

“THE GC MS STUDY OF ONE DIGESTIVE AYURVEDIC POWDER, ELADI CHURNAM”

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ABSTRACT

The present study is to subject a digestive Ayurvedic powder, Eladichurnam to GC MS analysis. Eladichurnam was procured from standard Ayurvedic vendor at Chennai, India was subjected to GC MS analysis after processing it following standard procedure. The GCMS profile indicated the presence of some medicinally important biomolecules such as, Caryophyllene, Thunbergol, Sulfurous acid, butyl heptadecyl ester, Behenic alcohol, Oleyl alcohol, trifluoroacetate, cis-1-Chloro-9-octadecene, .beta.-Amyrin, Octatriacontylpentafluoropropionate, 4,4,6a,6b,8a,11,11,14b-Octamethyl-, 1,4,4a,5,6,6a,6b,7,8,8a,9,10,11,12,12a,14,14a,14boctadecahydro-2H-picen-3-one and Betulin. These molecules have wide range of medicinal roles as shown Table 1 indicating the participation in addressing skin disorders for which Eladichurnam is prescribed. From the results it is clear that Eladichurnam contains some important biomolecules which helps this medicine as a digestive formulation.

Key words: GC MS, EladiChurnam, Ayurvedic, Caryophyllene, Thunbergol, Sulfurous acid, Butyl heptadecyl ester, Behenic alcohol

INTRODUCTION

There is an imperative need to understand the molecular mechanism of action of alternative medicinal forms such as Ayurveda, Sidhhaand Unani, since this knowledge can pave way to better medical system, particularly in the present scenario of worldwide health issues like COVID-19 etc. GC MS is one such technique to find the types of biomolecules present in these medicines, since these are not single molecular drugs. The synergy of various molecules play a better and effective role compared to single or combinational therapies of modern medicine. Some work in this direction has been reported and it is still a long way to go. (1-25).

The present work is one more report in this direction. The GC MS analysis of one Ayurvedicdigestive powder known as Eladichurnam was done and the results are analysed.

This churnam finds its reference in the Ayurvedic treatise, Astangahrudayam in which as many as 27 different constituents are powdered and mixed in equal quantities to make this powder. There is another churnam with the same name, which finds its reference in another Ayurvedictreatise, Sahasrayogam, which is also a digestive powder. Half to one spoon of this powder is mixed with

butter milk and taken along with butter milk before or after food or as directed by the physician. This medicine contains the following constituents.

Ela(*Elettariacadamomum*), Sukshmaela(Small*Elettariacadamomum*), Turushka (*Boswellia serrate*), Kusta (*Saussurealappa*), Phalini (*Callicarpamicrophylla*), Jatamamsi (*Nardostachysjatamansi*), jala(Netrabala: *Pavoniaodorata*), Dyamaka(Sugandhitrina : *Cymbopogonmartinii*), Sprikk (*Delphinium zalil*Aitch et. Hemsl.), Kacchora (Karchura:*Curcuma zedoaria*, Chocha (Dalchini:*Cinnamomumzeylanicum*), Patra(*Cinnamomumtamala*), Tagara (*Valerian wallichii*), Sthouneya (*Leonotisnepetifolia* (L.)R.Br.), Jatisara or Jatiphala (*Myristicafragrans*), Sukti (muktasukti: the bhasma made of pearl oyster, Vyagranaka (*Euphorbia neriifolia*), Suahya, Agar (Aquillariaagallocha), Srivasaka (Gum from *Acacia*), Kumkuma (*Crocus sativus*), Chandana(*Santalum album*), Guggulu (*Commiphoramukul*), Devadaru(*Cedrusdeodara*), Khapura (*Areca catechu*), Punnaga(*Calophylluminophyllum*) and Nagakesara(*Mesuaferrea* L).

MATERIALS AND METHODS

Eladi churnam 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 sample 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 consisted of DB5 MS (30mm×0.25mm 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 1ml/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 10min) fragments from 45 to 450 Da. Total GC running time is 32.02 min. The compounds are identified by GC-MS Library (NIST & WILEY).

RESULTS

Qualitative Compound Report

Data File	220620030.D	Sample Name	Eladi churnam
Sample Type		Position	108
Acq Method	GC Screening Method.M	Acquired Time	24-06-2020 PM 03:51:42
Comment			

User Chromatogram

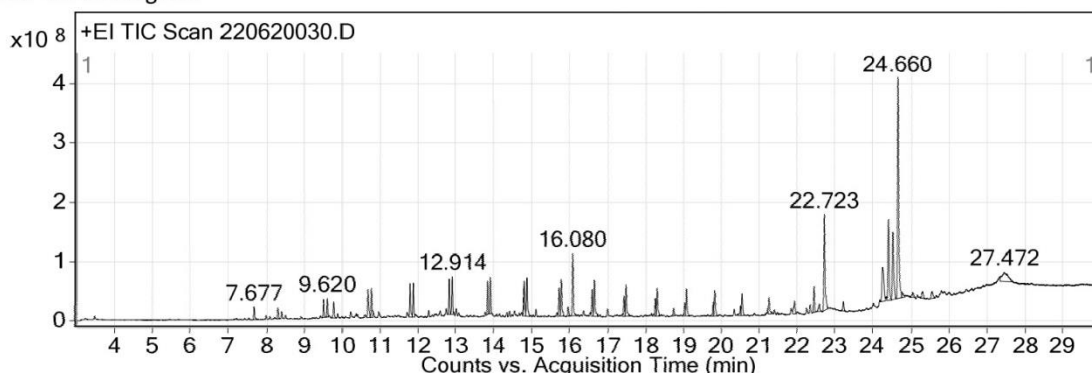


Figure 1. Indicates the GC MS profile of EladiChurnam

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 EladiChurnam.

