



**GAS CHROMATOGRAPHIC- MASS SPECTROMETRIC ANALYSIS OF MENSTROSAP- AN AYURVEDIC PROPRIETARY MEDICINE FOR DYSMENORRHEA**

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**ABSTRACT:**

Primary dysmenorrhea is a lower abdominal pain occurring during the menstrual cycle which is not associated with other diseases or pathology. It hinders the day-to-day activities of women. Treatment of primary dysmenorrhea aims to relieve pain and other symptoms. Menstrosap is an Ayurvedic proprietary medicine manufactured by Sitaram Ayurveda Private Ltd. Thrissur for dysmenorrhea. The medicine is a combination of *Sapthasaram Kashayam* (decoction), *Hinguvachadi Choornam* (powder), Sesame oil and Ricinus oil. Knowledge of bio- medical compounds in the product is mandatory to explain the scientific mode of action of the drug. Gas Chromatographic- Mass Spectrometric analysis was done to reveal the compounds present in the drug. This type of study is the need of the hour for better scientific validation. GC-MS revealed nine compounds that explain scientifically the mode of action of the drug. Compounds identified are omega 7 fatty acid and anti- inflammatory compounds. Presence of these compounds in Menstrosap helps to reduce the symptoms of dysmenorrhea.

**Keywords:** Dysmenorrhea, Menstrosap, Gas Chromatographic – Mass Spectrometric Analysis

## INTRODUCTION

Dysmenorrhea is throbbing or cramping pain, pain that radiates to lower back and thighs occurring in the lower abdomen before or during the menstrual period. Studies suggest that the prevalence of dysmenorrhea is 70.2% in India [1].

Dysmenorrhea can be classified as primary and secondary dysmenorrhea. Primary dysmenorrhea is a lower abdominal pain happening during the menstrual cycle which is not associated with other diseases or pathology. Secondary dysmenorrhea is associated with other pathology inside or outside the uterus [2]. Both primary and secondary dysmenorrhea leads to a significant negative impact on a patient's quality of life [3]. Primary dysmenorrhea is correlated with *Udavarthini Yonivyapad* (dysmenorrhea) in Ayurveda [4].

*Sapthasaram kashayam* (decoction) and *Hinguvachadi choornam* (powder) are two medicines that are very effective in the treatment of *Udavarthini Yonivyapad* (dysmenorrhea) [5]. *Sapthasaram kashayam* is explained in the classical text book '*Sahasrayogam*' and *Hinguvachadi choornam* is explained in '*Ashtangahrudayam*'.

Menstrosap is an ayurvedic proprietary medicine manufactured by Sitaram Ayurveda Private Ltd. Thrissur, Kerala for dysmenorrhea. It is a 1 gram soft gelatin capsule with a combination of *Sapthasaram kashayam* and *Hinguvachadi choornam* along with Sesame oil and Ricinus oil.

**Table 1: ingredients of Menstrosap**

Sl.	Sanskrit Name	Botanical Name	Part used	Quantity
1	Punarnava	<i>Boerhaavia diffusa</i>	Root	0.330 g
2	Palasa	<i>Butea monosperma</i>	Stem bark	0.330 g
3	Bilva	<i>Aegle marmelos</i>	Root	0.330 g
4	Kulatha	<i>Dolichos biflorus</i>	Seed	0.330 g
5	Eranda	<i>Ricinus communis</i>	Root	0.330 g
6	Sahachara	<i>Nilgiranthus ciliatus</i>	Root	0.330 g
7	Sunti	<i>Zingiber officinale</i>	Rhizhome	0.330 g

