



**GC-MS PROFILING OF CLASSICAL SIDDHA DISTILLATE *INJI DRAVAGAM***

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**ABSTRACT**

**Background:** *Yacob Vaidhya Cinthamani* is a classical siddha work which mentions several herbal distillates for a wide range of clinical conditions. The medicine which is prepared through distillation is termed as Theeneer or Dravagam in Siddha system. Inji Dravagam is a formulation prepared with fresh ginger juice and Ajowan seeds mainly given for gastro intestinal problems. Since research work in Theeneer medicines are limited but very crucial for its validity, the distillate is prepared with reference to the classical siddha texts and further carried out GC-MS studies to understand the biological picture of the drug. **Aim and Objectives:** To validate the efficacy of Inji Dravagam with GC-MS supportive studies. **Materials and Methods:** The distillate with the reference to the classical texts were selected and prepared as per the standard procedures. The sample was studied with GC-MS. **Results and Conclusion:** *Inji Dravagam* was colorless with pleasant aroma and pungent taste. The Gas chromatogram of *Inji Dravagam* revealed 15 prominent peaks with retention time ranging from 3.6 to 47.8. The predominant compounds belong to the class of fatty acid esters reported through GC-MS which have labeled pharmacological profile as a health promoter. The compounds may work in a synergistic mode for the intended broad spectrum activity of the drug to be used in a wide range of medical conditions. The clinical importance of Inji Dravagam as a rejuvenative is well supported with this preliminary studies. Apart from the indications mentioned in the siddha texts, the drug may possess significant Anti oxidant effects and cardio protective role on the basis of presence of these biocompounds.

**KEYWORDS:** *Yacob Vaidhya Cinthamani*, Theeneer, *Inji Dravagam*, GC-MS.

**I. INTRODUCTION**

Herbal distillates are the pioneer medicines in siddha system meant for its neutraceutical and curative potential.<sup>[1]</sup> Hundreds of raw drugs are being utilized specific for each medical condition. Various parts including leaves, flowers, seeds, bark, roots, root bark, stem bark, hard wood of primarily raw drugs belonging to Aromatic spices or herbs were efficiently used to yield high quality distillates. The raw drugs are purified, pounded well, macerated with water over a period before initiating a distillation process in case of dried herbs. Fresh herbal parts are pounded well for extracting juice or either macerated with water. For distilling fruits with higher water content, the material is directly charged in the still without adding water. Ginger (*Zingiber officinale*) is a common raw drug which is either used as fresh or dry form called Chukku. Both are widely used in the manufacture of distillates. Fresh ginger is acclaimed for its Carminative, stomachic and digestive property and used extensively in siddha medicine for emesis, phlegmatic disorders, cough, bilious diseases, rheumatic

pain, diarrhea due to indigestion etc.<sup>[2]</sup> So many distillate formulations are available in which the juice of fresh ginger is used a medium for distilling apart from water.<sup>[3]</sup>

*Inji Dravagam*,<sup>[3]</sup> the distillate prepared from fresh ginger juice and Ajwain seeds is a fine *siddha* traditional formula popular as a digestive tonic. Moreover the distillate is indicated for Vitiated *vayu* conditions (Gaseous disturbances including flatulence, colonic spasms, Abdominal distensions, heaviness, belching etc) and *Gunnam* (Gastro intestinal ailments). The GC-MS study on the drug was intended to understand the bioactive profile of the distillate and to validate its health potential.

**II. MATERIAL AND METHODS**

**A. Ingredient Details**

Fresh Ginger (*Zingiber officinale*) and Ajwain seeds (*Carum copticum*)

### B. Method of Preparation of Distillate Sample (Fig. 1)<sup>[3]</sup>

Outer skin of fresh ginger was removed and juice extracted. For the quantity of 1 litre juice 100 grams of

ajwain seeds were added and charged in a traditional distillation still. The distillate collected was preserved for GC-MS studies.



