Nat. Volatiles & Essent. Oils, 2021; 8(4): 6347-6454

NVEO
Natural Volatiles &
Essential Oils

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

Ganesan Muruga Perumal[1], Prabhu K[2], Rao MRK[3*], Janaki C. S.[4], Kalaivannan J[5], Kavimani M[1]

[1]Professor, Department of Anatomy, SreeBalaji Medical College and Hospital, Chennai, Tamil Nadu, India.

[2] Associate Professor, Department of Anatomy, SreeBalaji Medical College and Hospital, Chennai, Tamil Nadu, India.

[3*]Consultant Scientist, M/s. Noahs Laboratories, No, 8/1, Old Mahabalipuram Road, Thiruporur, Tamil Nadu 603110, India.

[4] Associate Professor, Department of Anatomy, Bhaarath Medical College and Hospital, Chennai, Tamil nadu, India.

[5]Associate Professor, Department of Anatomy, Vinayaka Mission's Medical College and Hospital, Karikal, Vinayaka Mission's Research foundation, Salem, Tamil nadu, India.

ABSTRACT

The present study deals with the GC MS analysis of ethyl acetate extracts of the aerial parts of one herbal plant 'Jatrophacurcu'. The plant Jatrophacurcuswas 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. The GC MS profile revealed the presence of some important metabolites such as n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Sulfurous acid, butyl heptadecyl ester, Farnesol (E), methyl ether, Palmitoleic acid, 1-Heptatriacotanol, n-Propyl 11-octadecenoate, .gamma.-Tocopherol, Fumaric acid, tetradec-3-enyl tridecyl ester. These biomolecules have many important medicinal roles, which augur well with the medicnal role ofthis plant.

Keywords : GC MS, Jatrophacurcus, Ethyl acetate, n-Hexadecanoic acid,1-Heptatriacotanol, .gamma.-Tocopherol, Fumaric acid, tetradec-3-enyl tridecyl ester.

INTRODUCTION

Jatrophacurcus is a common plant available on the road side and uncultivated land, This plant was exploited for its oil as bio diesel. This plant has been traditionally used as medicine for treatment of various ailments. Crude extracts and isolated compounds from Jatrophacurcas show a wide range of pharmacological activities, such as anti-inflammatory, antioxidant, antimicrobial, antiviral, anticancer, antidiabetic, anticoagulant, hepatoprotective, analgesic and abortifacient effects. J.

curcas has been a widely used source of medicine for decades in many cultures. The present review reveals that J. curcas is a valuable source of medicinally important molecules and provides convincing support for its future use in modern medicine (Abdelgadir and Staden, 2013; Prasad et al, 2012; Diwanet al, 2013; Insanuet al, 2013). The antibacterial activity of lef extracts of Jatrophacurcus was reported by Rahmanet al, 2014. Othman et al, 2015 have reported the anti-inflammatory role of bioactive compounds isolated from Jatophacurcus.The present work reports the GC MS pattern of the ethyl acetate extracts of Jatophacurcus,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 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).

MATERIALS AND METHODS

The plant Jatrophacurcuswas 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 ethyl acetate extract, along with the possible medicinal role of each molecule ofJatrophacurcusextract are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Jatrophacurcus. 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.[21]The results as shown in Table 1 indicate the medicinal roles of some of the molecules such as n-Hexadecanoic acid, 2-((Octan-2-yloxy)carbonyl)benzoic acid, Sulfurous acid, butyl heptadecyl ester, Farnesol (E), methyl ether, Palmitoleic acid, 1-Heptatriacotanol, n-Propyl 11-octadecenoate, .gamma.-Tocopherol, Fumaric acid, tetradec-3-enyl tridecyl ester. These molecules do have medicinal roles which are supportive of the medicinal role of Jatrophacurcus. Further work is on to establish the molecular mechanism of the medicinal roles of each molecule.

CONCLUSION

From the results it could be concluded that apart from being a source of bio-diesel manufacturing, Jatrophacurcus has some important medicinal roles.

