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GC MS ANALYSIS OF ONE AYURVEDIC MEDICINE SAHACHARADI KASHAYAM

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Abstract

Aim: Sahachardi Kashayam is an ayurvedic preparation used for the treatment of nerve related diseases like paraplegia, hemiplegia, epilepsy, backache, palsy etc. This is prepared by three plants namely, Sahachara (*Barleria prionitis/ Strobilanthes heynianus*), Suradaru (Devadaru) (*Cedrus deodara*) and Sunthi (*Zingiber officinale*). The present study is aimed at understanding the type of biomolecules present in this kashayam by GC MS analysis.

Method: The GC MS analysis of Sahacharadi kashayam was performed after following required protocols.

Results: The presence of biomolecules like Heptanediamide, N,N'-di-benzoyloxy- Benzoic acid, Phenol, 2-methoxy-4-(1-propenyl), Eugenol, Tetradecanoic acid, 3-Decanone, 1-(4-hydroxy-3-methoxyphenyl)- (Gingerol), Abietic acid, 3-(6-Hydroxy-3,7-dimethyl-octa-2,7-dienyl)-4-methoxyphenol, 5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one, 1,1a,1b,4,4a,7a,7b,8,9,9a-decahydro-7b,9,9a-, Naphtho[2,3-c]furan-1(3H)-one, 3a,4,9,9a-tetrahydro-6-hydroxy-4-(4-hydroxy-3-methoxyphenyl)-7-methoxy-, [3aR-(3a,4,9,9a)]- and Lupeol has indicated the medicines efficacy of Sahacharadi Kashayam.

Conclusions: The medicine Sahacharadi kashayam contains some very important bio-molecules which could give it the medicinal potential. Further work to confirm the molecular mechanism is in process.

Key words: Sahacharadi Kashayam, Eugenol, *Barleria prionitis*, *Cedrus deodar*, *Zingiber officinale*, Lupeol.

Introduction

Sahacharadi Kashayam is a decoction prepared out of three herbal ingredients, namely Sahachara (*Barleria prionitis: Strobilanthes heyneanus*), Suradaru (Devadaru) (*Cedrus deodara*) and Sunthi (*Zingiber officinale*) in water. This is used in Ayurveda for the management of Vata related diseases like Sciatica, low back pain, disc prolapsed, facial palsy and paralysis. This kashayam is administered at doses of 5 to 15 ml diluted with water to be taken twice a day before food or as advised by the physician. The tablet forms of this medicine are also available which are taken 1-2 tablets twice a day.

The medicine is prepared by the three ingredients at equal proportions. The coarse powder of the three plant parts are boiled in 16 parts of water till it reduces to 4 parts, filtered and stored to be used as medicine. The literature for preparation of this medicine is from Astangahridayam Vatavyadhi chikitsa 21/57. There are a number of manufactures of this medicine such as Arya Vaidya Sala, Kottakkal, Ashoka Pharmaceuticals, SNA Oushadhasala Pvt. Ltd., Nagarjuna Ayurvedic Group etc.

There is lack of knowledge on the scientific aspects of the role of this medicine. The present work is one step in understanding the possible molecular mechanism for the activity of Sahacharadi Kashayam by GC MS analysis to understand the types of molecules that could be present and to understand the possible molecular mechanisms for its activity.

It is imperative to go through the medicinal role of each of the constituents of Sahacharadi Kashayam to understand its role in a better way. The medicinal values of each of the ingredient are mentioned below.

Sahachara (*Barleria prionitis* Linn)

Ethno-medically this plant parts are used for treating various diseases like stomach disorders, urinary infections ulcers and fever. [1, 2] Leaf juice with honey is given to children for relief from fever. Leaves are chewed to relieve toothache. The leaf juice is applied externally in lacerated soles of feet and pimples. The dried stem bark is used as expectorant in whooping cough and as a diaphoretic. The root paste is externally applied to disperse boils and glandular swellings. The flowers are used internally for the treatment of migraine, internal abscesses, edema, haemoptysis, urethral discharges, seminal disorders and obesity. It is also used in urinary infection, jaundice,

hepatic obstruction and dropsy. [3] Crude extract of this plant in oil is recommended in arresting graying of hair, arthritis and gout. In South India, this plant is widely used in neurological disorders like paraplegia, sciatica, also in leprosy and other skin diseases. [4, 5] This plant has been reported to have medicinal activities like antibacterial against oral pathogens *Streptococcus mutans*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Bacillus cereus* causing dental caries.