### C. Gas Chromatography- Mass Spectrometry (GC-MS)<sup>[4]</sup>

GC-MS analysis of the distillate was performed with Agilent 7890B GC connected to 5977A MSD along with NIST Ver.2.1 MS data library Specification.

### III. RESULTS

*Inji Dravagam* was colorless with pleasant aroma and pungent taste.

III. a GC- MS reports of *Vasambu Dravagam* (Fig 2, Table . 1)

The Gas chromatogram of *Inji Dravagam* revealed 15 prominent peaks with retention time ranging from 3.6 to 47.8. The detailed report of the compounds retention time (RT), Peak intensity rank, Molecular weight, name, chemical formula chemical structure and its pharmacological activities were presented in Fig 2 & 3, Table. 1 & 2.

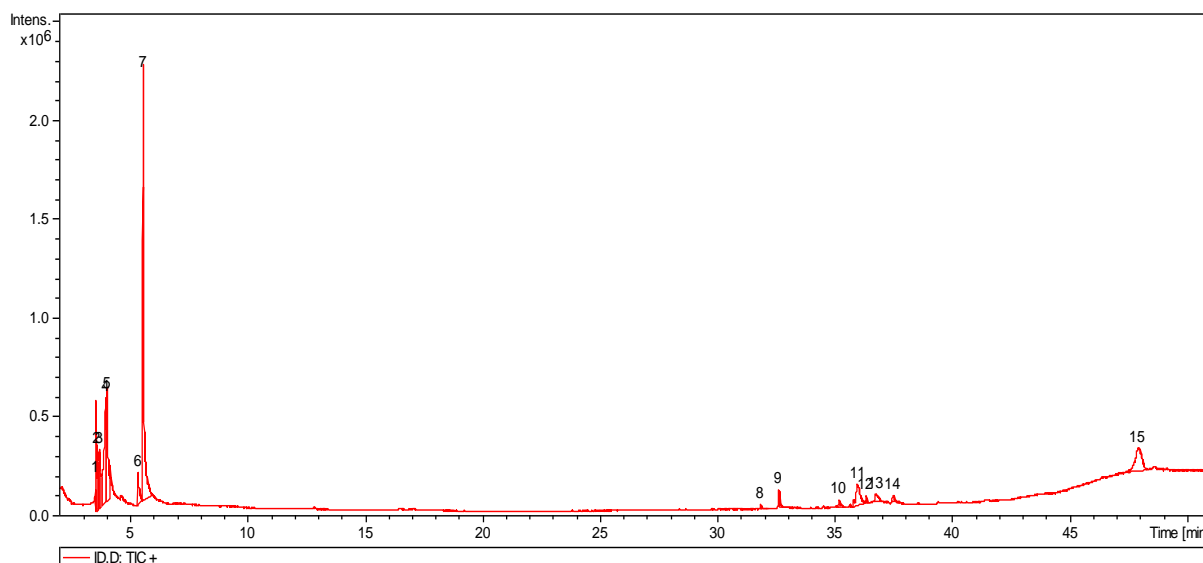
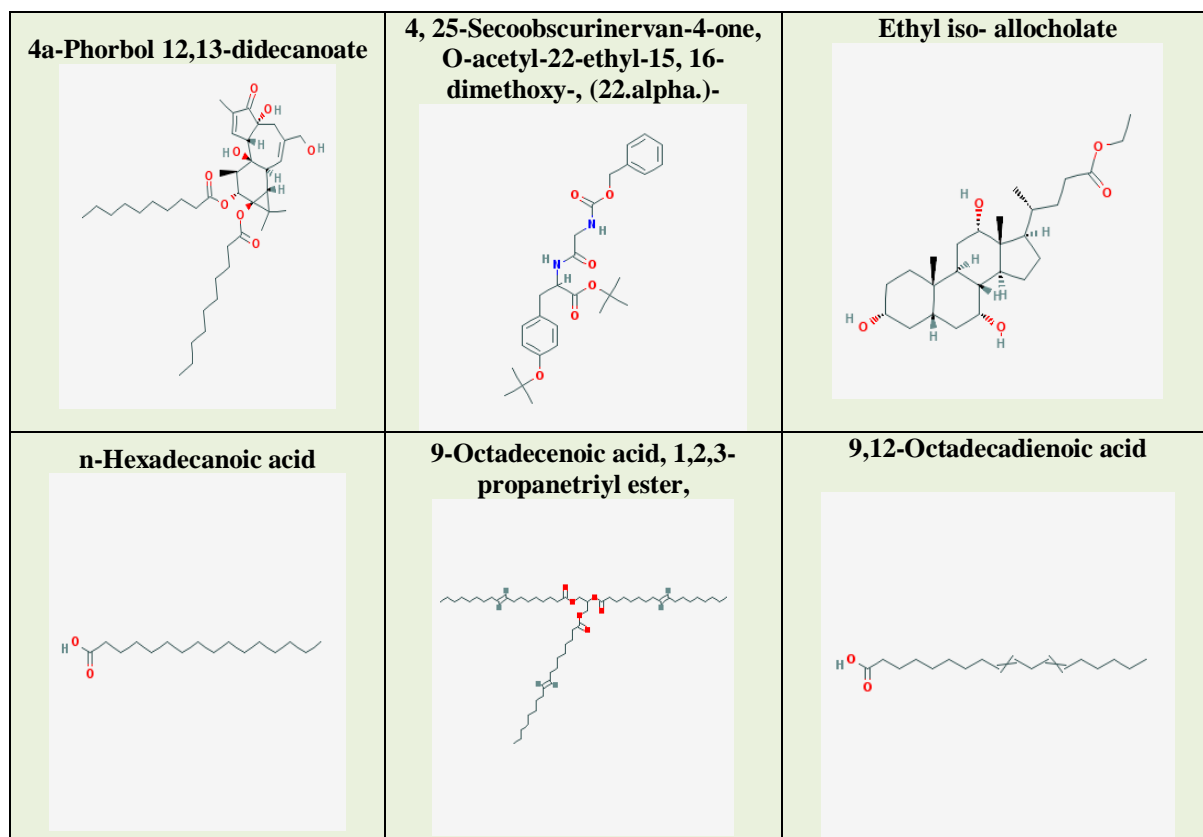