ACKNOWLEDGMENTS

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

REFERENCES

1. Abdelgadir, H. A., Staden,J. V. (2013) Ethnobotany, ethnopharmacology and toxicity ofJatrophacurcasL.(Euphorbiaceae): A review. South African J of Botany, 88, 204-218

2. Prasad, D. M.R., Izam, A., Khan, M. K. R. (2012) Jatrophacurcas: Plant of medical benefits. Journal of Medicinal Plants Research, 6(14), 2691-2699

3. Diwan, P. D., Gadhikar, Y. A., Jain, S. B. (2013) Traditional Ethnomedicinal Plants Used for Oral Health Care by Tribals of Melghat Region, Dist. Amravati (M.S.), India. Int. J. Pharm. Sci. Rev. Res., 21(1), 301-304

4. Insanu,M., Dimaki, C., Wilkins, R., et al. (2013) Rational use of Jatrophacurcus L. in food and medicine: from toxicity problems to safe applications. Phytochemistry Reviews, 12,107-119

5. Rahman, M. M., Ahmad, S. H., Mohamed, T. M., Rahman, Z. A. (2014) Antimicrobial compounds from leaf extracts of Jatrophacurcus, Psidiumguajava and Andrographispaniculata. Sci World J, 2014; Article Id 635240, 8 pages.

6. Othman, A. R., Abdullah, N., Ahmad, S. et al. (2015) Elucidation of in-vitro anti-inflammatory bioactive compounds isolated from Jatrophacurcas L. plant root. BMC Complement Altern Med,15**,** 11.https://doi.org/10.1186/s12906-015-0528-4

7. GomathiPriyadarshini, Arul Amutha Elizabeth, Jacintha Anthony, Mudiganti Ram Krishna Rao, Prabhu. K., Aiswarya Ramesh, VaniKri,shna. (2017) The GC MS analysis of one medicinal plant, Premnatomentosa. Journal of Pharmaceutical Sciences and Research, **9(9),** 1595-1597

8. 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

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

10. Vijayalakshmi, N., Mudiganti Ram Krishna Rao. (2019) The antioxidant studies of two medicinal plants, Sphaeranthusindicusand Psophocarpustetragonolobus.Asian J of pharmaceutical and Clinical Res, 12(1), 321-327.

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

12. MutteviHyagreva Kumar, Prabhu, K., Mudiganti Ram Krishna Rao, Lakshmisundram, R., SampadShil, Sathish Kumar, M., Vijayalakshmi, N. (2019)The GC MS study of one medicinal plant, Dodoneaangutifolia. Drug Invention Today, 12(9), 1661-1664

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

14. MutteviHyagreva Kumar, Prabhu, K., Mudiganti Ram Krishna Rao, Lakshmisundram, R., SampadShil, Sathish Kumar, M., Vijayalakshmi, N.(2020)The GC MS study of one medicinal plant, AristolochiaIndica .DIT, 12(12), 2919-2923.

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

16. Janaki C. S.', Prabhu K., Mudiganti Ram Krishna Rao,VenkatRamaiah, ShrutiDinkar, Vijayalakshmi, N., Kalaivannan. J. (2021) The GC MS analysis of Ethyl acetate extract of Merremiaemerginata'.Ind J of Natural Sciences, 12(67), 33638-33646

