Research Article

The GC MS Analysis Study of One Ayurvedic Medicine "Ajaswagandhadi Lehyam"

Cynthia Shankari[1], Vathsala Venkatesan[2], Mudiganti Ram Krishna Rao[3], Saravanan[4], K Prabhu[5], Seppan Prakash[6]

[1]Lecturer, Dept. of Anatomy, C. S. I. College of Dental Sciences and Research, Bharath University, Chennai, Tamil Nadu, India.
[2]Professor, Dept. of Anatomy, Sree Balajee Medical College and Hospital, Chennai, Tamil Nadu, India.
[3]Professor, Dept. of Industrial Biotechnology, Bharath University, Chennai, Tamil Nadu, India.
[4]Head In-Charge, Dept. of Anatomy, C. S. I College of Dental Sciences and Research, Madurai, India.
[5]Associate Professor, Dept of Anatomy, Sree Balaji Medical College & Hospital, Chennai, Tamil Nadu, India.
[6]Associate Professor, Dept. of Anatomy, Dr. A. L. M. Post Graduate I B M S, University of Madras, Chennai, Tamil Nadu, India.
***Corresponding author's E-mail:** mrkrao1455@gmail.com

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ABSTRACT

Ajaswagandhadi lehyam is a ayurvedic paste made up of nine plants and the flesh of goat. This lehyam is used as aphrodisiac, muscle strengthener, food supplement and for improving digestive and respiratory health. The present study deals with GC MS analysis of this medicine to know the bio molecules present. It was found that some very important bio molecules with medicinal activities like 16-Hexadecanoyl hydrazide, Myristic acid vinyl ester, 1, 4-Dioxin, 2,3-dihydro-5,6-dimethyl, Benzoic acid, 5-Hydroxymethylfurfural, (3-Ethoxy-4, 5-dihydro-isoxazol-5-ylmethyl)- amine, Sucrose, 3-Deoxy-d-mannoic lactone, Tetradecanoic acid, n-Hexadecanoic acid, Dodecanoic acid, trans-13-Octadecanoic acid along with some minor compounds such as Disparlure. This report is the initial level of understanding the types of bio molecules present in Ajaswagandhadi lehyam and further work is in progress to find out the medicinal efficacy by other standard methods.

Keywords: Ajaswagandhadi Lehyam, GC MS, Myristic acid vinyl ester, 16-Hexadecanoyl hydrazide, Sucrose, 5-Hydroxymethylfurfural.

INTRODUCTION

Ajaswagandhadi Lehyam is an Ayurvedic preparation in paste form used as aphrodisiac, muscle strengthener for body building as supplement and relieves tiredness, to keep optimum energy levels throughout the day and useful in improving digestive and respiratory health.

It is taken at a dose of 5 - 10 grams once or twice a day before or after food with milk, or as directed by Ayurvedic Doctor. For children below 5 years the dose is 1 -2 grams once or twice a day along with one tea spoon of honey, worm water or milk. For children between 5 – 12 years of age the dose is 5 grams once or twice a day along with a teaspoon of honey, warm water or milk.

Although no side effects are reported it not suitable for diabetics since it contains sugar.

Ajaswagandhadi Lehyam – Ajaswagandha lehyam is prepared form the following ingredients.

Ashwagandha *(Withania somnifera)*

Atmagupta *(Mucuna pruriens)*

Lavanga (Clove) *Syzigium aromaticum*

Nagakesara (*Mesua ferrea)*

Salaimisri (*Orchis latifolia)*

Ela, Clove (*Elettaria cardamomum*)

Cinnamon, Twak (*Cinnamomum zeylanicum)*

Yastimadhu (*Glycyrrhiza glabra)*

Jati (*Myristica fragrans)*

Ajamamsam. (Meat of Goat).

This medicine is manufactured by Arya Vaidya Sala, Kottakkal.

The medicinal roles of each of the constituents of Ajaswagandhadi Lehyam are described hereunder.