Table 1: GCMS Report of *Inji Dravagam*.

Peak no	Retention Time	Peak Intensity Rank	Mol. Wt	Name of the Compound	Chemical Formula
1	3.6	14	672	4a-Phorbol 12,13-didecanoate	C <sub>40</sub> H <sub>64</sub> O <sub>8</sub>
2	3.7	6	484	4, 25-Secoobscurinervan-4-one, O-acetyl-22-ethyl-15,16-dimethoxy-, (22.alpha.)-	C <sub>27</sub> H <sub>36</sub> N <sub>2</sub> O <sub>6</sub>
3	3.8	7	436	Ethyl iso- allochololate	C <sub>26</sub> H <sub>44</sub> O <sub>5</sub>
4	4	2	444	9-Octadecenoic acid, (2-phenyl-1,3-dioxolan-4-yl)methyl ester, cis-	C <sub>28</sub> H <sub>44</sub> O <sub>4</sub>
5	4.1	4	884	9-Octadecenoic acid, 1,2,3-propanetriyl ester, (E,E,E)-	C <sub>57</sub> H <sub>104</sub> O <sub>6</sub>
6	31.8	15	374	Cyclopropanebutanoic acid, 2-[[[2-[(2-pentylcyclopropyl) methyl] cyclopropyl]methyl]cyclopropyl]methyl]-, methyl ester	C <sub>25</sub> H <sub>42</sub> O <sub>2</sub>
7	32.6	10	256	n-Hexadecanoic acid	C <sub>16</sub> H <sub>32</sub> O <sub>2</sub>
8	35.1	12	562	Oleic acid, eicosyl ester	C <sub>38</sub> H <sub>74</sub> O <sub>2</sub>
9	35.9	5	280	9,12-Octadecadienoic acid (Z,Z)-	C <sub>18</sub> H <sub>32</sub> O <sub>2</sub>
10	36.3	13	624	Octadecanoic acid, 2-hydroxy-1,3-propanediyl ester	C <sub>39</sub> H <sub>76</sub> O <sub>5</sub>
11	36.7	9	280	9,12-Octadecadienoic acid (Z,Z)-	C <sub>18</sub> H <sub>32</sub> O <sub>2</sub>
12	37.4	11	352	9,12,15-Octadecatrienoic acid, 2,3-dihydroxypropyl ester, (Z,Z,Z)-	C <sub>21</sub> H <sub>36</sub> O <sub>4</sub>
13	47.8	3	528	Dodecanoic acid, 1a, 2, 5, 5a, 6, 9, 10,10a-octahydro-5a-hydroxy-4-(hydroxymethyl)-1,1,7,9-tetramethyl -6,11 -dioxo-1H-2,8a-methanocyclopenta[a] cyclopropa [e]cyclodecen-5-yl ester, [1aR-(1a.alpha.,2.alpha.,5.beta.,5a.beta.,8a.alpha. 9.alpha., 10a.alpha.)	C <sub>32</sub> H <sub>48</sub> O <sub>6</sub>