Sl. No	Retention Time	Compound Name	Mol. Formula	Mol. Weight	% Peak Area	Possible medical Role
1	7.68	3-Carene	C ₁₀ H ₁₆	136.1	3.01	Not known
2	8.31	Caryophyllene	C ₁₅ H ₂₄	204.2	2.58	Nitric oxide synthase inhibitor
3	9.52	1-Nonylcycloheptane	C ₁₆ H ₃₂	224.3	3.76	Not known
4	9.79	1,4-Methano-1H-indene, octahydro-4-methyl-8-methylene-7-(1-methylethyl)-, [1S-(1.alpha.,3a.beta.,4.alpha.,7.alpha.,7a.beta.)]-	C ₁₅ H ₂₄	204.2	3.93	Not known
5	15.72	5-Eicosene, (E)-	C ₂₀ H ₄₀	280.3	6.66	Not known
6	15.78	Dodecane, 1-fluoro-	C ₁₂ H ₂₅ F	188.2	12.40	Not known
7	15.96	Thunbergol	C ₂₀ H ₃₄ O	290.3	2.22	Antibacterial
8	17.50	Sulfurous acid, butyl heptadecyl ester	C ₂₁ H ₄₄ O ₃ S	376.3	12.36	Acidifier, arachidonic acid inhibitor, increase aromatic amino acid decarboxylase activity, inhibit the

						production of uric acid
9	18.74	11,13-Dimethyl-12-tetradecen-1-ol acetate	C18H34O2	282.3	1.95	Oligosaccharide provider
10	19.04	Behenic alcohol	C22H46O	326.4	3.01	Alcohol dehydrogenase inhibitor
11	19.79	Oleyl alcohol, trifluoroacetate	C20H35F3O2	364.3	3.29	Alcohol dehydrogenase inhibitor
12	20.52	cis-1-Chloro-9-octadecene	C18H35Cl	286.2	2.66	Skin protection and respiratory protection
13	20.56	1-Decanol, 2-hexyl-	C16H34O	242.3	10.11	Not known
14	22.45	.beta.-Amyrin	C30H50O	426.4	5.72	17 beta hydroxysteroid dehydrogenase inhibitor, Anti amyloid beta, Anti TGF beta, Beta receptor agonist, Beta adrenergic receptor blocker, beta blocker, beta galactosidase inhibitor, beta glucuronidase inhibitor, ER beta binder
15	22.59	Octatriacontylpentafluoropropionate	C41H77F5O2	696.6	2.40	5 alpha reductase inhibitor, alpha amylase inhibitor, alpha glucosidase inhibitor, Antibacterial, Antioxidant, Potential antiplatelet, Hypoglycemic, Hypolipidemic, Sedative, Hepatoprotective
119	23.23	11,13-Dimethyl-12-tetradecen-1-ol acetate	C18H34O2	282.3	2.37	Oligosaccharide provider
18	24.26	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,6b,7,8,8a,9,10,11,12,12a,14,14a,14boctadecahydro-2H-picen-3-one	C30H48O	424.4	15.12	Adrenergic blocker, antiacromegalic, anti amyloid beta, anticancer, antidote, anticholinergic, Antileukotriene-B4, Anti TGF-beta, Benzodiazepine-Receptor Agonist
19	24.77	Lycoxanthin	C40H56O	552.4	2.11	Not known
20	25.05	4-(cis-2,3,4,trans-6-Tetramethyl-3-cyclohexenyl)butan-2-one 2,4-dinitrophenylhydrazon e	C20H28N4O4	388.2	2.02	Catechol-O-Methyl transferase inhibitor, Decrease Glutamate Oxaloacetate Transaminase, Decrease Glutamate Pyruvate Transaminase, Glucosyl-Transferase-Inhibitor, Glutathione-S-

						Transferase-Inhibitor, Increase Glutathione-S-Transferase (GST) Activity, Increase Glyoxalate transamination, Reverse-Transcriptase-Inhibitor
21	25.32	Betulin	C ₃₀ H ₅₀ O ₂	442.4	2.33	It has a role as a metabolite, an antiviral agent, an analgesic, an anti-inflammatory agent and an antineoplastic agent

The GC MS profile of Eladichurnam is represented in Figure 1. Table1 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 Eladichurnam. 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. (26)

DISCUSSION

From Table 1 the molecules present in the GC MS profile of Eladichrunam were Caryophyllene, Thunbergol, Sulfurous acid, butyl heptadecyl ester, Behenic alcohol, Oleyl alcohol, trifluoroacetate, cis-1-Chloro-9-octadecene, .beta.-Amyrin, Octatriacontylpentafluoropropionate, 4,4,6a,6b,8a,11,11,14b-Octamethyl-, 1,4,4a,5,6,6a,6b,7,8,8a,9,10,11,12,12a,14,14a,14boctadecahydro-2H-picen-3-one and Betulin. These molecules have wide range of medicinal roles as shown Table 1 indicating there participation in addressing digestive disorders for which Eladichurnam is prescribed.

The GC MS pattern of a similar medicine, EladiKerathailam (in oil form) used for skin problems, in which some of the ingredients of Eladichurnam were present as reported by Kumar *et al*, 2019. (27)The GC MS patternEladikerathailam indicated the presence of molecules such as Dodecanoic acid, 2,3-dihydroxypropyl ester, Dodecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester, Octadecanoic acid, 2,3-dihydroxypropyl ester and Dodecanoic acid, 1,2 3-propanetriyl ester whereas in EladiChurnam the molecules present are quite different. Thus although both medicines have some common ingredients their roles are different.

CONCLUSION

From the above discussion it is clear that Eladichurnam does contain some important bio molecules which help digestion.

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