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‘The Gc Ms Analysis Of Ethyl Acetate Extract Of One Herbal Plant, ‘Microstachys Chamaelea’

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ABSTRACT

The present study deals with the GC MS analysis of one medicinal plant, Microstachyschamaelea’. Not much work was done on this species Microstachyschamaelea’ although it has some important ethno-medical use. The 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 Oleyl alcohol, trifluoroacetate, n-Hexadecanoic acid, Methyl 3-cis,9-cis,12-cis-octadecatrienoate, 2-((Octan-2-yloxy)carbonyl)benzoic acid, dl-.alpha.-Tocopherol, .beta.-Sitosterol, Betulin, .alpha.-Amyrin, trimethylsilyl ether were observed in the GC MS profile of this plant. These molecules which show promising medicinal values could contribute to the medicinal role of this plant.

KeyWords GC MS, Microstachyschamaelea, dl-.alpha.-Tocopherol, .beta.-Sitosterol, Betulin, .alpha.-Amyrin, trimethylsilyl ether

INTRODUCTION

Microstachyschamaelea is weed usually found in paddy fields. This plant is known as Eli Amanaku and in Ayurveda it is known as Khudreranda.Ethno-botanicllly is it used totreat vata, pitta, disorders, diarrhoea, skin diseases, dysentery, haemorrhoids, menorrhagia, leucorrhea and haemorrhage. A

decoction of the leafy stems is used as a bath to relieve teething pain in babies. A decoction of the leafy stems is used as a bath to relieve teething pain in babies. In India, such a decoction taken with butter is considered a tonic, and is applied to the head as a treatment for vertigo. When cooked together with meat and vegetables, whole young plants are used for giving a speedy recovery to women after giving birth. Ganesanet al, 2013 have studied the antibacterial and phytochemical aspects of this plant leaf and callus. ShanthiSreeet al, 2010, have also reported the antibacterial role of methanolic extract of the leaf of this plant. Kandepuet al, 2012 have studied the antioxidant activities of the aerial parts of this plant.The present work reports the GC MS pattern of the ethyl acetate extracts of Microstachyschamaelea' whole plant. This is in continuation of our endeavour to establish the medicinal efficacy of the herbal and traditional systems of Ayurveda, Sidhha and Unani systems of medicine (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;Perumalet al, 2021).

MATERIALS AND METHODS

The plant, Microstachyschamaelea' was collected from the nearby fields 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 DISCUSSION

The results of the GC-MS analysis of the whole plant of Microstachyschamaeleaethyl acetate extract, along with the possible medicinal role of each molecule are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Microstachyschamaelea. 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.Some molecules as represented by the GC MS profile indicated the presence of some important biomolecules such as Oleyl alcohol, trifluoroacetate, n-Hexadecanoic acid, Methyl 3-cis,9-cis,12-cis-octadecatrienoate, 2-((Octan-2-yloxy)carbonyl)benzoic acid, dl-.alpha.-Tocopherol, .beta.-Sitosterol, Betulin, .alpha.-Amyrin, trimethylsilyl ether were observed in the GC MS profile of this plant. These molecules which show promising medicinal values could contribute to the medicinal role of this plant.

CONCLUSION

Thus it can be concluded that due to the presence of these molecules, Microstachyschamaeleahas the medicinal roles for which it is used. Further work to isolate and understand the molecular mechanism is warranted.

