

“THE GAS CHROMATOGRAPHY MASS SPECTROSCOPY ANALYSIS OF A UNANI MEDICINE, “HABB SURINJAN”

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ABSTRACT

This work deals with Gas chromatography mass spectroscopic analysis of Unani medicine, “HabbSurinjan” which is prescribed for joint related ailments such as rheumatoid arthritis and osteoarthritis. The medicine was bought from a Unani medicine supplier and was processed suitably before analysis. Some molecules in the profile, namely, trans-2-methyl-4-n-pentylthiane, S,S-dioxide, Sulfurous acid, 2-ethylhexyl octadecyl ester, disulfide, di-tert-dodecyl, 1-cyclohexanol, 4-tert.butyl-1-methyl-, tridecanoic acid, methyl ester, piperine etc. which have a wide ranges of medicinal properties such as anti-inflammatory, analgesic etc. These molecules contribute to the medicinal role HabbSunrinjan.

Key words : GC MS, HabbSurinjan, Tridecanoic acid, methyl ester, Piperine, Sulfurous acid, 2-ethylhexyl octadecyl ester

INTRODUCTION

The Unani drug, *Habb-E-Surinjanis* prescribed mainly for joint related ailments such as rheumatoid arthritis and osteoarthritis. This drug has curative properties such as analgesic, anti-inflammatory, anti-phlegmatic and as a blood purifier. There are at least fifteen types of preparations of this medicine depending on the types of ingredients used and the type of processing. (Suhail *et al*, 2017).¹Mostly the main ingredients are: Tukhm soya (*Anethum sowa*), Turbud(*Ipomea turpethum*), Habb-ul-Neel (*Ipomea hederacea*), Suranjaansheerin (*Colchicum autumnale*), Sabrzard (*Aloe vera* dried leaf juice), Post HaleelaZard (*Termineliachebula* half-ripe fruit), Sooranjan (*Colchicum leutium* root), Muqil (*Commiphoramukul*), Sibr (*Aloe barbadensis*) and Mastagi (*Pistacia lenticus*). All the dried plant parts are dried and powdered at equal proportion. The powders are mixed with water or AabAdrak (*Zingiber officinalis* juice) and made into pills of the size of gram seed. According to QurabaddinMajeedi, the composition of Habb-e-Surinjan is as follows:Tukhm soya (*Anethum sowa*): 31 gm; Turbud (*Ipomea turpethum*): 81 gm; Sibr (*Aloe barbadensis*): 31 gm; Muqil (*Commiphoramukul*): 13 gm; Mastagi (*Pistacia lenticus*): 13 gm and Sooranjan (*Colchicum leutium* root):28 gm. For children the dose is prescribed at 125 to 250 mg and for adults 250 to500 mg to be taken one hour after food. Not much work is reported on the scientific validation of this medicine. Alamet *al*, 2018 have done a clinical study on the safety

and efficacy of Habb -e-Surinjan.²Ghazanfar *et al*, 2018 have studied the sub chronic oral toxicity of this medicine and found it to be safe.³Suhail *et al*, 2021 have reported the physico-chemical standardization of Habb-e- Suranjan.⁴The therapeutic efficacy of MajoonSurinjan, a related drug, was reported b Subramanayaan *et al*, 2013.⁵The present workers have rworked to scientifically evaluate the veracity of these medicine systems by latest techniques so that deeper knowledge of the mechanism of action of these medicines could be gained.⁶⁻²⁴ The present study in one step further in this endeavour.

MATERIALS AND METHODS

HabbSurinjan was purchased from Unani medicine vendor in Chennai. The medicine was suitably processed by standard procedures and the GC-MS analysis was performed.

RESULTS

The Gas chromatography mass spectrometric analysis results of the Unani medicine HabbSurinjanand possible medicinal role of each molecule is tabulated in Table 1. Figure 1 shows the GC-MS profile of the Unani medicine HabbSurinjan.The identification of molecules was done by comparing with NIST Chemical library and the possible pharmaceutical roles of each bio molecule as per National Agriculture Library, USA and others as shown in Table 1.²⁵

DISCUSSION

HabbSurinjancontains some compounds such as, trans-2-methyl-4-n-pentylthiane, S,S-dioxide, sulfurous acid, 2-ethylhexyl octadecyl ester, disulfide, di-tert-dodecyl, 1-cyclohexanol, 4-tert.butyl-1-methyl-, tridecanoic acid, methyl ester, piperine etc. which have a wide ranges of medicinal properties such as anti-inflammatory, analgesic etc. These molecules contribute to the medicinal role HabbSunrinjan.

