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'THE GC MS PROFILES PLUMARIA PUDICA LEAF EXTRACTS'

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ABSTRACT:

*Plumaria pudica*which is a garden plant belonging to family, Apocynaceae is also known as bridal bouquet and White Frangipani.This plant was collected from herbal garden at Chennai, Tamil Nadu India. The ethyl acetate and n-Hexane extracts of the leaves this plant was subjected to GC MS study following standard protocols. It was observed that some very important molecules such as Methyl 11,12-tetradecadienoate, Methyl N-(N-benzyloxycarbonyl-beta-l- , aspartyl)-beta-d- glucosaminide, 9-Octadecenoic acid, (2-phenyl-1,3-dioxolan-4-yl)methyl ester, trans-, trans-3,4,5-Trimethoxy-.beta.-methyl-.beta.-nitrostyrene, 2,4,6-Trimethylmandelic acid, 1-Heptatriacotanol and p-Xylenolphthalein in ethyl acetate extract and Strychane, 1-acetyl-20.alpha.-hydroxy-16-methylene-, trans-3,4,5-Trimethoxy-.beta.-methyl-.beta.-nitrostyrene, Ethyl iso-allocholate, 7-Methyl-Z-tetradecen-1-ol acetate, 1-Heptatriacotanol and p-Xylenolphthalein in n-Hexane extract. These molecules have far reaching medicinal roles which correspond to the reports of its medicinal values of *Plumaria pudica.*

Key words:

GC MS, *Plumaria pudica,* Methyl 11, 12-tetradecadienoate, 1-Heptatriacotanol, Ethyl iso-allocholate, p-Xylenolphthalein

INTRODUCTION:

Plants are rich resources of medicines and most of the modern medicines own their origin from plant. Ethnobotanically, all over the world, plants are the chief sources of medicines even today, which are mostly used by folklore, traditional, complementary and alternative forms of medicines. Although the history of use of plants as medicine is as old as mankind itself, their scientific role and mechanism of action are being probed only recently. The world health organization (WHO) has clearly defined traditional medicines in its report (WHO,2013).[1] The present study deals with the GC MS analysis of ethyl acetate (polar) and n-hexane extracts of the leaves of one medicinal plant, *Plumaria pudica*. Ethnobotanically this plant has been used as used as Antiinflammatory, nociceptive, anti-helminthic, anti-diarrheal activities and neurodegenerative disorders. In north eastern Brazil the plant has utilized as a folk medicine due to analgesic properties of it (Rao*et al,* 2020).[2]*Plumaria pudica* was also effective in various in vivo and in vitro pharmacological activities algicidal, antibacterial and cytotoxic activities (Chowdhary *et al.*, 2014).[3] Plumeria oil is warmed asnd used for a veriety of nerve related ailments.(Radhika *et al.*,2019).[4] Oliveiraa *et al,* 2019 have reported the anti-inflammatory and antioxidant role of the latex of *Plumaria pudica*.[5] Chanaka *et al*, 2016, have reported the the methanolic extracts of *Plumeria pudica* inhibit the production of Acetyl choline esterase in Zebra fish brain (Chanaka *etal*., 2016).[6] The anti-inflammatory and nociceptive roles of lactifer proteins from Plumaria pudica was reported by Fernandesa *et al*, 2015.[7]

MATERIALS AND METHODS

The plant *Plumaria pudica*was collected from herbal garden at Chennai, Tamil Nadu. The plant was identified by a qualified botanist at Chennai. The ethyl acetate extract and n-Hexane extracts of the shade dried leaves of *Plumaraia pudica* were collected after 48 h of soaking. The extracts were evaporated and the dried powder was subjected to GC-MS analysis by standard procedures. The compounds are identified by GC-MS Library (NIST and WILEY).

RESULTS

The results of the GC-MS analysis of the ethyl acetate and n-hexane extracts of the leaves of *Plumaria pudica*are tabulated in Table 1 and 2 along with the possible medicinal role of each

molecule as shown in the profiles are tabulated in Table 1. Figure 1 and 2 represent the GC MS profiles of ethyl acetate and n-hexane extracts of *Plumaria pudica*.The identification of metabolites done as per mass spectra of the NIST spectral library(version 1.10 beta, Shimadzu) and possible medicinal 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 and 2.[8]