Ashwagandha – Winter cherry/ Indian Ginseng (root) – Withania somnifera (L.) Dunal

This plant has medicinal values such as powerful immuno-modulator, aphrodisiac, antitumor, anti-inflammatory, anti stress, antioxidant, sleep inducing, effective in memory related conditions, insomnia, hemopoetic effect on CNS and cardiopulmonary systems (Uddin).[1]

The phytoconstituents present in this plant like Withanoside IV or VI produced dendritic outgrowth in normal cortical neurons of isolated rat cells, whereas axonal outgrowth was observed in the treatment with withanolide A in normal cortical neurons (Tohda).[2]

The crude extract of the plant containing the steroidal substances sitoinodosides VII–X and withaferin A augmented learning acquisition and memory in both young and old rats (Ghoshal).[3]

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Atmagupta *(Mucuna pruriens)*

Mucuna pruriens is one of the popular medicinal plants of India and is a constituent of more than 200 indigenous drug formulations. It is widespread over most parts of the subcontinent and is found in bushes and hedges. This is a dry deciduous plant. All parts of the plant posses valuable medicinal properties and there is a heavy demand of this plant in Indian drug market. Seeds of *Mucuna prurirns* are known to produce the unusual non protein amino acid 3(3,4-Dihydrophenyl)-l-alanine(L-Dopa), a potent neuro transmission precursor, i.e. at least in part, believed to be responsible for the toxicity of *Mucuna pruriens* seed. L-Dopa, a potentially neurotoxic agent is used in the treatment of Parkinson's disease, is found in relatively large amounts in *Mucuna pruriens* seeds (Bell and Janzen ; Daxenbichler ; Katzenschlager).[4-6] It is also known that different parts of the plant are used for the management of several free radical mediated diseases, such as rheumatoid arthritis, diabetes, arthrosclerosis, male infertility and nervous disorders in Ayurvedic system of medicine (Kumar and Muthu, 2010; Tripathi and Upadhayay, 2002).[7,8] Suresh have reported the anti oxidant properties of *M. pruriens.* It is also said to be good aphrodisiac and a good nerve tonic.[9] It is used to treat spermatorrhea and diseases of urino-genital system. The anti inflammatory, anti diabetic and anti bacterial activities of *Mucuna pruriens* was reported by Bala and Debnath, 2011.[10]

Lavanga – Clove – Syzigium aromaticum

Cloves are rich source of phenolic compounds like eugenol and gallic acid, which have medicinal properties such as antioxidant, antimicrobial, antiviral and cytotoxic (Gulcin).[11]

Nagakesara (Mesua ferrea L.)

This medicinal role of this plant was reviewed by Chahar.[12] It has medicinal activities like antioxidant and hepato protective (Jayanthi ; Garg), analgesic (Hassan), antispasmodic (Prasad), anti-venom (Uawonggul), cancer chemotherapy (Saxena), Immuno-modulatory (Chahar), anti-neoplastic (Mahavorasirikul), anti-convulsant (Tiwari), anti-inflammatory (Gopalakrishnan), anti-ulcer (Jalalpure) and anti-microbial (Mazumder).[13-24]

Slammisri, Salep Orchid (Orchis mascula L)

This plant is used as a nerve stimulant and invigorating tonic that has long been known for its value in cases of sexual weakness. It has also been tested for cases of nervous debility (Ballah and Chaurasia, 2003).[25] This plant is also reported to have medicinal activities like antihypertensive, antidyslipidemic and endothelial modulating (Aziz).[26]

Ela - Cardamom (Elettaria cardamomum)

Cardamom is another important culinary ingredient used for its characteristic aroma. Apart from the aroma it has medicinal value. Verma have reported blood pressure lowering, fibrinolysis enhancing and antioxidant activities of Cardamom.[27] Khan have shown the pharmacological basis of cardamom as medicine for asthma.[28]

Twak – Cinnamon – Cinnamomum zeylanicum

Almost every part of the cinnamon tree has some medicinal or culinary use. Ranasinghe and Jayaprakasha have reviewed the medicinal properties of Cinnamon.[29,30]

Yashti – Licorice – Glycrrhiza glabra

Glycrrhiza glabra is known for its medicinal properties such as anti-tussive & expectorant, antioxidant and antibacterial, anti-inflammatory, antiviral, memory enhancer, antifungal, antibacterial, anti hyperglycemic, immune stimulatory, hepato protective, anticancer and anticoagulant (Damle, 2014).[31]

Jathikkai - Nutmeg (Myristica fragrans Houtt.)