REFERENCES

1. Suhail S, Jamil SS, Jilani S, Jahangir U, Qamar MW. Habb-e-Suranjaan: A classical analgesic Unani formulation. *Int J Adv Pharm Med Bioallied Sci.* 2017; 2017:127. 15 different combinations are mentioned depending on the ingredients.
2. Alam MI, Ahmad T, Ahmad MW, Perveen A, Imam H, Anjum Nand, Parveen N. A Clinical Study of Safety and Efficacy of Unani Pharmacopoeial Formulations of Habb-e-Suranjan and Raughan-eSuranjan as Antiarthritic Effect in Waja-al-Mafasil (Joints Pain). *Hippocratic J of Unani Medicines*, 2018; 13(1); 9-16
3. Ghazanfar K, Dar SA, Nazir T, Akbar S. Subchronic oral toxicity study of Habb e-Sunabjan in albino Wistar rats. *J Coml. Integ. Med*, 15(3), 2018; pp.20170144. <https://doi.org/10.1515/jcim-2017-0144>
4. Suhail S, Parveen S, Jilani S, Shama. Physico-chemical standardization of a Unani analgesic formulation Habb-e-Suranjan. *Int. J of Adv Pharm Med Bioallied Sci.*, 2019; 9(4): 486-489
5. Subramanayaan M, Yasmeen S, Ahmed RS, Arora VK, Tripathi AK, Banerjee BD. Evaluation of therapeutic efficacy of MajoonSuranjan, a Unani formulation, in the treatment of rheumatoid arthritis: an experimental study. *Experimental Biology and Medicine.* 2013;238(12):1379-1387. doi:10.1177/1535370213498983
6. Rao, M. R. K, S. Philip, MutteviHyagreva Kumar, Y. Saranya, D. Divya and K. Prabhu. GC-MS analysis, antimicrobial, antioxidant activity of an Ayurvedic medicine, SalmaliNiryasa. *Journal of Chemical and Pharmaceutical Research*, 7(7):131-139, (2015).
7. Sivakumaran, G., K. Prabhu, Mudiganti Ram Krishna Rao, Sumathi Jones, R. Lakshmi Sundaram, V. Rahul Ulhas, Shruthi Dinakar and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one ayurvedic oil, Anu thailam. *DIT*, 11(10), 2675-2678, (2019)
8. Sivakumaran G., K. Prabhu, Mudiganti Ram Krishna Rao, Sumathi Jones, R. Lakshmi Sundaram, V. Rahul Ulhas, Shruthi Dinakar and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one ayurvedic oil, KsheerabalaThailam, *DIT*, 11(10), 2661-2665, (2019)
9. Sivakumaran G., K. Prabhu, Mudiganti Ram Krishna Rao, Sumathi Jones, R. Lakshmi Sundaram, V. Rahul Ulhas and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one Ayurvedic oil, TriphaladiThailam. *DIT*, 11(10), 2679-2683, (2019)
10. Narayanan G., K. Prabhu, Mudiganti Ram Krishna Rao, Kamala Kannan, R. Lakshmi Sundaram, Shruthi Dinakar and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one Ayurvedic medicine, DrakshadiKashayam. *DIT*, 11(10), 2652-2656, (2019)