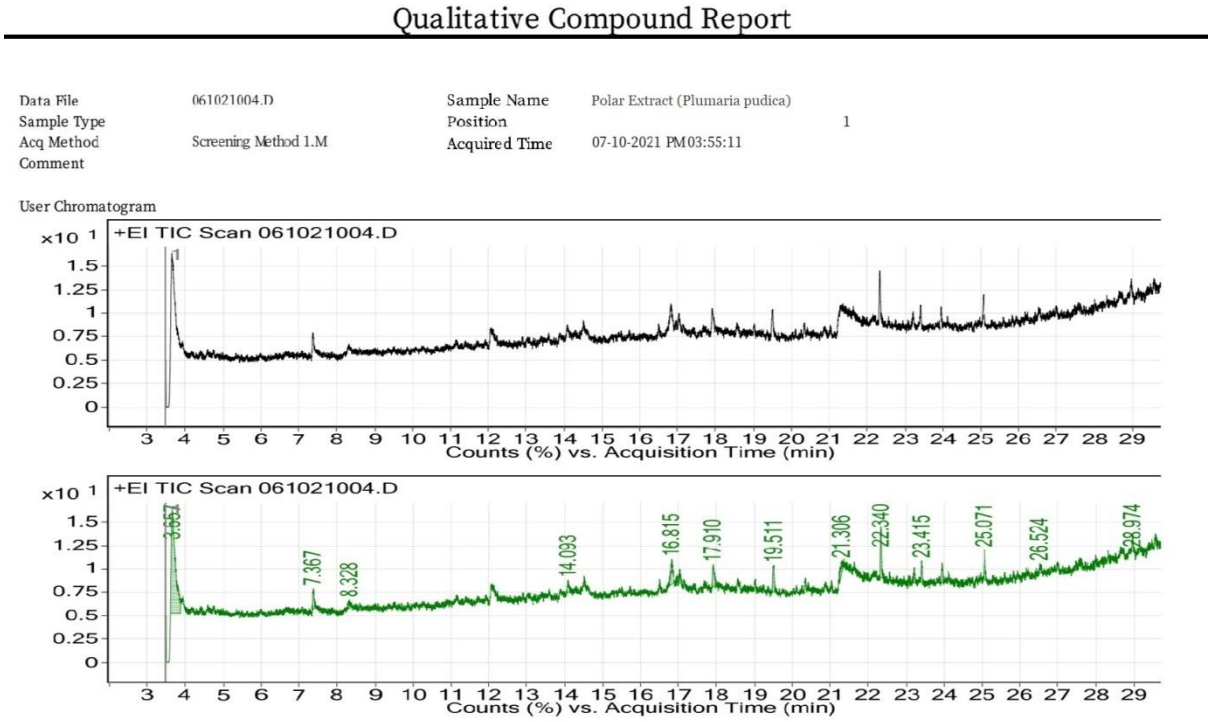

Figure 1. Represents the GC MS profile of the ethyl acetate extract of leaves of *Plumaria pudica*

Table 1. Shows the types of compounds present in the polar extract of *Plumaria pudica* leaves with retention time, molecular mass, Molecular formula, percept peak values and possible medicinal roles of each compound as shown in the GC MS profile.

Retention Time	Name of Molecule	Mol. Mass	Mol. Formula	% Peak area	Possible Medicinal Role

7.37	Methyl 11,12-tetradecadienoate	238.2	C15H26O2	4.42881356	Catechol o methyl Transferase inhibitor, methyl donar, methyl guanidine inhibitor,
8.33	Methyl N-(N-benzyloxycarbonyl-beta-l-aspartyl)-beta-d- glucosaminide	442.2	C19H26N2O10	2.51515403	Anaphylactic, Anti-tumor, Aryl amine N acetyl transferase inhibitor, decreases nor epinephrine production, down regulates uptake of nuclear and cytosol androgen, GABA-nergic, Increases Natural Killer cell activity, Inhibits tumor necrosis factor, myo-neuron stimulator
14.09	9-Octadecenoic acid, (2-phenyl-1,3-dioxolan-4-yl)methyl ester, trans-	444.3	C19H26N2O10	2.90488422	Catechol-O-Methyl-Transfearse inhibitor, Increases Glutathione-s-Transferase Activity, Decrease Glutamate Oxaloacetate transaminase activity, Decreases Glutamate pyruvate transaminase, Glycosyl transferase inhibitor, Glutathione-S-Transfearse inhibitor, Increases glyoxalate transamination, Reverse transcriptase inhibitor, Anti 5-HT, Anti HIV integrase, Aryl hydrocarbon hydroxylase inhibitor, HIF 1 alpha inhibitor, increases tyrosine hydroxylase activity, Suppress HMG Co-A reductase activity, Tyrosine hydroxylase activator, 11Beta HSD inhibitor.
16.8	trans-3,4,5-Trimethoxy-.beta.-	253	C12H15	9.426	17 beta hydroxysteroid