The plant has been reported to have antifungal, enzyme inhibitory, antiviral, antifertility, antioxidant, antidiabetic, anti-inflammatory, anti-arthritic, cytoprotective, hepatoprotective), antioxidant, anti-nociceptive and inflammatory activities. [6-17] According to Astangahridayam Vatavyadhi chikitsa 21/57, Sahachara plant is known to be *Barleria prionitis* Linn., whereas according to Sahasra Yogam ayurvedic treatise, Sahachara plant is *Strobilanthes heynianus*. Both these plants belong to family Acanthaceae and have similar medicinal properties.

Sahachara: (*Strobilanthes heynianus*)

Nair *et al*, 2016 have reviewed the various phyto-chemical and pharmacological properties of this plant such as antibacterial, antioxidant, anti-inflammatory, analgesic, hepato-protective, immunosuppressant, anticancer. [18, 19] Shirwaikar *et al*, 2015 have reported its anti-diabetic properties. [20]

Devadaru (*Cedrus deodara* (ROXB.) Loud

In Ayurveda this tree has very important medicinal roles. Deodar Bark, Heartwood, Himalayan Cedar oil, leaves and resins are used medicine. According to Susruta, Deodar tree has medicinal role in controlling kapha and vata balance. It is used to treat many ailments like indigestion, skin diseases, in controlling hiccups, worm infestation, cough and asthma, constipation, urinary ailments and diabetes etc. Its bark and the oil from the heart wood are used as a part of many ayurvedic formulations.

Pharmacological studies have revealed its role as antibacterial, mast cell stabilizing activity, immune-modulating, anti inflammatory, anti-arthritic, anticancer, analgesic, anti-diabetic, anti-hyperlipidemic, antioxidant, anxiolytic, anticonvulsant and antiulcer. [21-30]

Sunthi (Ginger): *Zingiber officinale*

Ginger is one of the household medicines used against common cold, cough and indigestion. The medicinal values of Ginger are well documented. [31] Adel and Prakash, 2010 have reported its antioxidant properties. [32] Smith *et*

M.R. K. Rao**et al.* /International Journal of Pharmacy & Technology al, 2004 have demonstrated that Ginger controls vomiting and nausea during pregnancy. [33] It controls blood pressure by blocking calcium channels. [34]

Material and Methods

The medicine, Sahacharadi kashayam was procured from standard Ayurvedic store at Chennai. It was prepared for GC MS analysis by standard procedures. The results obtained were tabulated and analyzed.

Results and Discussion

Figure-1: Depicts the GC MS graph of Sahacharadi Kashayam.