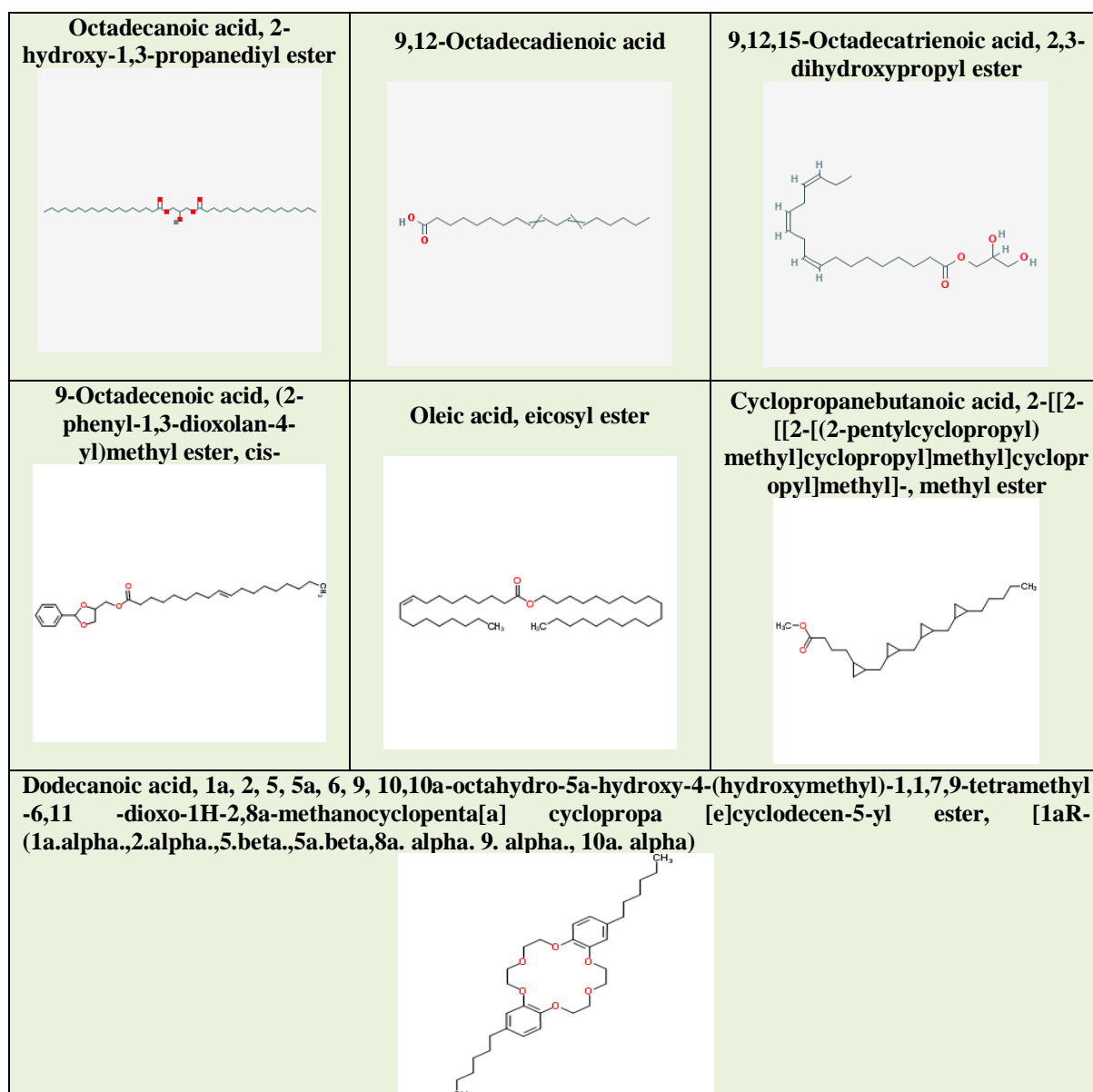


Fig. 3 Chemical structure of Bio active compounds – *Inji Dravagam* spotted through GC-MS.

Table. 2 Pharmacological significance of compounds spotted in <i>Inji Dravagam</i> <sup>[5-21]</sup>		
Compounds	Category	Activity
Ethyl iso-allocholate	Steroid derivative	Anti oxidant Anti Inflammatory Antimicrobial
Octadecenoic acid	Fatty acid ester	Vaso relaxant Anti spasmodic
Hexadecanoic acid (Palmitic acid)	Fatty acid ester	Anti oxidant Hypocholesteremic Antifibrinolytic Anti microbial
9,12-Octadecadienoic acid (Z,Z) (Linoleic acid)	Poly Unsaturated Fatty Acid	Anti anaphylactic Anti arteriosclerotic Anti arthritic Anti Cancer Anti Dyslipedemic. Ant eczemic Antifibrinolytic Anti Histaminic

		Anti Obesity
9,12,15-octadecatrienoic acid-2,3-dihydroxy propyl ester	Alpha Linolenic acid	Antimicrobial Anti-inflammatory, Anticancer
Oleic acid		Anti- Atherogenic Anti- inflammatory Immuno modulator Anti Tumor Hypotensive Hypocholesterolemic Immuno modulator Percutaneostimulant

#### IV. DISCUSSION

*Inji Dravagam* is a classical siddha herbal distillate formulation given for gastro intestinal ailments. With Gas Chromatography studies the bio molecular picture of the distillate has been screened for further validating its therapeutic potential. Most of the compounds belonging to the fatty acid class reported through GC-MS have labeled pharmacological profile as a health promoter. The compounds may work in a synergistic mode for the broad spectrum activity of the drug in a wide range of medical conditions.

#### V. CONCLUSION

The clinical importance of *Inji Dravagam* as a rejuvenative is well supported with this preliminary studies. The drug may possess significant Anti oxidant effects and cardio protective role on the basis of presence of these biocompounds.

Theeneer (Herbal Distillates) is a reservoir of Bio active principles. The entire screening of the distillate is still a challenging part to a researcher. The elements which decide the drug outcome may or may not be screened in the studies. An approximate profile will be appreciable with the present analytical methods. More repetitive and consecutive sample preparation and studies enables a greater outlook on the biopicture of this wonderful formulation.

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