2	methyl-.beta.-nitrostyrene	.1	NO5	15653	dehydrogenase inhibitor, Antiamyloid beta, Anti TGF beta, Beta receptor agonist,
17.04	5,6,7,8,9,10-Hexahydro-9-methyl-spiro[2H-1,3-benzoxazine-4,1'-cyclohexane]-2-thione	253.2	C14H23NOS	3.289 09684	Not known
17.91	Phen-1,4-diol, 2,3-dimethyl-5-trifluoromethyl-	206.1	C9H9F3O2	6.291 54299	Not known
19.51	2,4,6-Trimethylmandelic acid	194.1	C11H14O3	6.445 85962	Acidifier, Acidulant, Arachidonic acid inhibitor, increases aromatic amino acid decarboxylase activity, inhibit production of uric acid.
21.31	[1-(3,3-Dimethyloxiran-2-ylmethyl)-3,7-dimethylocta-2,6-dienyl]trimethylsilane	294.2	C18H34OSi	4.740 44683	Not known
22.34	Cyclopropanebutanoic acid, 2-[[2-[[2-[(2-pentylcyclopropyl)methyl]cyclopropyl]methyl]cyclopropyl]methyl]-, methyl ester	374.3	C25H42O2	9.933 45753	Not known
23.21	1-Heptatriacotanol	536.6	C37H76O	3.002 85844	Antibacterial, anticancer, antiprotozoal, chemopreventive, anti-inflammatory, antimalarial, anti-flu, antiviral, enzyme inhibitor, anti-hypercholesterolemic
23.42	1H-2,8a-Methanocyclopenta[a]cyclopropa[e]cyclodecen-11-one, 1a,2,5,5a,6,9,10,10a-octahydro-5,5a,6-trihydroxy-1,4-	364.2	C20H28O6	3.649 52862	Not known

	bis(hydroxymethyl)-1,7,9-trimethyl-, [1S-(1.alpha.,1a.alpha.,2.alpha.,5.beta.,5a.beta.,6.beta.,8a.alpha.,9.a l pha.,10a.alpha.)]-				
23.96	Fenretinide	391.3	C37H76O	3.451 51877	Not known
25.07	Dasycarpidan-1-methanol, acetate (ester)	326.2	C20H26N2O2	6.678 45737	Not known
26.52	1H-2,8a-Methanocyclopenta[a]cyclopropa[e]cyclodecen-11-one, 1a,2,5,5a,6,9,10,10a-octahydro-5,5a,6-trihydroxy-1,4-bis(hydroxymethyl)-1,7,9-trimethyl-, [1S-(1.alpha.,1a.alpha.,2.alpha.,5.beta.,5a.beta.,6.beta.,8a.alpha.,9.a l pha.,10a.alpha.)]-	364.2	C20H28O6	2.582 46141	Not known
28.97	D-Homo-24-nor-17-oxachola-1,20,22-triene-3,7,16-dione, 14,15:21,23-diepoxy-4,4,8-trimethyl-, (5.alpha.,13.alpha.,14.beta., 15.beta.,17a.alpha.)-	438.2	C26H30O6	3.130 92054	Not known
31.74	Flurandrenolide	436.2	C24H33FO6	2.528 18042	Not known
31.91	4H-Cyclopropa[5',6']benz[1',2':7,8]azuleno[5,6-b]oxiren-4-one, 8-(acetyloxy)-1,1a,1b,1c,2a,3,3a,6a,6b,7,8,8a-	422.2	C22H30O8	2.379 78487	Not known

	dodecahydro- 3a,6b,8a-trihydroxy-2a-(hydroxymethyl)-1,1,5,7-tetramethyl-, (1a.alpha.,1b.beta.,1c.beta.,2a.beta.,3a.beta.,6a.alpha.,6b.alpha., 7.alpha.,8.beta.,8a.alpha.)-				
32.32	p-Xylenolphthalein	374.2	C24H22O4	2.99431453	Adrenalin-pressor, Algogenic, ANS Paralytic, Anti-cAMP-Phosphodiesterase, Anticancer, Anticarcinomic, antidote, Antimitral valve prolapse