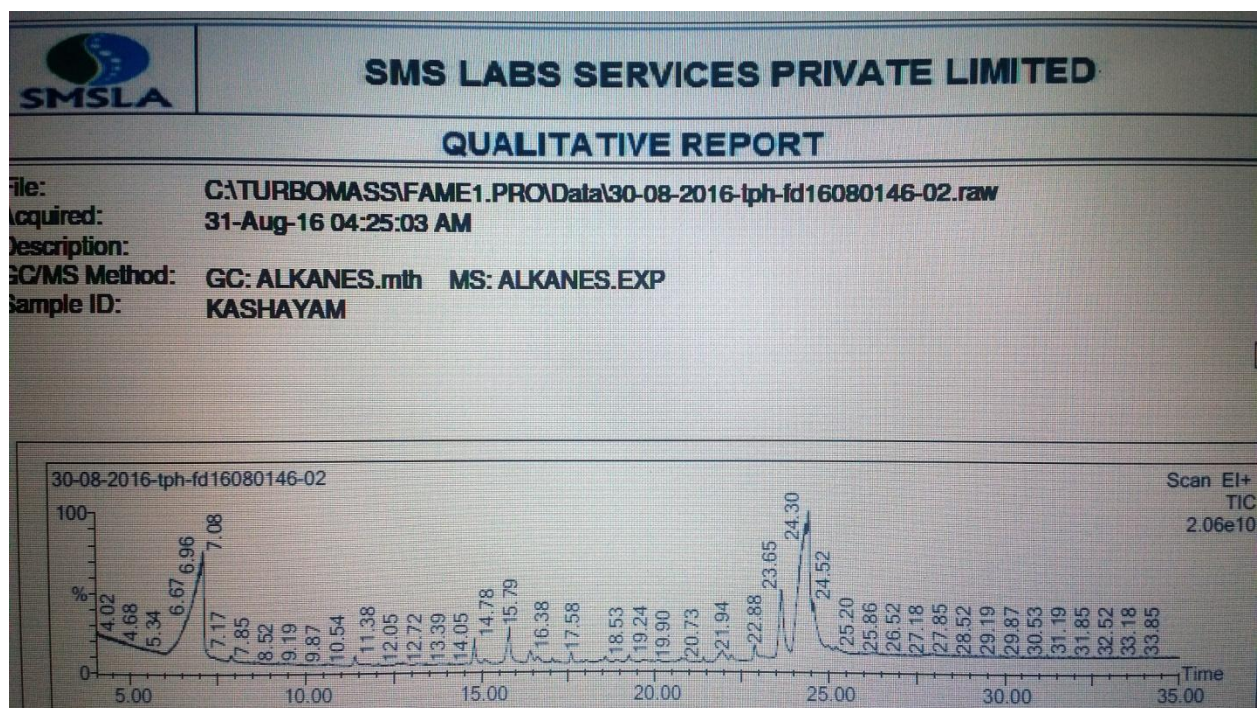


Figure 1. The GC MS profile of Sahacharadi Kashayam.

Table-1: Shows the possible presence of important biomolecules in Sahacharadi Kashayam with Retention time, % peak values, Molecular formula and molecular weights.

Sl. No	Retention Time	% Peak Value	Compound	Formula	Molecular weight
1	6.148	0.220	Benzoic acid	C7H6O2	122
			Cyclohexanamine, N-(benzoyloxy)-	C13H17NO2	219
2	7.076	29.403	Heptanediamide, N,N'-di-benzoyloxy-	C21H22N2O6	398
			Benzoic acid	C7H6O2	122
3	7.898	0.431	Phenol, 2-methoxy-4-(1-propenyl)-		

			Eugenol	C10H12O2	164
				C10H12O2	164
4	11.382	0.646	Butan-2-one, 4-(3-hydroxy-2-methoxyphenyl)	C11H14O3	194
5	12.783	0.185	Tetradecanoic acid	C14H28O2	228
6	14.784	1.269	n-Hexadecanoic acid	C16H32O2	256
7	15.076	0.354	5,6-Dimethoxyphthalaldehydic acid	C10H10O5	210
			Benzenamine, N-(1-methylpropyl)-2,6-dinitro-	C10H13N3O4	239
			3-(2,6,6-Trimethyl-cyclohex-1-enyl)-propionic acid, methyl Ester	C13H22O2	210
8	15.788	3.054	(R-(R*,R*))-4-(1,5-Dimethyl-3-oxohexyl)-1-cyclohexenecarboxylic acid	C15H24O3	252
			Todomatuic acid	C15H24O3	252
			Limonen-6-ol, pivalate	C15H24O2	236
9	16.395	1.011	Oleic Acid	C18H34O2	282
			trans-13-Octadecenoic acid	C18H34O2	282
10	16.587	0.573	Octadecanoic acid	C18H36O2	284
			Hexadecanoic acid, ethyl ester	C18H36O2	284
11	17.031	0.213	3-Decanone, 1-(4-hydroxy-3-methoxyphenyl)-	C17H26O3	278
			Butan-2-one, 4-(3-hydroxy-2-methoxyphenyl)-	C11H14O3	194
			Gingerol	C17H26O4	294
12	17.579	0.594	Gingerol	C17H26O4	294
			2-Cyclohexyl-2,5-cyclohexadiene-1,4-dione, 4-oxime	C12H15NO2	205
			7-Oxabicyclo[4.1.0]heptane, 1-(1,3-	C15H24O	220

