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

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ABSTRACT

The present study deals with the GC MS analysis of one medicinal plant, Ziziphusrugosa. The bark of Ziziphusrugosa is used to brew alcohol and a paste from it is used to cure gastric problems. The dry leaves are used to make traditional cheroots. Seeds and fruits are edible. This plant has not been much explored for its medicinal values. 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 asn-Hexadecanoic acid, Octadecanoic acid, 17-methyl-, methyl ester, Octadecanoic acid, Methyl 9,10-octadecadienoate, Methyl 9,10-octadecadienoate, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin, .beta.-Amyrintrimethylsilyl ether, Lupeol, Benzoic acid, octadecyl ester were shown in the GC MS profile of the ethyl acetate leaf extracts of this plant. These molecules could throw some light on the possible medicinal roles of this plant. Further work In this regard is required.

KeyWords GC MS, Ziziphusrugosa, n-Hexadecanoic acid, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin, .beta.-Amyrintrimethylsilyl ether, Lupeol, Benzoic acid,

INTRODUCTION

The bark of Ziziphusrugosa is used to brew alcohol and a paste from it is used to cure gastric problems. The dry leaves are used to make traditional cheroots. Seeds and fruits are edible. There are not many scientific reports about this plant. Premaet al, 2018 have studied the antimicrobial activity of the pericarp of Z. rugosa. Prashithet al, 2011 have reported the antioxidant role of the methanolic extract of this plant. Krishnamurthy and Sarala have shown the nutritive value of the fruit of Z. rugosa. The present work reports the GC MS pattern of the ethyl acetate extracts of Ziziphusrugosa leaves. 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 Ziziphusrugosawas 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 leaves were 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 ofZiziphusrugosaextract are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Ziziphusrugosa. 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. From the details as shown in Table 1, this plant leaf contain some highly medicinal value compounds such as n-Hexadecanoic acid, Octadecanoic acid, 17-methyl-, methyl ester, Octadecanoic acid, Methyl 9,10-octadecadienoate, Methyl 9,10-octadecadienoate, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Campesterol, Stigmasterol, .beta.-Sitosterol, .beta.-Amyrin, .beta.-Amyrintrimethylsilyl ether, Lupeol, Benzoic acid, octadecyl ester . Further work to establish the relationship of these molecules and finding out the possible medicinal uses of this plant is going on. It is important since this plant could be used as an effective medicine once its medicinal roles as established.

CONCLUSION

It is concluded that the types of medicinal values the molecules have, as is shown in the Table, Ziziphusrugosa can prove itself as an important medicinal plant.

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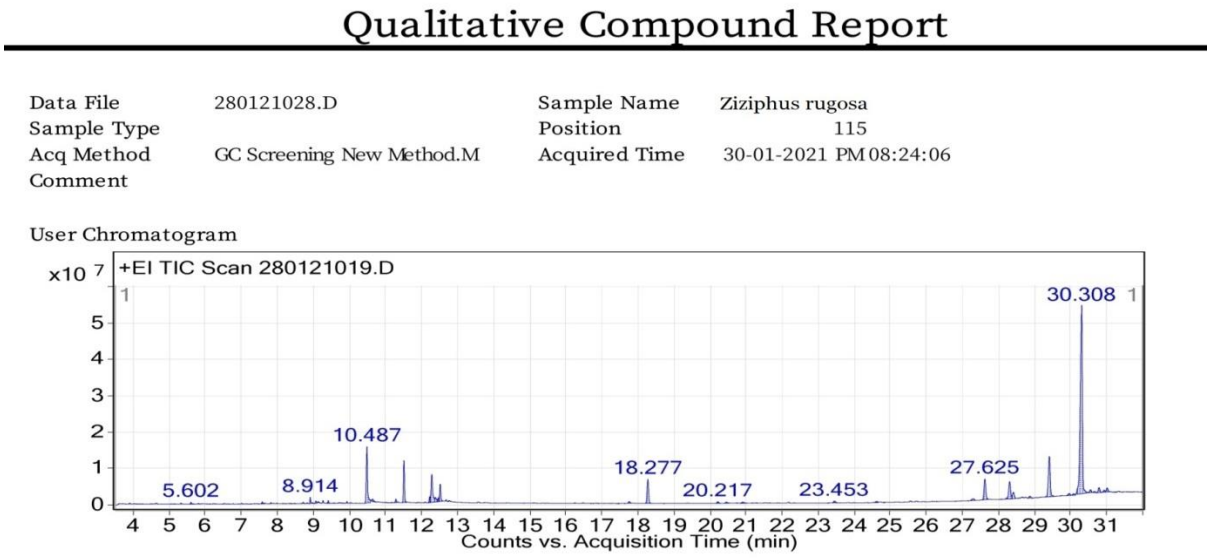