It is yet another spice used widely in Indian culinary practice for its characteristic fragrance. It has medicinal properties such as, antibacterial, antiviral, anti diabetic and anti leukemic and has mitosis suppressing roles (Chirathaworn ; Akinboro).[32,33] Iyer have reported the medicinal potential of nutmeg.[34]

Ajamamsa (Flesh of Goat)

Flesh of goat is commonly eaten for the protein content which is obvious for body building and strong muscles.

RESULTS AND DISCUSSION

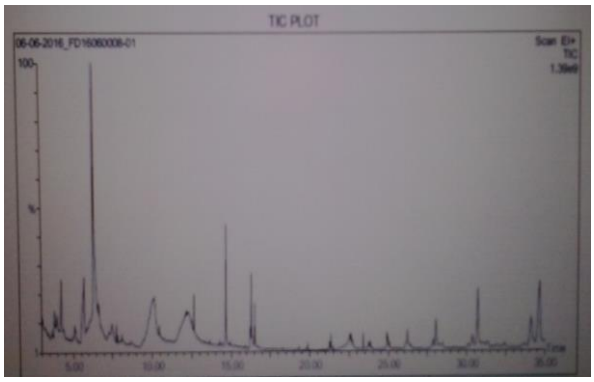

Figure 1: The GC Ms graph of Ajaswagandhadi Lehyam.

From the list above some of the compounds which have shown more peak values are discussed below for their medicinal roles as per earlier reports.

1. 1, 4-Dioxin, 2,3-dihydro-5,6-dimethyl- The s-triazole derivatives possess extensive spectrum of biological activities such as antibacterial, antifungal, anti tubercular, anxiolytic, anticonvulsant, anti-inflammatory, analgesic, anticancer, antioxidant activities (Singh).[35]

2. 2, 5-Dimethyl-4-hydroxy-3(2H)-furanone – Anti allergic and antibacterial (Hi ; Sung).[36,37]

3. Benzoic acid - Benzoic acid is reported to have anticancer properties and benzoic acid derivatives

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possess antibacterial, antifungal properties (Vidhu and Evans, 2015; Terreaux, 1998).[38,39]

4. 5-Hydroxymethylfurfural - It is reported to stop neuron apoptosis (Hai).[40]
5. (3-Ethoxy-4, 5-dihydro-isoxazol-5-ylmethyl)- amine – This coumpond is known for its antimicrobial, antifungal, anti allergic activities(Sharma).[41]
6. Sucrose is a rich energy source.
7. 3-Deoxy-d-mannoic lactone - The compound, 3-Deoxy-d-mannoic lactone has been reported for antibacterial activity (Shobana).[42]
8. Tetradecanoic acid. n-Hexadecanoic acid, Dodecanoic acid, trans-13-Octadecanoic acid are antiinflammatory (Vasudevan), antioxidant, 5-alpha-reductase inhibitor, hemolytic, pesticide.[43]
9. Myristic acid vinyl ester- This compound is used in Cosmetics such as skin care ointments etc.
10. 16-Hexadecanoyl hydrazide - Sulfa drugs are used for treatment of gut infections, conjunctivitis, urinary tract infections, in meningitis, eye lotions, bacillary dysentery, malaria (Vivekanandadasan and Rajangam).[44]

Disparlure- Although present in small quantity this compound, which is a Pheromone could be of some significance as far as the role of Ajaswagandhadi lehyem as strength increasing component.

