Nat. Volatiles & Essent. Oils, 2021; 8(4): 6364-6370

NVEO
Natural Volatiles &
Essential Oils

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

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 one medicinal plant, **'**Pavoniaodorata.**'**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 dl-.alpha.-Tocopherol, Stigmasterol, Ursodeoxycholic acid, Lanosterol, 5.alpha.,14.beta.-Androstane, 16.alpha.,17.alpha.-epoxy-. These molecules have far reaching medicinal roles which correspond to the reports of the medicinal values of Pavoniaodorata.

KEYWORDS : GC MS, Ethyl acetate,Pavoniaodorata, Tocopherol, Stigmasterol, Ursodeoxycholic acid, Lanosterol,

INTRODUCTION

The present study deals with the GC MS analysis of one medicinal plant, **'**Pavoniaodorata.**'**Pavoniaodorata is a wild flowering plant belonging to Hibiscus family. It is reported to have analgesic,antibacterial, antifungal,antimicrobial, antioxidant, antiulcer, anti-inflammatory activities. It is also known to reduce blood pressure. It is been widely used in traditional system of medicine in India. Gantaitet al, 2017 have described the conventional applications, phyto-chemistry and pharmacology of Pavoniaodorata.Girishet al, 2016 have reported the anticancer potential of

Pavoniaodorata extracts on human cancer cell lines. The volatile composition and sensory properties of this plant was reported by Yusieet al, 2014.Rayaret al, 2015 have shown the antimicrobial and anti-inflammatory activities of this plant by using Ethanol and chloroform extracts of Pavoniaodorata.Jyotsnaet al, 2019 have evaluated the analgesic and anti-inflammatory potential of Pavoniaodorata. 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 Pavoniaodoratawas 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 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 ofPavoniaodorataextract are tabulated in Table 1. Figure 1 represents the GC-MS profile of ethyl acetate extract of the whole plant of Pavoniaodorata. 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. The GC MS profile indicated the presence of some metabolites such as dl-.alpha.-Tocopherol, Stigmasterol, Ursodeoxycholic acid, Lanosterol, 5.alpha.,14.beta.-Androstane, 16.alpha.,17.alpha.-epoxy- etc. which have various medicinal roles as shown in Table 1. The presence of these molecules could contribute to the ethnomedicinal value of this plant.

CONCLUSION

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

ACKNOWLEDGMENTS

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

REFERENCES

1. Gantait, S., Kundu, S.,Salma, U. (2017) Pavoniaodorata: Botany, Conventional Applications, Phytochemistry and Pharmacology. PharmacologyBiochemistry and Therapeutic Uses of Medicinal Plants.Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India), 2017, 220-231

2. Girish, H. V., Vinod, A. B., Dhananjaya, B. L., Satish Kumar, D., Senthil, D.(2016)The Anticancer Potential of Pavoniaodorata extract on Human Breast (MD-MB-231), Prostate (PC-3) and Lung (Calu-6) Cancer cell lines.Pharmacognosy Journal, 8(1), 20-30

3. Yusei, K., Nakaya, S., Miyazawa, M. (2014) Volatile composition and sensory properties of Indian herbal medicine-Pavoniaodorata-used in Ayurveda. J Oleo Sci, 63(2),149-58.

4. Rayar, A., Aeganathan, R., Ilayaraja, S., Prabakaran, K.,Manivannan, R. (2015) Anti-microbial and Anti-Inflammatory Activity of Bioactive Components of Pavoniaodorata Wild.AJPCT, 3(01), 079-087.

Etoh and ehloroform fractions were subjected to GC MS.

5. Jyostna, G. T., Murali, S., Vijay Kumar, G. (2019) Pharmacological Evaluation of PavoniaOdorataWilld for Analgesic, Anti-Inflammatory and Anti-Ulcer Activity. IJCTPR, 7(6),202-208

6. 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

7. 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

8. 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

9. 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.

10. 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

11. 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

12. 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

13. 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.

