. Jayakumari, S., Prabhu, K., Mudiganti Ram Krishna Rao, Bhupesh, G., Kumaran, D., Aishwariya Ramesh. (2017) The GC MS Analysis of a Rare Medicinal Plant Aloe barbadensis. J. Pharm. Sci. & Res.9(7), 1035-1037

8. Rao, M. R. K., Vijayalakshmi, N. (2018) Preliminary phytochemical and GC MS analysis of different extracts of Sphaeranthus indicus leaves. Indo American J of Pharmaceuical Sciences, 5(3), 1511-1520

9. Vijayalakshmi, N., Mudiganti Ram Krishna Rao. (2019) The antioxidant studies of two medicinal plants, Sphaeranthus indicusand Psophocarpus tetragonolobus.Asian J of pharmaceutical and Clinical Res, 12(1), 321-327.

10. Yuvaraj, R., Mudiganti Ram Krishna Rao, Prabhu, K., Lakshmisundram, R., Sampad Shil, Sathish Kumar, M., Vijayalakshmi, N. (2019)The GC MS study of one medicinal plant, Stachyterpheta indica.Drug Invention Today, 12(9), 1665-1669

11. Muttevi Hyagreva Kumar, Prabhu, K., Mudiganti Ram Krishna Rao, Lakshmisundram, R., Sampad Shil, Sathish Kumar, M., Vijayalakshmi, N. (2019)The GC MS study of one medicinal plant, Dodonea angutifolia. Drug Invention Today, 12(9), 1661-1664

12. Mudiganti Ram Krishna Rao, Vijayalakshmi, N., Prabhu, K., Sathish Kumar, M. (2019)The gas chromatography–mass spectrometry study of Moringa oleifera seeds. DIT, 12(10), 2172-2175

13. Muttevi Hyagreva Kumar, Prabhu, K., Mudiganti Ram Krishna Rao, Lakshmisundram, R., Sampad Shil, Sathish Kumar, M., Vijayalakshmi, N.(2020)The GC MS study of one medicinal plant, Aristolochia Indica .DIT, 12(12), 2919-2923.

14. Vijayalakshmi, N., Mudiganti Ram Krishna Rao. (2020) 'Preliminary phytochemical and antioxidant studies of leaf extracts of one medicinal plant, Vitex negundo".RJPT, 13(5), 2167-2173

15. Janaki C. S., Prabhu K., Mudiganti Ram Krishna Rao, Venkat Ramaiah, Shruti Dinkar, Vijayalakshmi, N., Kalaivannan. J. (2021) The GC MS analysis of Ethyl acetate extract of Merremia emerginata'.Ind J of Natural Sciences, 12(67), 33638-33646

16. Dr. Duke's Phytochemcial and Ehnobotanical Databases. U.S. Department of Agriculture, Agricultural Research Service. 1992-2016. Dr. Duke's Phytochemical and Ethnobotanical Databases. Home Page, http://phytochem.nal.usda.gov/ http://dx.doi.org/10.15482/USDA.ADC/1239279

Figure 1. Shows the GC MS profile graph of ethyl acetate extract of Spermacoce hispida L