11. Narayanan G., K. Prabhu, Mudiganti Ram Krishna Rao, Kamala Kannan, R. Lakshmi Sundaram, Shruthi Dinakar and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one ayurvedic medicine, Kutajarishtam. DIT, 11(10), 2666-2669, (2019)
12. Narayanan G., K. Prabhu, Mudiganti Ram Krishna Rao, Sumathi Jones, R. Lakshmi Sundaram, V. Rahul Ulhas and N. Vijayalakshmi. Gas chromatography–mass spectrometry analysis of one Ayurvedic antiobesity medicine, Lohasava. DIT, 11(10), 2670-2674, (2019)
13. MutteviHyagreva Kumar, K. Prabhu, Mudiganti Ram Krishna Rao, B. Shanthi, M. Kavimani, Shruti Dinakar, R. Lakshmi Sundaram, N. Vijayalakshmi and SampadShil. Gas chromatography/mass spectrometry analysis of one Ayurvedic skin oil, Eladi Kera Thailam. DIT, 2019; 11(10), 2657-2660, (2019)
14. Hassan Mohammad, K. Prabhu, Mudiganti Ram Krishna Rao, R. Lakshmi Sundram, Sruthi Dinakar, M. Sathish Kumar and N. Vijayalakshmi. The GC MS study of one Ayurvedic Pain relieving OIL “Mahamashathailam”. Drug Invention Today, 12(7), 1524-1527, (2019)
15. Hassan Mohammad, K. Prabhu, Mudiganti Ram Krishna Rao, R. Lakshmi Sundram, Sruthi Dinakar, M. Sathish Kumar and N. Vijayalakshmi. The GC MS study of one Ayurvedic Pain relieving oil “Karpooradithailam”, Drug Invention Today, 12(7), 1542-1546, (2019)
16. Jai Prabhu, K. Prabhu, Anathbandhu Chaudhury, M. R. K. Rao, V. S. KalaiSelvi, T. K. Balaji and Shruti Dinakar. Neuroprotective role of Saraswatharishtam on Scopolamine induced memory impairment in animal model. Pharmacognosy Journal, 12(3), 465-472, (2020)
17. Prabhu, K, Mudiganti Ram Krishna Rao, A. K. Bharath, S. K. Vishal, Penna Balakrishna, Aparna Ravi and J. Kalaivannan The GC MS study of one Ayurvedic Rasayana formulation Narasimha Rasayanam. DIT, 13(5), 658-662, (2020)
18. Prabhu K, Mudiganti Ram Krishna Rao, Vishal S K, Bharath A K, Penna Balakrishna, Aparna Ravi, Kalaivannan J. GC MS study of one Ayurvedic Rasayana drug, DhanwantariRasayanam. DIT, 14(5):783-786 (2020)
19. Sharmila, D, A. Poovarasana, E. Pradeep, Tanmoy Saha, Mudiganti Ram Krishna Rao and K. Prabhu. GC MS analysis of one Ayurvedic formulation, Sitopaladi. RJPT, 14(2), 911-915, (2021)
20. Narayanan, G., K. Prabhu, Anathbandhu Chaudhuri, Mudiganti Ram Krishna Rao, V. S. KalaiSelvi, T. K. Balaji, N. S. Mutiah and Shruthi Dinakar. Cardio protective role of Partharishtam on isoproterenol induced myocardial infarction in animal model. Pharmacognosy J., 13(2), 591-595, (2021)
21. Kalivannan J, Janaki CS, Mudiganti Ram Krishna Rao, Prabhu K, Balaji TK, Subashree A, Birunthaa CG, Shruthi Dinakar. The GC MS astudy of one ayurvedic formulation, Chandanasavam. Ind J of Natural Sciences, 2021; 12(67): 33671-33676.
22. Akshaya S R, Kalaivani S, Prabhu K, Rao M R K, Venkataramiah C , Janaki C S. Shruti Dinakar. The GC MS study of one Ayurvedic churnam, Avalgubijadichurnam. Ind J of Natural Sciences, 2021; 12(68): 34395-34402
23. Angielie Jessica Subbiah, Kavimani M, Rao M R K, Prabhu K, MukilanRamadoss, Janaki C S, Shruti Dinakaran, Raja P. The GC MS study of one ayurvedic formulation, Pushyanugachurnam. Ind J of Natural Sciences, 2021; 12(69): 35757-357-66
24. Yuvaraj R, Vijayakumar S, Rao M R K, Prabhu K, Balaji T K, Janaki C S, Shruti Dinakar, Raja P. The GC MS study of one ayurvedic medicine Pippalyasavam'. Ind J of Natural Sciences, 2021; 12(69): 35612-35618
25. 25.Dr. Duke’s Phytochemical 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 Gas Chromatography Mass Spectroscopic profile of Habbsurinjan

Qualitative Compound Report

Data File	030221053.D	Sample Name	Habb Surinjan
Sample Type		Position	103
Acq Method	GC Screening New Method.M	Acquired Time	06-02-2021 PM 07:19:39
Comment			

