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'The Gc Ms Analysis Of Ethyl Acetate Extract Of One Herbal Plant, 'Memecylonumbellatum'

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ABSTRACT

The present study deals with the GC MS analysis of one medicinal plant, **'**Memecylonumbellatum.**'**This plant has many ethno-medicinal uses. 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 7-Octadecyne, 2-methyl-, n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Benzeneethanol, 4-hydroxy-, Squalene, Sulfurous acid, butyl heptadecyl ester, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin were shown in the GC MS profile of this plant. These molecules have far reaching medicinal roles which correspond to the reports of its medicinal values.

KeyWords : GC MS, Memecylonumbellatum, Ethyl acetate, 7-Octadecyne, 2-methyl-, n-Hexadecanoic acid, Squalene, Sulfurous acid, butyl heptadecyl ester, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin

INTRODUCTION

The present work deals with the GC MS analysis of the ethyl acetate leaf extracts of Memecylonumbellatum. This plant is found in the wild with beautiful and colourful inflorescence. Its medicinal roles have been reported by some workers. Bharathiet al, 2016 have reviewed the various traditional information and taxonomic status of Memecylon genus. The GC MS profile of the methanolic leaf extract of related species Memecylonmalabaricum was reported by Rajalakshmi,

2018. Kannanet al, 2014 have reported the GC MS profile of the methanolic extract of Memecylonumbellatum. Mala and Saravanakumar, 2016 have studied the GC MS profile of methanolic leaf extract of Memecylonedule. Srinivasanet al, 2014 have studied the GC MS profile and antimicrobial activity of different extracts of the leaves of Memecylonedule. Research articles on the medicinal roles of Memecylon indicate its antidiabetic (Ramaiahet al, 2012), anti-inflammatory (Joshi et al, 2009), Nephroprotective activity (Joshi et al, 2009), Analgesic activity (Joshi et al, 2010), Antihelmintic activity (Ramanjayaluet al, 2010), Antioxidant activity (Rumzhumet al, 2012), Hepatoprotective activity (Joshiet al, 2008), Anticancer activity (Naiduet al, 2013).This work is in continuation of our work to establish the efficacy of the herbal plants, Ayurvedic and Sidhha medicines. (Priyadarshiniet al, 2017; Jayakumariet al, 2017; Raoet al, 2018; Vijayalakshmi and Rao, 2019; Yuvarajet al, 2019; Mutteviet al, 2019, Raoet al, 2019; Mutteviet al, 2020; Vijayalakshmi and Rao, 2020; Janakiet al, 2021).

MATERIALS AND METHODS

The plant Memecylonumbellatumwas 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 aerial parts of the 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 DISCUSSION

The results of the GC-MS analysis of the whole plant ethyl acetate extract, along with the possible medicinal role of each molecule ofMemecylonumbellatumextract are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Memecylonumbellatum.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 ethno-botanical data base (National Agriculture Library, USA) and others as shown in Table 1. The results as shown in Table 1 indicate the medicinal roles of some of the molecules such as7-Octadecyne, 2-methyl-, n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Benzeneethanol, 4-hydroxy-, Squalene, Sulfurous acid, butyl heptadecyl ester, dl-.alpha.-Tocopherol, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin. These molecules have promising medicinal role as mentioned in Table 1. From these result it is evident that the plant Memecyloeumbellatumhas a number of medicinal roles.

CONCLUSION

From the results is clear that Memecylonumbellatumhas some important medicinal roles. Further work in this regard is warranted.

ACKNOWLEDGMENTS

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Figure 1. Shows the GC MS profile graph of ethyl acetate extract of Memecylonumbellatum.