			dimethyl-1,3-butadienyl)-2,2,6-trimethyl-, (E)-		
13	18.577	0.395	1-Phenanthrenecarboxylic acid, 7-ethenyl-1,2,3,4,4a,4b,5,6,7,8,10,10a-dodecahydro-1,4a,7-trimethyl-, methyl ester, [1R-(1à,4aá,4bà,7à,10aà)]-	C21H32O2	316
			Preg-4-en-3-one, 12,17-dihydroxy-20-nitrilo-	C20H27NO3	329
			4,7,10,13,16,19-Docosahexaenoic acid, methyl ester, (all-Z)-	C23H34O2	342
14	18.886	0.214	Dehydroabietic acid	C20H28O2	300
			Gibbane-1,10-dicarboxylic acid, 4a-(hydroxymethyl)-1-methyl-8-methylene-, 1,4a-lactone, 10-methyl ester, (1à, 4aà,4bá,10á)-	C21H28O4	344
			3,19-Epoxyandrosta-5,7-diene, 17-acetoxy-4,4-dimethyl-3-methoxy-	C24H34O4	386
15	19.237	0.430	Abietic acid	C20H30O2	302
			á-Pimaric acid	C20H30O2	302
16	20.765	0.255	3-(3-Hydroxy-4-methoxyphenyl)-l-alanine	C10H13NO4	211
			Phenol, 2-methoxy-4-propyl-	C10H14O2	166
			Bicyclo[3.2.0]hept-2-ene, 5-(diethylamino)-6-[2-(methoxy)ethoxy]methoxy-exo-7-	C21H31NO3	345

			phenyl-		
17	21.407	0.195	Squalene	C30H50	410
18	21.938	1.580	Pyridine-3-carbonitrile, 2-[2-(3,4-dihydroxyphenyl)-2-oxoethylthio]-4-methoxymethyl-6-methyl-	C17H16N2O4S	344
			3-(3-Hydroxy-4-methoxyphenyl)-l-alanine	C10H13NO4	211
			Phenol, 2-methoxy-4-propyl-	C10H14O2	166
19	22.207	0.452	1,2-Benzenediol,4-(2-aminopropyl)-	C9H13NO2	167
			Phenol, 4-(2-aminoethyl)-2-methoxy-	C9H13NO2	167
20	22.884	1.084	3-(6-Hydroxy-3,7-dimethyl-octa-2,7-dienyl)-4-methoxyphenol	C17H24O3	276
			Ingol 12-acetate	C22H32O7	408
			3-(3-Hydroxy-4-methoxyphenyl)-l-alanine	C10H13NO4	211
21	23.105	0.259	5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one, 1,1a,1b,4,4a,7a,7b,8,9,9a-decahydro-7b,9,9a-trihydroxy-3-(hydroxymethyl)-1,1,6,8-tetramethyl-, [1aR-(1aà,1bá,4aà,7aà,7bà,8à,9á,9aà)]-	C20H28O5	348
			Estra-1,3,5(10),7-tetraen-17-one, 3-[(trimethylsilyl)oxy]-	C21H28O2Si	340
			Yohimbic Acid	C20H24N2O3	340
22	23.671	6.716	2(3H)-Furanone, dihydro-3,4-bis[(4-hydroxy-3-methoxyphenyl)methyl]-, (3R-trans)-	C20H22O6	358
			3-Benzofuranmethanol, 2,3-dihydro-2-	C20H22O6	358

