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The GC MS Study of One Ayurvedic Formulation Rohithakarishtam

Satheesh Kumar C[1], Prabhu K[2*], S Kalaivani[3], A Franklin[4], MRK Rao[5], CS Janaki[6], Shruti Dinakaran[6]

[1]Department of Anatomy, Bharath Institute of Higher Education and Research, Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, Melmaruvathur, Chennai, Tamil Nadu, India

[2]Department of Anatomy, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India

[3]Department of Anatomy, Vel's Medical College and Hospital, Chennai, Tamil Nadu, India

[4]Department of Microbiology, CEO Anna Medical College, University of Technology, Mauritius, Port Louis

[5]Department of Anatomy, Amritha University, Old Mahabalipuram Road, Thiruporur, Tamil Nadu, India

[6]Department of Anatomy, Ayurvedic Medical Practioneer, Kottakkal Arya Vaidya Sala, Kerala, India

ABSTRACT

The present study deals with the GC MS analysis of one Ayurvedic medicine Rohithakarishtam which is prescribed for spleen related diseases. The GC MS study was performed by standard procedures. The analysis of "Rohitakarishtam" indicated the some important biomolecules of significance such as 13-heptadecyn-1-ol, silane, diethylbutoxydecyloxy-, bis(2-ethylhexyl) phthalate, 2,2,4-trimethyl-3-(3,8,12,16-tetramethyl-heptadeca-3,7,11,15-tetraenyl)-cyclohexanol, oleic acid, eicosyl ester, hexadecanoic acid, 1-[(2-aminoethoxy)hydroxyphosphinyl]-1,2-ethanediyl ester. The relationship between the claimed medicinal roles and the presence of biomolecules, as indicated by GC MS, seems encouraging and further work in this required is in process. The medicinal roles of few molecules present in Rohitakarishtam such as bis(2-ethylhexyl) phthalate, 2,2,4-trimethyl-3-(3,8,12,16-tetramethyl-heptadeca-3,7,11,15-tetraenyl)-cyclohexanol and hexadecanoic acid, 1-[(2-aminoethoxy)hydroxyphosphinyl]oxy]methyl]-1,2-ethanediyl ester are not known and further work in this regard is needed.

Key words: GC MS, Rohitakarishtam, 13-Heptadecyn-1-ol, Silane, Phytochemical, Oleic acid

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Corresponding author: Dr. Prabhu K
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INTRODUCTION

The knowledge of the mechanism of action of Ayurvedic and other forms of alternative medicines is of utmost importance to understand to bring these forms of medicines into the main stay of medical field. Some reports are work in this regard is under process and lot more need be done [1-17]. In continuance with our endeavour, the present work deals with the GC MS analysis of one medicine, Rohithakarishtam which is a spleen protective medicine in Ayurveda. It is used for various conditions associated with spleen disorders, like splenomegaly, detoxification of blood due to various infections etc. This medicine is also prescribed for liver enlargement, gall bladder problems etc.

Rohithakarishtam ingredients

The main ingredient of this medicine is the bark of Rhohitaka, *Tecomella undulata*, which is reported to have all the activities ascribed to rohitakarishtam [18]. The stem bark (100 parts) is boiled with 1024 parts of water till the final volume becomes ¼th the total volume and filtered. To this warm decoction, one part of powders of each of the following ingredients namely, flowers of *Woodfordia fruticosa*, *Piper longum* fruits, *Piper longum* roots, fruits of *Piper chaba*, stem of *Plumbago zeylanica*,

bark of *Cinnamomum zeylanicum*, fruits of *Elattariacardamomum*, rhizome of *Zingiber officinale*, leaves of *Cinnamomum tamala*, *Terminalia chebula* fruits, *Embelica officinalis* fruits, *Terminalia bellarica* fruits, are added and the mixture is kept in special Asava/Arishta vessel and allowed to ferment for 30 days. After 30 days the resultant fluid is filtered and used as medicine. The general dose prescribed is 2.5 to 10 ml for children above 5 years and 10-30 ml for adults, twice a day with equal amount of water.

MATERIALS AND METHODS

Rohithakarishtam was obtained from standard Ayurvedic vendor at Chennai and was subjected to GC MS analysis by standard procedure.

Instrument: Gas chromatography (Agilent: GC: (G3440A) 7890A. MS MS: 7000 triple quad GCMS) was equipped with mass spectrometry detector.

Sample Preparation: 100 micro lit samples dissolved in 1 ml of suitable solvents. The solution stirred vigorously using vortex stirrer for 10 seconds. The clear extract was determined using gas chromatography for analysis.

GC MS protocol: The GC MS column: DB5 MS (30 mm × 0.25 mm ID × 0.25 µm, composed of 5% phenyl 95% methyl poly siloxane), 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 GC MS profile of Rohithakarishtam is represented in Figure 1.