17. 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 ofJatrophacurcus

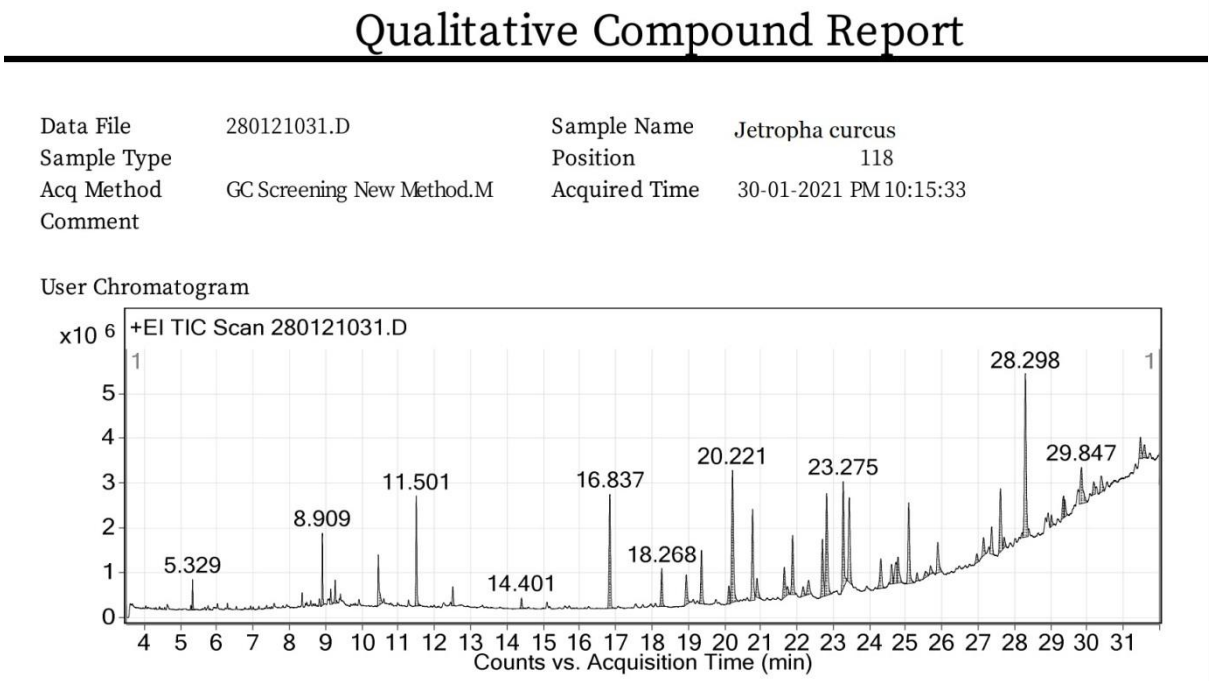

Table1. Indicates the retentions time, types of possible compound, molecular formula, molecular mass, percentage peak area and the possible medicinal roles of each compound as shown in the GC MS profile of Jatrophacurcus

Ret. Time	Compound	Mol. formula	Mol. Mass	% Peak Area	Possible Medicinal Role
8.91	Bicyclo[3.1.1]heptane, 2,6,6-trimethyl-	C10H18	138.1	2.04	Not Known
10.45	n-Hexadecanoic acid	C16H32O2	256.2	2.50	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
11.50	Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta.,5.alpha.)-(.+/-.)-	C10H20O	156.2	4.27	Not Known
16.84	Dodecane, 1-fluoro-	C12H25F	188.2	6.24	Not Known
18.27	2-((Octan-2-yloxy)carbonyl)benzoic acid	C16H22O4	278.2	2.20	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
19.37	Sulfurous acid, butyl heptadecyl ester	C21H44O3S	376.3	3.25	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
20.22	Farnesol (E), methyl ether	C16H28O	236.	9.68	anticancer, antidote, antitumor,

			2		Cytochrome-P450-2E1-Inhibitor, Decreases C-Teleopeptide Excretion, Decreases Deoxypyridinoline Excretion, Decreases Endothilial Leukocyte Adhesion, Decreases Epinephrine Production, Decreases Oxalate Excretion
20.77	Palmitoleic acid	C16H30O2	254.2	5.57	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity
22.32	1-Heptatriacotanol	C37H76O	536.6	1.21	Antibacterial, anticancer, antiprotozoal, chemo-preventive, anti-inflammatory, antimalarial, anti-flu, antiviral, enzyme inhibitor, anti-hyper-cholesterolemic
22.70	Butyl 9-hexadecenoate	C20H38O2	310.3	3.73	Not Known
22.82	n-Propyl 11-octadecenoate	C21H40O2	324.3	7.45	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, N-Cholinolytic, NADH-Oxidase-Inhibitor, NADH-Ubiquinone-Oxidoreductase-Inhibitor
23.44	1-Nonylcycloheptane	C16H32	224.3	5.46	Not known

24.61	Octacosyl acetate	C30H60O2	452.5	1.35	Not known
24.74	.gamma.-Tocopherol	C28H48O2	416.4	1.79	Tocopherol synergist, PPAR-gamma antagonist
25.08	9-Octadecenoic acid (Z)-, 2-(acetyloxy)-1-[(acetyloxy)methyl]ethyl ester	C25H44O6	440.3	5.60	Not known
25.88	1,19-Eicosadiene	C20H38	278.3	2.29	Not known
27.15	Fumaric acid, tetradec-3-enyl tridecyl ester	C31H56O4	492.4	1.27	Acidifier, Arachidonic acid inhibitor, Increases Aromatic Amino acid Decarboxylase activity