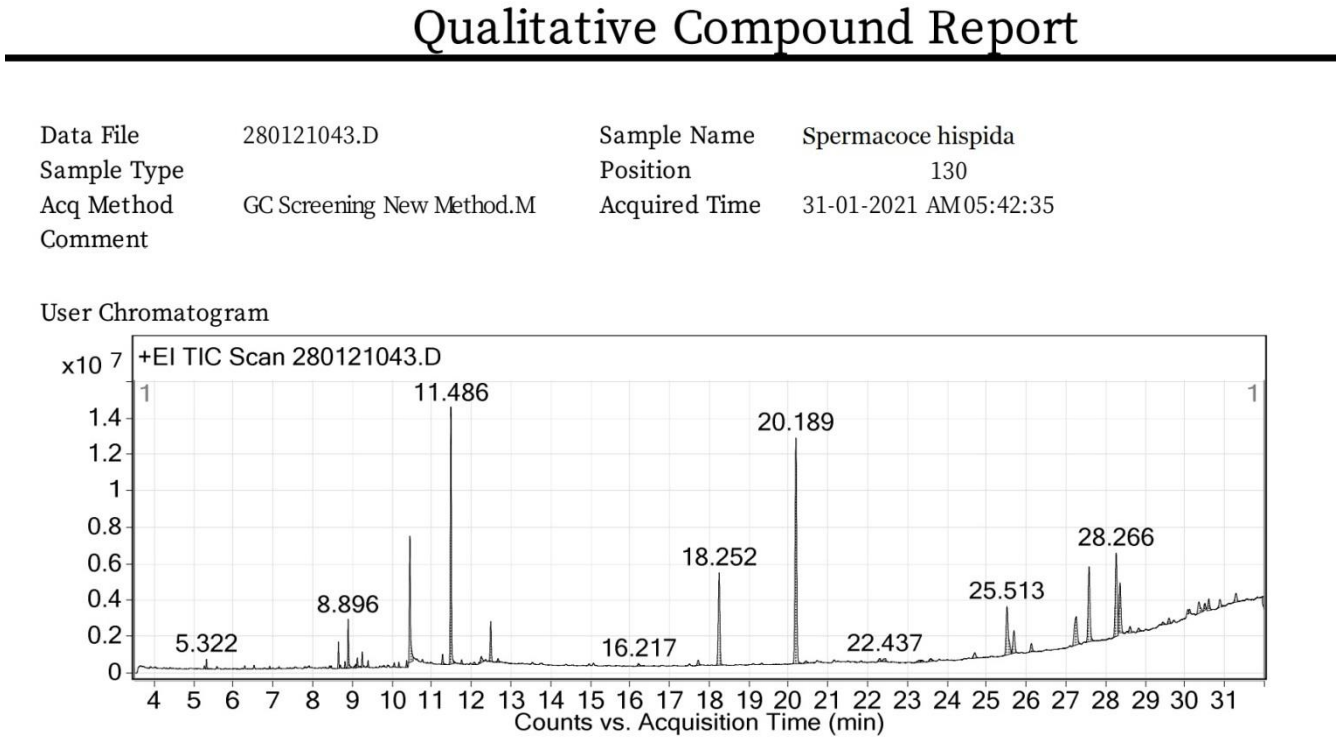

Table1. Indicates the retentions time, types of possible compound, molecular formula, molecular mass, percentage peak area and the possible medicinal roles of each compound as shown in the GC MS profile of Spermacoce hispida L

Ret. Time	Compound	Mol. Formula	Mol. Mass	% Peak Area	Possible Medicinal Role
8.5	1-Pentadecyne	C15H28	208.2	0.98	Not known
8.90	Bicyclo[3.1.1]heptane, 2,6,6-trimethyl-	C10H18	138.1	2.21	Not known
10.45	n-Hexadecanoic acid	C16H32O2	256.2	7.32	Acidifier, Arachidonic acid Inhibitor, Increases Aromatic

					Amino acid decarboxylase activity, Inhibits production of uric acid, Urine acidifier, Anaphylactic, Arylamine N acetyltransferase inhibitor, decreases norepinephrine production, Down regulates nuclear and cytosol androgen reuptake, GABA-nergic, Increase NK cell activity, inhibits production of tumor necrosis factor, Myo-neuro-stimulator
11.49	Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta., 5.alpha.)-(.+/-.)-	C10H20O	156.2	13.80	Not known
18.25	2-((Octan-2-yloxy)carbonyl)benzoic acid	C16H22O4	278.2	7.54	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
20.19	Squalene	C30H50	410.4	19.58	Plant steroid use as food additive and has cholesterol lowering role
24.70	.gamma.-Tocopherol	C28H48O2	416.4	0.65	Tocopherol synergist, PPAR-gamma antagonist
25.51	4,5,6,7-Tetrahydro-benzo[c]thiophene-1-carboxylic acid allylamide	C12H15NOS	221.1	5.53	Not known
25.69	dl-.alpha.-Tocopherol	C29H50O2	430.4	2.19	Tocopherol synergist, 5 alpha reductase inhibitor, Alpha agonist, Alpha amylase

					inhibitor, Alpha glucosidase inhibitor, HIF-1 alpha inhibitor, Ikappa B-alpha phosphorylation inhibitor, Increase alpha mannosidase activity, Interleukin 1-alpha inhibitor, Testosterone-5-Alpha-Reductase-Inhibitor, TNF- alpha inhibitor
27.26	Campesterol	C28H48O	400.4	4.14	Plant steroid use as food additive and has cholesterol lowering role
27.58	Stigmasterol	C29H48O	412.4	7.40	Precursor of progesterone , acts as intermediate in the biosynthesis of androgens and estrogens, anti-osteoarthritic, antihypercholesterolemic, cytotoxic, antitumor, hypoglycemic, antimutagenic, antioxidant, anti-inflammatory, analgesic
28.27	.beta.-Sitosterol	C29H50O	414.4	8.31	17 beta dehydrogenase inhibitor, androgen blocker, anti-amyloid beta, anticancer, Anti TGF beta, Beta 2- receptor, beta blocker, beta-galactosidase inhibitor, beta-glucuronidase inhibitor
28.36	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296.3	7.29	Oligosaccharide provider
28.61	Phytonadione	C31H46O2	450.4	0.59	Not known

30.61	E,E,Z-1,3,12-Nonadecatriene-5,14-diol	C19H34O2	294.3	1.14	anticancer, antidote, antitumor, Cytochrome-P450-2E1-Inhibitor, Decreases C-Teleopeptide Excretion, Decreases Deoxypyridinoline Excretion, Decreases Endothilial Leukocyte Adhesion, Decreases Epinephrine Production, Decreases Oxalate Excretion