8	Agnimandha	<i>Premna corymbosa</i>	Root	0.330 g
9	Chirubilva	<i>Holoptelea integrifolia</i>	Stem bark.	0.330 g
10	Chitraka	<i>Plumbago zeylanica</i>	Root	0.330 g
11	Harithaki	<i>Terminalia chebula</i>	Fruit rind	0.330 g
12	Pippali	<i>Piper longum</i>	Fruit	0.330 g
13	Thila thaila	Sesame oil	As Such	0.800 ml
14	Eranda thaila	Castor oil	As Such	0.200 ml
15	Hingu	<i>Ferula asafoetida</i>	Exudate	0.012 g
16	Vacha	<i>Acorus calamus</i>	Rhizome	0.012 g
17	Pashuganda	<i>Cleome viscosa</i>	Root	0.012 g
18	Dadima	<i>Punica granatum</i>	Fruit rind	0.012 g
19	Ajamoda	<i>Apium graveolens</i>	Fruit	0.012 g
20	Danyaka	<i>Coriandrum sativum</i>	Fruit	0.012 g
21	Pata	<i>Cyclea peltata</i>	Rhizome	0.012 g
22	Pushkara	<i>Inula racemosa</i>	Root	0.012 g
23	Shati	<i>Kaempferia galanga</i>	Rhizome	0.012 g
24	Hapusha	<i>Sphearanthus indicus</i>	Root	0.012 g
25	Chitraka	<i>Plumbago zeylanica</i>	Root	0.012 g
26	Yavaksharam	Carbonate of potash	As Such	0.012 g
27	Souvarchalaksharam	Sodium bicarbonate	As Such	0.012 g
28	Nagara	<i>Zingiber officinale</i>	Rhizome	0.012 g
29	Maricha	<i>Piper nigrum</i>	Fruit	0.012 g
30	Pippali	<i>Piper longum</i>	Fruit	0.012 g
31	Ashali	<i>Lepidium sativum</i>	Fruit	0.012 g
32	Chavya	<i>Piper mullesua</i>	Root	0.012 g
33	Chincha	<i>Tamarindus indicus</i>	Root bark	0.012 g
34	Vrukshamla	<i>Garcinia gummi-gutta</i>	Fruit rind	0.012 g

To explain the mode of action of the drug, GC-MS analysis of the compound was done.

#### METHODOLOGY

#### GC-MS Analysis

GC-MS Analysis was performed using the instrument model – 7890 A GC with 5975C

with triple axis detector. The equipment has a DB 5MS 30 m × 0.250 mm Diameter × 0.25 Micro Meter Thickness.

The sample was dissolved in Hexane, taken into vials and injected into GCMS. Analysis was performed by injecting 1 microliter of the sample with a split ratio of 150: 1. Helium gas (99.9995 %) was used as the carrier gas at a flow rate of 1 mL/min. The analysis was performed in the EI (electron impact) mode with 70eV of ionization energy. The injector temperature was maintained at 280 °C

(constant) and the oven temperature was programmed as follows: 50 °C for 10 minutes, then gradually increased to 280 °C at 15 minutes.

The compounds were identified after comparing the spectral configurations obtained with that of the available mass special database (NIST -08 SPECTRAL DATA).

## RESULT

### GC-MS analysis of Menstrosap

Nine compounds were identified in the spectrum.

File :D:\GCMSD\2023\MARCH\21.03.2023\T\_2693.D  
Operator :  
Acquired : 22 Mar 2023 15:36 using AcqMethod FATTY ACID STD.M  
Instrument : GCMS  
Sample Name: MENSTROSAP  
Misc Info :  
Vial Number: 13

