The GC MS Analysis Study of One Ayurvedic Medicine “Ajaswagandhadi Lehyam”

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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-manno 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, warm 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 latfolia)
- Ela, Clove (Elettaria cardamomum)
- Cinnamon, Twak (Cinnamomum zeylanicum)

Yastimadhu (Glycyrhiza glabra)
Jati (Myristica fragrans)
Ajamamssam. (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, anti-tumor, 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 sitoindosides VII-X and withaferin A augmented learning acquisition and memory in both young and old rats (Ghoshal).³
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 pruriens* 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 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). 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, arthrosisclerosis, male infertility and nervous disorders in Ayurvedic system of medicine (Kumar and Muthu, 2010; Tripathi and Upadhyay, 2002). Suresh has reported the anti oxidant properties of *M. pruriens*. It is also said to be good aphrodisiac and a good nerve tonic. 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.

Lavanga – Clove – Syzygium 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).

Nagakesara (Mesua ferrea L.)

This medicinal role of this plant was reviewed by Chahar. 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).

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). This plant is also reported to have medicinal activities like antihypertensive, antidysepidemic and endothelial modulating (Azia).

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. Khan have shown the pharmacological basis of cardamom as medicine for asthma.

Twak – Cinnamon – Cinnamonum zeylanicum

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

Yashti – Licorice – Glycyrrhiza glabra

*Glycyrrhiza 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).

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). Iyer have reported the medicinal potential of nutmeg.

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 Ajaswagandhi Lehym.

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).

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

3. **Benzoic acid -** Benzoic acid is reported to have anticancer properties and benzoic acid derivatives
possess antibacterial, antifungal properties (Vidhu and Evans, 2015; Terreaux, 1998).\textsuperscript{38,39}  
4. 5-Hydroxymethylfurfural - It is reported to stop neuron apoptosis (Hai).\textsuperscript{40}  
5. (3-Ethoxy-4, 5-dihydro-isoaxazol-5-ylmethyl)- amine – This compound is known for its antimicrobial, antifungal, anti allergic activities(Sharma).\textsuperscript{31}  
6. Sucrose is a rich energy source.  
7. 3-Deoxy-d-manno lactone - The compound, 3-Deoxy-d-manno lactone has been reported for antibacterial activity (Shobana).\textsuperscript{42}  
8. Tetradecanoic acid. n-Hexadecanoic acid, Dodecanoic acid, trans-13-Octadecanoic acid are antiinflammator (Vasudevan), antioxidant, 5-alpha-reductase inhibitor, hemolytic, pesticide.\textsuperscript{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).\textsuperscript{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 lehym 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.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>RT</th>
<th>Area</th>
<th>Area %</th>
<th>Name</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>3.837</td>
<td>8302788</td>
<td>1.09</td>
<td>1, 4-Dioxin, 2, 3-dihydro-5,6-dimethyl-</td>
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<td>2</td>
<td>4.000</td>
<td>7825952</td>
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<td>2, 5-Dimethyl-4-hydroxy-3(2H)-furanone</td>
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<td>3</td>
<td>4.281</td>
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<td>2.24</td>
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<td>4</td>
<td>5.103</td>
<td>6078163</td>
<td>0.80</td>
<td>4H-Pyrano-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-</td>
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<td>5</td>
<td>5.710</td>
<td>3365984</td>
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<td>6</td>
<td>6.340</td>
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<tr>
<td>7</td>
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<td>18423772</td>
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<td>1, 2, 3-Propanetriol, 1-acetate</td>
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<td>4521974</td>
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<td>L-Talose, 6-deoxy-3-C-methyl-2-O-methyl-</td>
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<tr>
<td>10</td>
<td>7.472</td>
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<td>1.91</td>
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<tr>
<td>11</td>
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<td>107127928</td>
<td>14.13</td>
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<td>16</td>
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<td>17</td>
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<td>30</td>
<td>34.618</td>
<td>45073720</td>
<td>5.94</td>
<td>16-Hexadecanoyl hydrazide</td>
</tr>
</tbody>
</table>
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-isooxazol-5-ylmethyl)- amine, Sucrose, 3-Deoxy-d-mannono 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 whether any synergistic effect exists among these major bio molecules along with other smaller fractions that are present in the GC MS profile.

REFERENCES


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