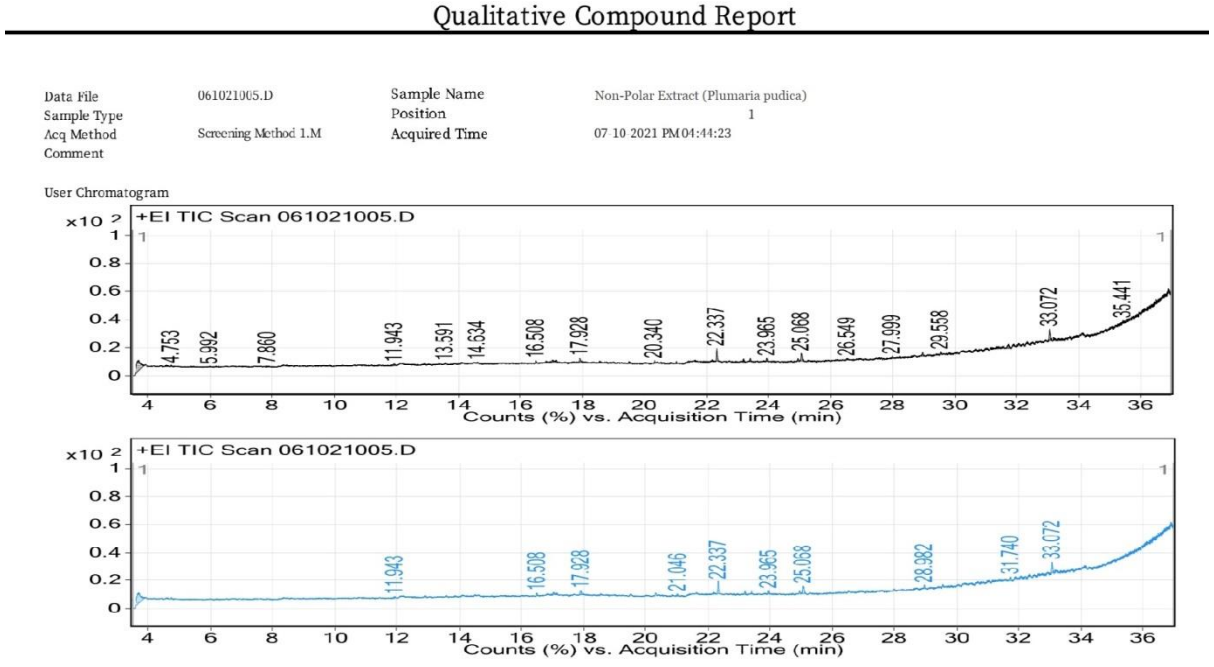

Figure 2. GC MS profile of n-Hexane extracts of the leaves of *Plumaria pudica*

Table 2. Shows the types of compounds present in the Non-polar extract of *Plumaria pudica* leaves with retention time, molecular mass, Molecular formula, percept peak values and

possible medicinal roles of each compound as shown in the GC MS profile.

Retention time	Name of the Molecule	Mole, mass	Mol. formula	% Peak Area	Possible medicinal roles
3.72	Strychane, 1-acetyl-20.alpha.-hydroxy-16-methylene-	338.2	C21H26N2O2	36.2988331	5, alpha-reductase inhibitor, alpha-amylase inhibitor, alpha-glucosidase inhibitor, alpha-reductase inhibitor, HIF 1 alpha inhibitor, increase alpha-N-mannosidase activity, interleukin-1 alpha inhibitor, testosterone 5-alpha reductase inhibitor TNF-alpha inhibitor, IKappa B alpha phosphorylation inhibitor, 17 beta hydroxysteroid dehydrogenase inhibitor, anti amyloid beta, Anti TGF beta, Beta blocker, Acetyl choline inhibitor
11.94	Oleic Acid	282.3	C18H34O2	2.83117669	Acidifier, Acidulant, Arachidonic acid inhibitor, increases aromatic amino acid decarboxylase activity, inhibit production of uric acid.
16.51	trans-3,4,5-Trimethoxy-.beta.-methyl-.beta.-nitrostyrene	253.1	C12H15NO5	6.94259444	17 beta hydroxysteroid dehydrogenase inhibitor, Antiamyloid beta, Anto TGF beta, Beta receptor agonist, Beta adrenergic receptor blocker, beta blocker, beta galactosidase inhibitor, beta glucuronidase inhibitor, ER beta binder
17.05	5,6,7,8,9,10-Hexahydro-9-	253.2	C14H23NOS	2.6865312	Not known