Qualitative Compound Report

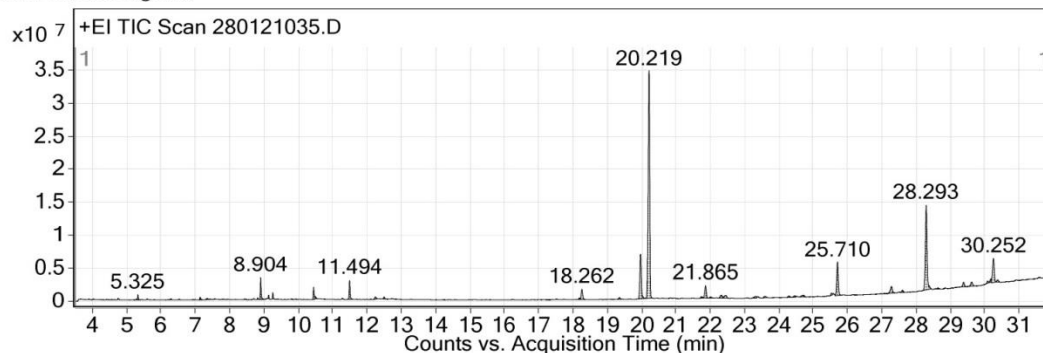| Data File	280121035.D	Sample Name	Memecylon umbellatum
Sample Type		Position	122
Acq Method	GC Screening New Method.M	Acquired Time	31-01-2021 AM 12:44:06
Comment			

Table 1. 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 Memecylonumbellatum

Ret. Time	Compound	Mol. Formula	Mol. Mass	% Peak Value	Possible Medicinal Role
8.90	Bicyclo[3.1.1]heptane, 2,6,6-	C10H18	138.	2.08	Not Known

	trimethyl-		1	
9.13	7-Octadecyne, 2-methyl-	C19H36	264.3	0.26	Catechol-O-methyl-Transferase Inhibitor, methyl Donar, Methyl Guanidine Inhibitor
10.44	n-Hexadecanoic acid	C16H32O2	256.2	1.37	Anaphylactic, Antitumor, Arylamine-N-Acetyltransferase-Inhibitor, Decreases Norepinephrine Production, Down regulates nuclear and cytosol androgen reuptake, GABA-nergic, Increases natural killer cell activity, Inhibits Production of Tumor Necrosis Factor, Myo-neuro-stimulant
11.49	Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta.,5.alpha.)-(.+/-.)-	C10H20O	156.2	2.15	Not known
18.26	2-((Octan-2-yloxy)carbonyl)benzoic acid	C16H22O4	278.2	1.77	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
19.97	Benzeneethanol, 4-hydroxy-	C8H10O2	138.1	7.92	17 beta dehydrogenase inhibitor, Arylamine N Acetyltransferase inhibitor, Testosterone Hydroxylase inhibitor

20.22	Squalene	C30H50	410.4	43.54	Monooxygenase inhibitor, biochemical precursor in the preparation of steroids, natural moisturizer, used in cosmetics
21.87	Sulfurous acid, butyl heptadecyl ester	C21H44O3S	376.3	2.20	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
25.71	dl-.alpha.-Tocopherol	C29H50O2	430.4	6.49	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
27.28	Campesterol	C28H48O	400.4	1.64	Plant steroid use as food additive and has cholesterol lowering role
27.60	Stigmasterol	C29H48O	412.4	0.38	Precursor of progesterone , acts as intermediate in the biosynthesis of androgens and estrogens, anti-osteoarthritic, antihypercholesterolemic, cytotoxic, antitumor, hypoglycemic, antimutagenic, antioxidant,

				anti-inflammatory, analgesic
28.29	.beta.-Sitosterol	C29H50O	414.4	18.33	17 beta dehydrogenase inhibitor, androgen blocker, anti-amyloid beta, anticancer, Anti TGF beta, Beta 2- receptor, beta blocker, beta-galactosidase inhibitor, beta-glucuronidase inhibitor
28.64	Phytonadione	C31H46O2	450.4	0.24	Not Known
29.38	.beta.-Amyrin	C30H50O	426.4	0.86	17 beta hydroxysteroid dehydrogenase inhibitor, Antiamyloid beta, Anti TGF beta, Beta receptor agonist, Beta adrenergic receptor blocker, beta blocker, beta galactosidase inhibitor, beta glucuronidase inhibitor, ER beta binder