			(4-hydroxy-3-methoxyphenyl)-5-(3-hydroxy-1-propenyl)-7-methoxy-3-(3-Hydroxy-4-methoxyphenyl)-l-alanine	C10H13NO4	211
23	24.483	37.308	(3-Methoxyphenyl)ethanolamine	C9H13NO2	167
			12-Oxatricyclo[4.4.3.0(1,6)]tridecane-3,11-dione	C12H16O3	208
			Fluoranthene, hexadecahydro-	C16H26	218
24	25.002	0.730	Naphtho[2,3-c]furan-1(3H)-one, 3a,4,9,9a-tetrahydro-6-hydroxy-4-(4-hydroxy-3-methoxyphenyl)-7-methoxy-, [3aR-(3aà,4à,9aá)]-	C20H20O6	356
			5,12d-Ethano(furo[2,3,4-mn]oxepino[2,3,4-ed]anthracen-2-on-9,12-diol)-, 6-methyl-	C21H24O5	356
			Dihydropleurotin	C21H24O5	356
25	25.212	0.799	1-Heptatriacotanol	C37H76O	536
			Lupeol	C30H50O	426
			Formic acid, 3,7,11-trimethyl-1,6,10-dodecatrien-3-yl ester	C16H26O2	250

Among the various compounds indicated in the table, their known biological roles are mentioned in the following paragraphs.

1. Benzoic acid: This is an acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Inhibit production of uric acid, Urine acidifier
2. Cyclohexanamine, N-(benzoyloxy) - Not Known.
3. Heptanediamide, N,N'-di-benzoyloxy- Benzoic acid: Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Anaphylactic, Antitumor, Arylamine -N-Acetyltransferase inhibitor, Decrease

Norepinephrine production, GABA-nergic, Increase nature Killer cell Activity, Inhibit production of Tumor

Necrosis factor, Myo-neuro-stimulant.

4. Phenol, 2-methoxy-4-(1-propenyl) - Anti-inflammatory.

5. Eugenol: Eugenol or Phenol, 2-methoxy-3-(2-propenyl): Synthetic Eugenol has been reported to have many important medicinal properties as is described by many reporters. It has medicinal roles such as antifungal, antioxidant, anticonvulsant and local anesthetic, antistress, bacteriostatic, bactericidal, anticarcinogenic, depresses activity of central nervous system, anti radiation, antiviral, induces apoptosis in melanoma cells and HL-60 leukemia cells. [35-41]

6. Butan-2-one, 4-(3-hydroxy-2-methoxyphenyl): Antimicrobial, 17 beta hydroxysteroid dehydrogenase inhibitor, Aryl Hydrocarbon hydroxylase inhibitor, Testosterone Hydroxylase Inducer.

7. Tetradecanoic acid: anti-inflammatory, antioxidant, 5-alpha-reductase inhibitor, hemolytic, pesticide.

8. n-Hexadecanoic acid: Antibacterial, cytotoxic, antioxidant. [42, 43]

9. 5,6-Dimethoxyphthalaldehydic acid : Acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Inhibit production of uric acid, Urine acidifier.

10. Benzenamine, N-(1-methylpropyl)-2,6-dinitro-: Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Anaphylactic, Antitumor, Arylamine -N-Acetyltransferase inhibitor, Decrease Norepinephrine production, GABA-nergic, Increase nature Killer cell Activity, Inhibit production of Tumor Necrosis factor, Myo-neuro-stimulant.

11. 3-(2,6,6-Trimethyl-cyclohex-1-enyl)-propionic acid, methyl Ester: Catechol-o-methyl-transferase inhibitor, Methyl donor, Methyl-Guanidine inhibitor, Acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity.

12. (R-(R*,R*))-4-(1,5-Dimethyl-3-oxohexyl)-1-cyclohexenecarboxylic acid: Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, 5-Alpha-Rductase inhibitor, aldose reductase inhibitor, Anthocyanodin- rich, Anti X-Radiation, Arginine rich, Benzodiazepine Receptor Antagonist.

13. Todomatuic acid: Acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Inhibit production of uric acid, Urine acidifier.