	methyl-spiro[2H-1,3-benzoxazine-4,1'-cyclohexane]-2-thione				
17.16	Ethyl iso-allocholate	436.3	C26H44O5	1.81920837	Anti-coagluant, antidyspeptic, anti-inflammatory, mucolyte, proteolytic
21.05	7-Methyl-Z-tetradecen-1-ol acetate	268.2	C17H32O2	2.0635513	Increases Zinc bioavailability, oligosaccharide provider, Catechol-O-methyl transferase inhibitor, Methyl donor, Methyl guanidine inhibitor
22.34	Methyl 9-methyltetradecanoate	256.2	C16H32O2	9.90989661	Catechol-O-methyltransferase inhibitor, methyl donor, methyl guanidine inhibitor,
23.21	Phen-1,4-diol, 2,3-dimethyl-5-trifluoromethyl-	206.1	C9H9F3O2	1.93984355	Not known
23.42	1-Heptatriacotanol	536.6	C37H76O	2.67705857	Antibacterial, anticancer, antiprotozoal, chemopreventive, anti-inflammatory, antimalarial, anti-flu, antiviral, enzyme inhibitor, anti-hypercholesterolemic
23.97	9,10-Secocholesta-5,7,10(19)-triene-1,3-diol, 25-[(trimethylsilyl)oxy]-, (3.beta.,5Z,7E)-	488.4	C30H52O3Si	2.72777606	Not kbown
25.07	Cyclopropanebuta	374.3	C25H42	8.807	**Not kbnown**

	noic acid, 2-[[2-[[2-[(2-pentylcyclopropyl) methyl]cyclopropyl] methyl]cyclopropyl] methyl]-, methyl ester		O2	70348	
28.98	D-Homo-24-nor-17-oxachola-1,20,22-triene-3,7,16-dione, 14,15:21,23-diepoxy-4,4,8-trimethyl-, (5.alpha.,13.alpha.,14.beta.,15.beta.,17a.alpha.)-	438.2	C26H30O6	3.347 65655	**Not known**
31.05	Flurandrenolide	436.2	C24H33FO6	1.953 11999	Not known
31.74	1H-2,8a-Methanocyclopenta[a]cyclopropa[e] cyclodecen-11-one, 1a,2,5,5a,6,9,10,10a-octahydro-5,5a,6-trihydroxy-1,4-	364.2	C20H28O6	5.121 84979	**Not known**

	bis(hydroxymethyl)-1,7,9-trimethyl-, [1S-(1.alpha.,1a.alpha.,2.alpha.,5.beta.,5a.beta.,6.beta.,8a.alpha.,9.alpha.,10a.alpha.)]-				
33.07	2,4,6-Decatrienoic acid, 1a,2,5,5a,6,9,10,10a-octahydro-5,5a-dihydroxy-4-(hydroxymethyl)-1,1,7,9-tetramethyl-11-oxo-1H-2,8a-methanocyclopenta[a]cyclopropa[e]cyclodecen-6-yl ester, [1aR-(1a.alpha.,2.alpha.,5.beta.,5a.beta.,6.beta.,8a.alpha.,9.alpha.,10a.alpha.)]-	496.3	C30H40O6	8.48902184	**Not known**
36.90	p-Xylenolphthalein	374.2	C24H22O4	2.38417845	Adrenalin-pressor, Algogenic, ANS Paralytic, Anti-cAMP-Phosphodiesterase, Anticancer, Anticarcinomic, antidote, Antimitral valve prolapse

DISCUSSION

From the GC MS profiles of both polar (ethyl acetate) and non-polar (n-Hexane) extracts of the leaves of *Plumaria pudica* is clear that some very important biomolecules are present therein with important medicinal roles. The presence of some biomolecules such asMethyl 11,12-tetradecadienoate, Methyl N-(N-benzyloxycarbonyl-beta-l- , aspartyl)-beta-d-glucosaminide, 9-Octadecenoic acid, (2-phenyl-1,3-dioxolan-4-yl)methyl ester, trans-, trans-3,4,5-Trimethoxy-.beta.-methyl-.beta.-nitrostyrene, 2,4,6-Trimethylmandelic acid, 1-Heptatriacotanol and p-Xylenolphthalein in the polar extract and the presence of molecules such as Strychane, 1-acetyl-20.alpha.-hydroxy-16-methylene-, trans-3,4,5-Trimethoxy-.beta.-methyl-.beta.-nitrostyrene, Ethyl iso-allocholate, 7-Methyl-Z-tetradecen-1-ol acetate, 1-Heptatriacotanol and p-Xylenolphthalein in non-polar extract clearly demonstrate that *Plumaria pudica* does have many far reaching medicinal roles which correspond well with its use as ethnobotanical medicine as Anti-inflammatory, nociceptive, anti-helminthic, anti-diarrheal activities and neurodegenerative disorders is well supported.

CONCLUSION

It could be summarized from the results and discussion that *Plumaria pudica* is a very important herb.

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