14. 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

15. 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

16. 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 ofPavoniaodorata

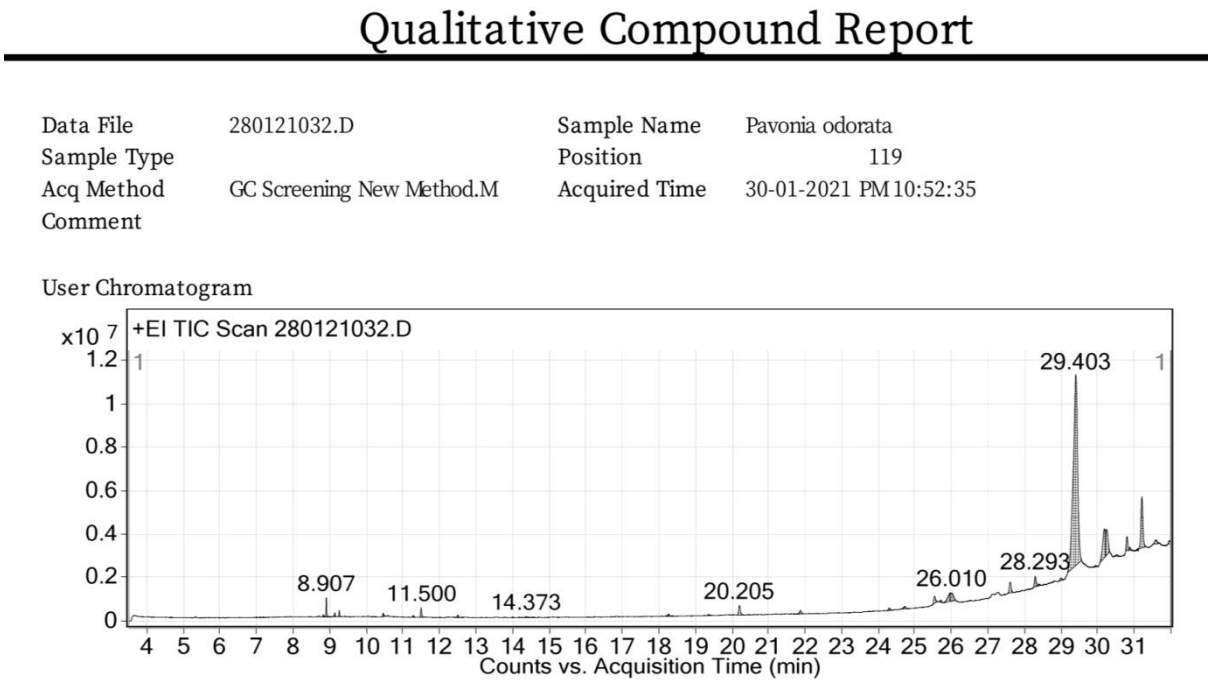

Table1. Indicates the retentions time, types of possible compound, molecular formula, molecular mass, percentage peak area and the possible medicinal roles of each compound as shown in the GC MS profile ofPavoniaodorata

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	1.16	Not Known
25.54	7H-Pyrazolo[4,3-d]pyrimidin-7-one, 1,6-dihydro-3-ribofuranosyl-	C10H12N4O5	268.1	0.97	Not Known
25.71	dl-.alpha.-Tocopherol	C29H50O2	430.4	0.23	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
26.01	3-Oxatricyclo[20.8.0.0(7,16)]triaconta-1(22),7(16),9,13,23,29- hexaene	C29H42O	406.3	1.85	Not Known
27.61	Stigmasterol	C29H48O	412.4	1.51	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	Ursodeoxycholic acid	C24H40O4	392.3	3.10	Acidifier, Arachidonic acid Inhibitor, Increases Aromatic Amino acid decarboxylase activity, Inhibits production of

					uric acid, Urine acidifier
29.40	9,19-Cycloergost-24(28)-en-3-ol, 4,14-dimethyl-, acetate, (3.beta.,4.alpha.,5.alpha.)-	C32H52O2	468.4	65.58	Not Known
30.19	Androstan-17-one, 3-ethyl-3-hydroxy-, (5.alpha.)-	C21H34O2	318.3	6.12	Not Known
30.24	9,19-Cyclolanostan-3-ol, acetate, (3.beta.)-	C32H54O2	470.4	4.48	Not Known
30.80	Lanosterol	C30H50O	426.4	1.71	Precursor to sterol synthesis
31.21	5.alpha.,14.beta.-Androstane, 16.alpha.,17.alpha.-epoxy-	C19H30O	274.2	8.08	5, alpha-reductase inhibitor, alpha-amylase inhibitor, alpha-glucosidase inhibitor, alpha-reductase inhibitor, HIF 1 alpha inhibitor, increases alpha-N-mannosidase activity, interleukin-1 alpha inhibitor, testosterone 5-alpha reductase inhibitor TNF-alpha inhibitor, 17 beta dehydrogenase inhibitor, androgen blocker, anti-amyloid beta, anticancer, Anti TGF beta, Beta 2-receptor, beta blocker, beta-galactosidase inhibitor, beta-glucuronidase inhibitor