User Chromatogram

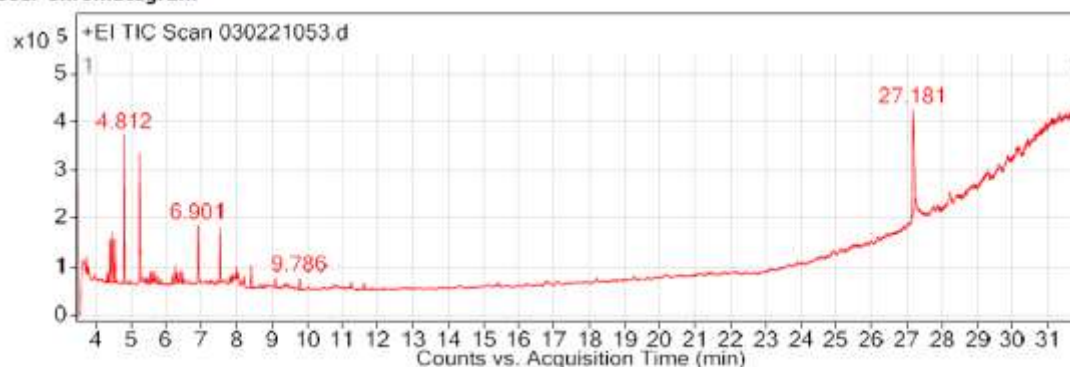


Table 1. Indicates the retentions values, types of possible compound, their molecular formulae, molecular mass, peak area and their medicinal roles of each compound as shown in the GC MS profile of Habbsurinjan

Ret. Time	Molecule	Mol. Formula	Mol. Mass	% Peak area	Possible Medicinal Role
3.75	2-Heptanoyl-2-methylmalononitrile	C ₁₁ H ₁₆ N ₂ O	192.1	1.95	Not known
4.33	trans-2-methyl-4-n-pentylthiane, S,S-dioxide	C ₁₁ H ₂₂ O ₂ S	218.1	1.25	Glutathione S Transferase inhibitor, catechol-O-methyl transferase inhibitor, Myo-neuro stimulant, Nitric oxide synthase inhibitor, NO scavenger, Stimulates norepinephrine production, stimulated Sympathetic nervous system, decreases glutamate oxaloacetate transaminase, decreases glutamate pyruvate transaminase, glycosyl transferase inhibitor, reverse transcriptase inhibitor, transdermal, smart drug, adrenal stimulator
4.48	Cyclopentane, 1-butyl-2-propyl-	C ₁₂ H ₂₄	168.2	8.17	Not Known
4.55	5-Eicosene, (E)-	C ₂₀ H ₄₀	280.3	5.94	Not Known
5.25	Dodecane, 1-fluoro-	C ₁₂ H ₂₅ F	188.2	15.91	Not Known
5.42	4-Pentadecyne, 15-chloro-	C ₁₅ H ₂₇ Cl	242.2	1.01	Not Known
5.61	Ethylene glycol, O,O-di(pivaloyl)-	C ₁₂ H ₂₂ O ₄	230.2	1.13	Not Known
5.69	Sulfurous acid, 2-ethylhexyl octadecyl ester	C ₂₆ H ₅₄ O ₃ S	446.4	1.18	Arachidonic acid inhibitor, Increases Aromatic Amino

					acid Decarboxylase activity
5.76	Disulfide, di-tert-dodecyl	C ₂₄ H ₅₀ S ₂	402.3	1.31	Antidote, Coronary dilator, Diuretic, increases superoxide dismutase activity
9.10	Diethyl Phthalate	C ₁₂ H ₁₄ O ₄	222.1	1.36	Not known
11.26	1-Cyclohexanol, 4-tert.butyl-1-methyl-	C ₁₁ H ₂₂ O	170.2	1.31	Catechol-O-Methyl Transferase Inhibitor,
11.61	Tridecanoic acid, methyl ester	C ₁₄ H ₂₈ O ₂	228.2	1.06	Arachidonic acid-Inhibitor, Increase Aromatic Amino Acid Decarboxylase Activity, Inhibits Uric Acid production, Catechol-O-Methyl Transferase Inhibitor
27.18	Piperine	C ₁₇ H ₁₉ NO ₃	285.1	30.10	Radioprotective, immunomodulatory, antitumor, antidepressant, anticonvulsant, antinociceptive and antiarthritic.