14. Limonen-6-ol, pivalate: Oligosaccharide provider
15. Oleic Acid: Oleic acid – Antitumor. [44]
16. Trans-13-Octadecenoic acid : Acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity, Inhibit production of uric acid, Urine acidifier, Reverse Transcriptase inhibitor, Increase Glyoxalate Transamination, Increase Glutathione-S-Transferase activity, Glycosyl- Transferase inhibitor, Catechol-o-emthyl-transferase inhibitor
17. Octadecanoic acid: Octadecanoic acid esters are reported to be antiviral, antibacterial and antioxidant activities.
18. Hexadecanoic acid, ethyl ester: Antioxidant. [45]
19. 3-Decanone, 1-(4-hydroxy-3-methoxyphenyl)-(Gingerol): Anticancer, antioxidant, anti-inflammatory.
20. Butan-2-one, 4-(3-hydroxy-2-methoxyphenyl): Antibacterial
21. 2-Cyclohexyl-2,5-cyclohexadiene-1,4-dione, 4-oxime: Not known
23. 7-Oxabicyclo[4.1.0]heptane, 1-(1,3-dimethyl-1,3-butadienyl)-2,2,6-trimethyl-, (E): Antibacterial.
24. 1-Phenanthrenecarboxylic acid, 7-ethenyl-1,2,3,4,4a,4b,5,6,7,8,10,10a-dodecahydro-1,4a,7-trimethyl-, methyl ester,[1R-(1à,4aá,4bà,7à,10aà)]- Not known.
25. Preg-4-en-3-one, 12,17-dihydroxy-20-nitrilo-: Decrease endothelial Leukocyte Adhesion, Decrease Endothelial Platelet Adhesion, Encephalopathic, Endoanesthetic, Endocrinprotective, Enterstimulant, Enterorelaxant, energizer.
26. 4,7,10,13,16,19-Docosahexaenoic acid, methyl ester, (all-Z)- Cardioprotective.
27. Dehydroabiatic acid: antiulcer, antimicrobial, anxiolytic, antiviral, antitumor and cytotoxic activities. [46]
28. Gibbane-1,10-dicarboxylic acid, 4a-(hydroxymethyl)-1-methyl-8-methylene-, 1,4a-lactone, 10-methyl ester, (1à,4aà,4bá,10á)- Antioxidant.
29. 3,19-Epoxyandrosta-5,7-diene, 17-acetoxy-4,4-dimethyl-3-methoxy: Antimicrobial.
30. Abietic acid: Abietic Acid is a potent testosterone 5 α -reductase inhibitor, a cancer inhibitor, antioxidant, antibacterial and antiacetylcholinesterase. [47, 48, 49]
31. á-Pimaric acid: Pimaric acid is a matrix metalloproteinase (MMP)-9 Inhibitor. [50]
32. 3-(3-Hydroxy-4-methoxyphenyl)-l-alanine: 17-beta-hydroxysteroid Dehydrogease inhibitor, Aryl-hydrocarbon Hydroxylase inhibitor, Testosterone-Hydroxylase Inducer.