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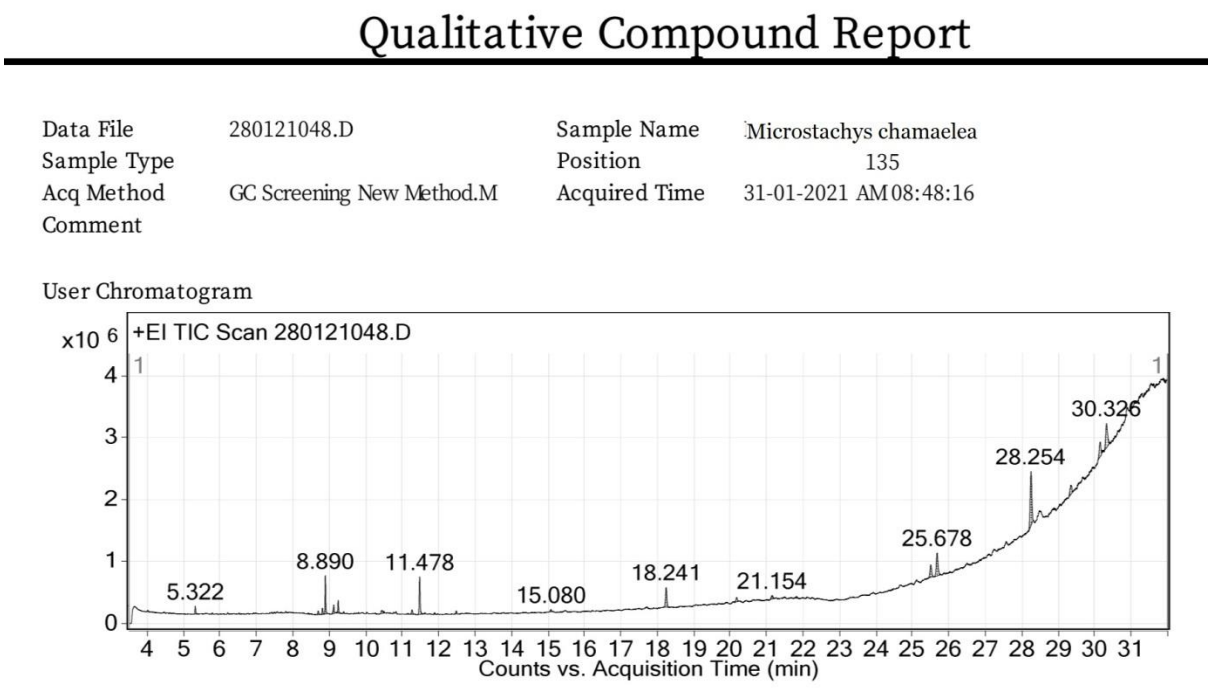

Figure 1. Represents the GC MS graph of ethyl acetate extract Microstachyschamaelea'.

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 Microstachyschamaelea'

Ret. Time	Compound	Mol. Formula	Mol. Mass	% Peak Area	Possible Medicinal Role
5.32	Naphthalene	C10H8	128.1	1.55	Not known
8.81	Oleyl alcohol, trifluoroacetate	C20H35F3O2	364.3	1.34	Alcohol dehydrogenase inhibitor
8.89	Bicyclo[3.1.1]heptane, 2,6,6-trimethyl-	C10H18	138.1	7.34	Not known
9.24	9-Eicosyne	C20H38	278.3	2.66	Not known
10.43	n-Hexadecanoic acid	C16H32O2	256.2	0.98	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
10.49	Nerolidyl propionate	C18H30O2	278.2	0.53	Not known
11.27	Methyl 3-cis,9-cis,12-cis-	C19H32O2	292.2	1.26	Catechol o methyl

	octadecatrienoate				Transferase inhibitor, methyl donar, methyl guanidine inhibitor
11.48	Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta.,5.alpha .)-(.+/-.)-	C10H20O	156.2	9.53	Not known
18.24	2-((Octan-2-yloxy)carbonyl)benzoic acid	C16H22O4	278.2	7.37	Acidifier, Acidulant, Arachidonic acid-Inhibitor, Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Urinary-Acidulant,
20.18	2,2-Dimethyl-3-(3,7,16,20-tetramethyl-heneicosa-3,7,11,15,19- pentaenyl)-oxirane	C29H48O	412.4	1.45	Not known
21.15	Androstan-17-one, 3-ethyl-3-hydroxy-, (5.alpha.)-	C21H34O2	318.3	1.44	Not known
25.50	4,5,6,7-Tetrahydro-benzo[c]thiophene-1-carboxylic acid allylamide	C12H15NOS	221.1	5.13	Not known
25.68	dl-.alpha.-Tocopherol	C29H50O2	430.4	10.39	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
28.25	.beta.-Sitosterol	C29H50O	414.4	23.76	17 beta dehydrogenase inhibitor, androgen blocker, anti-amyloid beta, anticancer, Anti TGF beta, Beta 2-receptor, beta blocker, beta-galactosidase inhibitor, beta-glucuronidase inhibitor
29.35	Betulin	C30H50O2	442.4	4.12	It has a role as a metabolite, an antiviral agent, an analgesic, an anti-inflammatory agent and an antineoplastic agent
30.15	.alpha.-Amyrin, trimethylsilyl ether	C33H58OSi	498.4	6.35	Testosterone 5 alpha reductase inhibitor, TNF alpha inhibitor, 5 alpha reductase inhibitor, alpha

					amylase inhibitor, alpha glucosidase inhibitor, Alpha reducatse inhibitor, HIF 1 alpha inhibitor, IKappaka B alpha phosphorylation inhibitor, increases alpha mannosidase activity, Interlukin 1 alpha inhibitor
30.33	1-Naphthalenepropanol, .alpha.-ethyldecahydro-.alpha.,5,5,8a-tetramethyl-2-methylene-, [1S-[1.alpha.(S*),4a.beta.,8a.alpha.]]-	C20H36O	292.3	12.24	Not known