Figure 1. Represents the GC MS graph of ethyl acetate extract Ziziphusrugosa'.

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 ofZiziphusrugosa'.

Ret. Time	Molecule	Mol. Formula	Mol. Mass	% Peak Area	Possible Medicinal Role
10.49	n-Hexadecanoic acid	C16H32O2	256.2	8.68	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
11.51	Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta.,5.alpha.)-(.+/-.)-	C10H20O	156.2	4.78	Not known
12.23	Octadecanoic acid, 17-methyl-, methyl ester	C20H40O2	312.3	0.69	Catechol-O-methyl-Transferase Inhibitor, methyl Donar, Methyl Guanidine Inhibitor, Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase

					activity
12.29	Octadecanoic acid	C18H36O2	284.3	5.17	Acidifier, Arachidonic acid Inhibitor, Increases Aromatic Amino acid decarboxylase activity, Inhibits production of uric acid, Urine acidifier
12.39	Methyl 9,10-octadecadienoate	C19H34O2	294.3	0.87	Catechol-O-methyl-Transferase Inhibitor, methyl Donar, Methyl Guanidine Inhibitor
12.52	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C20H40O	296.3	3.81	Oligosaccharide provider
18.28	2-((Octan-2-yloxy)carbonyl)benzoic acid	C16H22O4	278.2	4.18	Acidifier, Arachidonic acid Inhibitor, Increases Aromatic Amino acid decarboxylase activity, Inhibits production of uric acid, Urine acidifier
27.30	Campesterol	C28H48O	400.4	0.47	Plant steroid use as food additive and has cholesterol lowering role
27.63	Stigmasterol	C29H48O	412.4	4.26	Precursor of progesterone , acts as intermediate in the biosynthesis of androgens and estrogens, anti-osteoarthritic, antihypercholesterolemic, cytotoxic, antitumor, hypoglycemic, antimutagenic, antioxidant, anti-inflammatory, analgesic
28.31	.beta.-Sitosterol	C29H50O	414.4	3.88	17 beta dehydrogenase inhibitor, androgen blocker, anti-amyloid beta, anticancer, Anti TGF beta, Beta 2-receptor, beta blocker, beta-galactosidase inhibitor, beta-glucuronidase inhibitor
29.41	.beta.-Amyrin	C30H50O	426.4	8.88	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
30.31	Lupeol	C30H50O	426.4	46.17	anti-inflammatory, antioxidant, anti-diabetic, and anti-mutagenic effects
30.79	Lup-20(29)-en-3-ol, acetate, (3.beta.)-	C32H52O2	468.4	1.00	Not Known
31.02	Benzoic acid, octadecyl ester	C25H42O2	374.3	0.85	Acidifier, Arachidonic acid Inhibitor, Increases Aromatic Amino acid decarboxylase activity, Inhibits production of uric acid, Urine acidifier

17-beta-hydroxysteroid dehydrogenase inhibitor, Antiamyloid-Beta, Anti TGF-Beta, Beta-2-Receptor-Agonist, Beta-Adrenergic receptor blocker, Beta Galactosidase inhibitor, Beta-Glucuronidase inhibitor, Aldehyde oxidase inhibitor