Table 1: Table indicates the Retention values, peak areas, % peak areas and probable name of the compounds as compared to the standard Chemical library.

S. No.	RT	Area	Area %	Name
1	3.837	8302788	1.09	1, 4-Dioxin, 2, 3-dihydro-5,6-dimethyl-
2	4.000	7825952	1.03	2, 5-Dimethyl-4-hydroxy-3(2H)-furanone
3	4.281	16959068	2.24	Cyclopentane, 1-acetyl-1,2-epoxy-
4	5.103	6078163	0.80	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-
5	5.710	33659984	4.44	Benzoic acid
6	6.340	157215568	20.73	5-Hydroxymethylfurfural
7	6.638	18427372	2.43	1, 2, 3-Propanetriol, 1-acetate
8	6.784	4521974	0.60	1, 2-Ethanediol, monoacetate
9	7.274	4693354	0.62	L-Talose, 6-deoxy-3-C-methyl-2-O-methyl-
10	7.472	14490726	1.91	(3-Ethoxy-4, 5-dihydro-isoxazol-5-ylmethyl)-amine
11	10.133	107127928	14.13	Sucrose
12	10.449	9490302	1.25	Dodecanoic acid
13	12.222	89643240	11.82	3-Deoxy-d-mannoic lactone
14	12.643	15110827	1.99	Tetradecanoic acid
15	14.667	24311534	3.21	n-Hexadecanoic acid
16	16.208	3545374	0.47	11, 14-Eicosadienoic acid, methyl ester
17	16.272	14060170	1.85	trans-13-Octadecenoic acid
18	16.494	6946464	0.92	Octadecanoic acid
19	22.539	12514321	1.65	Octanoic acid, hexadecyl ester
20	22.639	4756834	0.63	Hexadecanoic acid, 2, 3-bis(acetyloxy)propyl ester
21	22.720	3152715	0.42	Butyric acid, 3-pentadecyl ester
22	26.216	8974371	1.18	Vinyl decanoate
23	27.861	3930181	0.52	Vinyl decanoate
24	28.025	14006253	1.85	Dodecanoic acid, ethyl ester
25	28.445	3073424	0.41	Hexadecanoic acid, (3-bromoprop-2-ynyl) ester
26	30.359	6122613	0.81	Disparlure
27	30.680	31332478	4.13	Myristic acid vinyl ester
28	31.327	3810111	0.50	Hexadecanoic acid, 2-(acetyloxy)-1-[(acetyloxy) methyl]ethyl ester
29	34.082	22941482	3.02	Myristic acid vinyl ester
30	34.618	45073720	5.94	16-Hexadecanoyl hydrazide

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The medicinal roles of some of the indicated compounds such as Trans-13-Octadecenoic acid, Vinyl decanoate. Dodecanoic acid ethyl ester, 1, 2, 3-Propanetriol, 1-acetate, Cyclopentane, 1-acetyl-1, 2-epoxy- are not reported.

The medicinal activities of Ajaswagandhadi lehyam and those of its possible ingredients as indicated above do not indicate similarity.

It has to be ascertained whether all the above compounds act synergistically to work as that of Ajaswagandhadi lehyam.

Further work is being carried out to prove its efficacy.

CONCLUSION

The GC MS pattern of Ajaswagandhadi lehyam shows some very important bio molecules with medicinal activities like 16-Hexadecanoyl hydrazide, Myristic acid vinyl ester, 1, 4-Dioxin, 2,3-dihydro-5,6-dimethyl, Benzoic acid, 5-Hydroxymethylfurfural, (3-Ethoxy-4, 5-dihydro-isoxazol-5-ylmethyl)- amine, Sucrose, 3-Deoxy-d-mannoic lactone, Tetradecanoic acid, n-Hexadecanoic acid, Dodecanoic acid, trans-13-Octadecanoic acid etc. Further work is warranted to prove the medicinal efficacy of Ajaswagandhadi lehyam to know find whether any synergistic effect exists among these major bio molecules along with other smaller fractions that are present in the GC MS profile.

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