33. Phenol, 2-methoxy-4-propyl- Anti-inflammatory
34. Bicyclo[3.2.0]hept-2-ene, 5-(diethylamino)-6-[2-(methoxy)ethoxy]methoxy-exo-7-phenyl- Energizer.
35. Squalene: Squalene- Monooxygenase inhibitor, biochemical precursor in the preparation of steroids, natural moisturizer, used in cosmetics Skin ointments, Steroid Precursor , Monooxygenase Inhibitor.
36. Pyridine-3-carbonitrile, 2-[2-(3,4-dihydroxyphenyl)-2-oxoethylthio]-4-methoxymethyl-6-methyl- antiviral
37. 3-(3-Hydroxy-4-methoxyphenyl)-l-alanine: antioxidant, hepatoprotective.
38. (3-Methoxyphenyl) ethanolamine: antihistaminic and cosmetic.
39. 1,2-Benzenediol,4-(2-aminopropyl)- Not known.
40. Phenol, 4-(2-aminoethyl)-2-methoxy- antimicrobial and antifungal.
41. 3-(6-Hydroxy-3,7-dimethyl-octa-2,7-dienyl)-4-methoxyphenol: fungicidal and Acetylcholine esterase inhibitor
42. Ingot 12-acetate: Antimicrobial, antiviral.
- 43.5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one,1,1a,1b,4,4a,7a,7b,8,9,9a-decahydro-7b,9,9a-Antiallergic, Antibacterial, Antihistaminic, Antiinflammatory, Hepatoregenerative , Antiulcer.
45. Estra-1,3,5(10),7-tetraen-17-one, 3-[(trimethylsilyl)oxy]- Not known.
46. Yohimbic Acid: acidifier, Arachidonic acid Inhibitor, Increase Aromatic Amino acid decarboxylase activity,
47. 2(3H)-Furanone, dihydro-3,4-bis[(4-hydroxy-3-methoxyphenyl)methyl]-, (3R-trans)- anticancer.
48. 3-Benzofuranmethanol, 2,3-dihydro-2-(4-hydroxy-3-methoxyphenyl)-5-(3-hydroxy-1-propenyl)-7-methoxy- Antimicrobial and antifungal
49. 12-Oxatricyclo[4.4.3.0(1,6)]tridecane-3,11-dione : Anticancer.
52. Fluoranthene, hexadecahydro- Not known
53. Naphtho[2,3-c]furan-1(3H)-one, 3a,4,9,9a-tetrahydro-6-hydroxy-4-(4-hydroxy-3-methoxyphenyl)-7-methoxy-, [3aR-(3a,4,9a)]- Antibacterial, anti-inflammatory.
54. 5,12d-Ethano(furo[2,3,4-mn]oxepino[2,3,4-ed]anthracen-2-on-9,12-diol)-, 6-methyl-2a,3,4,4a,5,6,7,8a-octahydro-Oncostatic, % alpha reductase inhibitor, ACE inhibitor, ACTHgenic, Adrenergic, Adreno receptor antagonist
55. Dihydropleurotin: antiarthritic

56. 1-Heptatriacotanol: antibacterial Lupeol: Anticancer, antiprotozoal, chemopreventive and anti-inflammatory properties, Antimalarial Antiflu, Antiviral, antiprotozoal, Antioxidant, Anti inflammatory, Antiperoxidant, Antitumor, anti inflammatory and anti cancer.

58. Formic acid, 3, 7, 11-trimethyl-1, 6, 10-dodecatrien-3-yl ester: Antimicrobial and anti fungal.

Conclusions

The above results indicate that some of the biomolecules that are indicated to be present in the GC MS analysis results such as Heptanediamide, N,N'-di-benzoyloxy- Benzoic acid, Phenol, 2-methoxy-4-(1-propenyl), Eugenol, Tetradecanoic acid, 3-Decanone, 1-(4-hydroxy-3-methoxyphenyl)-(Gingerol), Abietic acid, 3-(6-Hydroxy-3,7-dimethyl-octa-2,7-dienyl)-4-methoxyphenol, 5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one, 1,1a,1b,4,4a,7a,7b, 8,9,9a-decahydro-7b,9,9a-, Naphtho[2,3-c]furan-1(3H)-one, 3a,4,9,9a-tetrahydro-6-hydroxy-4-(4-hydroxy-3-methoxyphenyl)-7-methoxy-, [3aR-(3aà,4à,9aá)]- and Lupeol have anti-inflammatory and analgesics activities along with others properties.

Thus the results indicate that the three constituents of Sahacharadi kashayam have similar activities as that of the main kashayam. Thus there seems to be a synergy among the three constituents.

The name Sahachara plant has been shown to indicate plants which are botanically different. There is a need to scientifically verify as to which of these plants really represent Sahacahra. In Ayurveda there are many such examples where two different plants are represented by the same name causing confusion. For example Shankhpushpi is represented as *Clitoria ternate* in some medicines whereas in others it is *Convolvulus pluricaulis*. Thus there is an urgent need to thoroughly validate and standardize these Ayurvedic data in the light of modern medical standards.

Conflict of Interest: The authors do not have any conflict of interest.

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