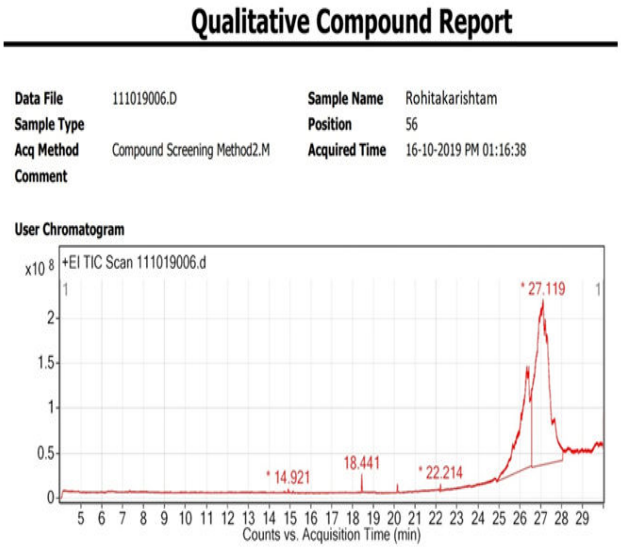

Figure 1: Indicates the GC MS graph of Rohitakarishtam.

Table 1 indicates the retention time, types of possible compound, their molecular formulae, molecular mass and percentage peak area as shown in the GC MS profile of Rohithakarishtam. Table 1 indicates the possible medicinal roles of each of the compounds found in GC MS profile. 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 Duke's phytochemical and ethno botanical data base (national agriculture library, USA) and others as shown in Table 1 [19].

Table 1: Indicates the retentions time, the types of possible compounds, their molecular formulae, molecular mass and peak area of each compound as shown in the GC MS profile of rohitha karishtam.

Ret. time	Compound name	Mol. formula	Mol. weight	Peak area	Possible medicinal role
14.02	13-Heptadecyn-1-ol	$C_{18}H_{40}O_2Si$	252.2	1.2E+07	Oligosaccharide provider
18.44	Silane, diethylbutoxydecyloxy-	$C_{17}H_{32}O$	316.3	3.4E+07	Anaphylactic, antitumor, arylamine-N-acetyltranferase-Inhibitor, decrease nor epinephrine production, down regulate nuclear and cytol androgens, GABAergic, increase Natural Killer cell activity. Inhibit tumour necrosis factor activity, myo-neuro stimulant, NADH oxidase inhibitor, NADH-ubiquinone-oxidoreductase-inhibitor.
20.16	Bis(2-ethylhexyl) phthalate	$C_{24}H_{38}O_4$	390.3	1.6E+07	Not Known
22.21	2,2,4-Trimethyl-3-(3,8,12,16-tetramethyl-	$C_{30}H_{52}O$	428.3	1.4E+07	Not Known

	heptadeca-3,7,11,15-tetraenyl)-cyclohexanol				
26.34	Oleic acid, eicosyl ester	$C_{38}H_{74}O_2$	562.6	4E+09	Acidifier, arachidonic acid inhibitor, increase aromatic amino acid decarboxylase activity, inhibit uric acid production.
27.12	Hexadecanoic acid, 1-[[[(2-aminoethoxy)hydroxyphosphinyl]oxy]methyl]-1,2-ethanediyl ester	$C_{37}H_{74}NO_8P$	691.5	8.3E+09	Not Known

From the above results some very interesting indications are available regarding the function of Rohithakarishtam. Liver and spleen are the organs which take care of the detoxification process in the body. The disease pertaining to liver or spleen could be due to over function of these organs in removing the various xenobiotic pollutants to which we are exposed. The molecule, silane, diethylbutoxydecyloxy-N has been attributed to have Arylamine-N-Acetyletransferease activity. Arylamine *N*-Acetyltransferases (NAT) is phase II Xenobiotic Metabolizing Enzymes (XME) which catalyses the transfer of an acetyl group from acetyl coenzyme A (Acetyl CoA) to the nitrogen or oxygen group of aromatic amine chemicals. These enzymes are important in detoxification and/or bio-activation of several aromatic amine drugs and carcinogens [20,21]. This role of the molecules present in Rohithakarishtam must be arresting the conversion of xenobiotic present in the body, thus saving the system form allergies and even cancer. This molecule is also attributed to have anaphylactic, antitumor activities also. Inhibition of TNF could help in maintaining the good heath of liver and spleen. The NADH Oxidase inhibitor activity of this molecule could help is slowing down the growth in splenomegaly. GABA-nergic, myoneuro stimulant, decrease of norepinephrine production, inhibition of arachidonic acid activities of the molecules present in Rohithakaristam could contribute to its anti-allergic, antioxidant and anti-inflammatory functions. Thus the medicinal role of Rohithakarishtam in the cure of diseases related to spleen and liver seem to reflect in the medicinal roles of the different molecules present in this medicine as indicated by its GC MS analysis.

The medicinal roles of few molecules present in Rohithakarishtam such as bis(2-ethylhexyl) phthalate, 2,2,4-Trimethyl-3-(3,8,12,16-tetramethyl- heptadeca-3,7, 11, 15-tetraenyl)-cyclohexanol and hexadecanoic acid, 1-[[[(2-aminoethoxy) hydroxyphosphinyl]oxy]methyl]-1,2 -ethanediyl ester are not known and further work in this regard is needed.

CONCLUSION

From the above results and discussion it is clear that the medicinal roles of the molecules present in Rohithakarishtam augurs well with its claimed role in Ayurveda for the cure of spleen and liver related diseases.

REFERENCES

1. Rao MRK, S Philip, Kumar MH, et al. GC MS analysis, antimicrobial, antioxidant activity of an Ayurvedic medicine, Salmali Niryasa. J Chem Pharma Res 2015; 7:131-139.
2. Sivakumaran G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic oil, Anuthailam. DIT 2019; 11:2675-2678.
3. Sivakumaran G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic oil, Ksheerabala Thailam, DIT 2019; 11:2661-2665.
4. Sivakumaran G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic oil, Triphaladi Thailam. DIT 2019; 11:2679-2683.
5. Narayanan G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic medicine, Drakshadi Kashayam. DIT 2019; 11:2652-2656.
6. Narayanan G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic medicine, Kutajarishtam. DIT 2019; 11:2666-2669.
7. Narayanan G, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic anti-obesity medicine, Lohasava. DIT 2019; 11:2670-2674.
8. Kumar MH, Prabhu K, Rao MRK, et al. Gas chromatography mass spectrometry analysis of one Ayurvedic skin oil, Eladi Kera Thailam. DIT 2019; 11:2657-2660.
9. Mohammad H, Prabhu K, Rao MRK, et al. The GC MS study of one Ayurvedic pain relieving OIL "Mahamashathailam". Drug Invention Today 2019; 12:1524-1527.
10. Mohammad H, Prabhu K, Rao MRK, et al. The GC MS study of one Ayurvedic pain relieving oil "Karpooradithailam". Drug Invention Today 2019; 12:1542-1546.
11. Prabhu J, Prabhu K, Chaudhury A, et al. Neuro protective role of Saraswatharishtam on Scopolamine induced memory impairment in animal model. Pharmacognosy J 2022; 12:465-472.
12. Prabhu, K, Rao MR, Bharath AK, et al. The GC MS study of one Ayurvedic Rasayana formulation Narasimha Rasayanam. DIT 2020; 13:658-662.

13. Prabhu K, Rao MRK, Vishal SK, et al. GC MS study of one Ayurvedic Rasayana drug, Dhanwantari Rasayanam. DIT 2020; 14:783-786.
14. Sharmila DA, Poovarasan E, Pradeep, et al. GC MS analysis of one Ayurvedic formulation, Sitopaladi. RJPT 2021; 14:911-915.
15. Narayanan GK. Prabhu K, Chaudhuri AB, et al. Cardio protective role of Partharishtam on isoproterenol induced myocardial infarction in animal model. Pharmacognosy J 2021; 13:591-595.
16. Kalivannan J, Janaki CS, Rao MRK, et al. The GC MS a study of one Ayurvedic formulation, Chandanasavam. Ind J of Nat Sci 2021; 12:33671-33676.
17. Akshaya SR, Kalaivani S, Prabhu K, et al. The GC MS study of one Ayurvedic Churnam, Avalgujabijadichurnam. Ind J Nat Sci 2021; 12:34395-34402.
18. Dhir R, Shekhawat GS. Critical review on *Tecomella Undulata*: A medicinally potent endangered plant species of Indian Thar Desert. Int J Curr Res 2012; 4:36-44.
19. Duke, James A. Phytochemcial and ehnobotanical databases. U.S. Department of agriculture, agricultural research service. Ag Data Commons, U.S, 2021.
20. Hein DW, McQueen CA, Grant DM, et al. Pharmacogenetics of the aryl amine N-acetyltransferases: A symposium in honour of Wendell webe. Drug Metab Dispos 2000; 28:1425-1432.
21. Sim E, Fakis G, Laurieri N, et al. Arylamine N-transfereases from drug metabolism and pharmacogenetics to identification of novel targets for pharmacological intervention. Adv Pharmacol 2012; 63:169-205.