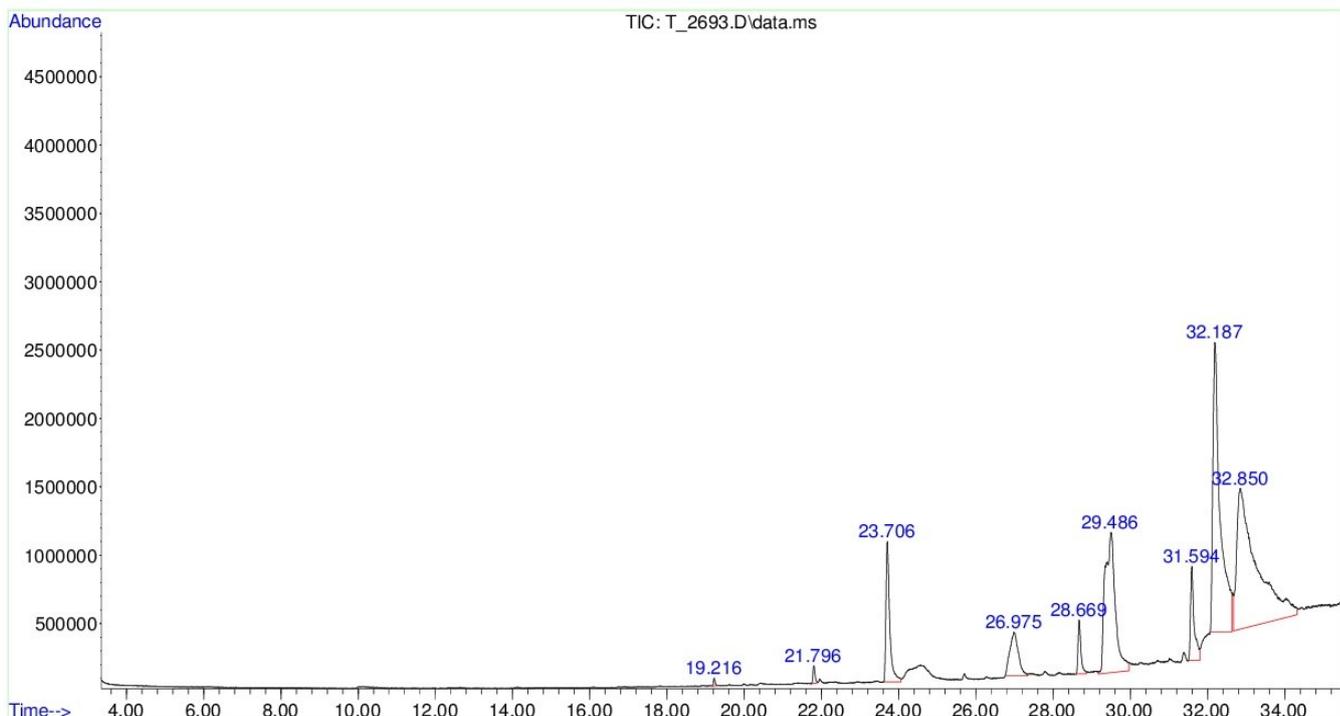


Figure 1: Chromatogram analysis of Menstrosap

**Table 2: compounds and their properties**

Sl No	R.T. min	Peak area %	Name of the compound	Type of compound	Properties of the compound
1	32.187	35.112	cis-Vaccenic acid	Omega 7 fatty acid [6]	Anti-inflammatory [12]
2	29.486	24.062	n-Hexadecanoic acid	Saturated long chain fatty acid [7]	Anti-inflammatory [13]
3	32.850	16.654	9,12-Octadecadienoic acid (Z,Z)-	Doubly unsaturated fatty acid [8]	Anti-bacterial, Anti-cancer, Anti-asthmatic [14]
4	23.706	8.845	13-Hexyloxacyclotridec-10-en-2-one	-	-
5	26.975	6.207	Tetradecanoic acid	Saturated long fatty acid [9]	Anti inflammatory [15]
6	31.594	5.685	9-Octadecenoic acid (Z)-,		Anti-bacterial, Anti-cancer, Anti-asthmatic [14]
7	28.669	2.578	Hexadecanoic acid	Saturated long chain fatty acid [7]	Anti-inflammatory [13]
8	21.796	0.614	Asarone	Crystalline phenolic ether [10]	Anti-oxidant, Anti-inflammatory, Anti-cancerous, Anti-apoptotic, Neuroprotective [16]
9	19.216	0.243	Phenol	Organic compound with a group of hydroxyl group bound to a carbon atom that forms part of an aromatic ring [11]	Anti-bacterial, Anti-inflammatory, Anti-cancerous [17]

## DISCUSSION

Despite numerous studies, the patho mechanism of dysmenorrhea is not fully understood but the role of inflammatory factors in dysmenorrhea is well understood. One of the factors contributing to dysmenorrhea may be an increased prostaglandin level before menstruation. Before menstruation, endometrial tissue acquires the characteristics of inflammation. It has been proven that prostaglandins are associated with inflammation and they are produced during menstruation. Studies explain that these prostaglandins are one of the causes of pain in dysmenorrhea. Along with prostaglandins, cytokines and other pro-inflammatory factors also play a major role [18]. The drug of choice in dysmenorrhea is analgesics & NSAIDs (Non-steroidal anti-inflammatory drugs) [19].

Menstrosap is a combination of *Saptasaram Kashayam* (decoction) & *Hinguvachadi choornam* (powder) along with Sesame oil and Ricinus oil. Both the *Sapthasaram kashayam* (decoction) & *Hinguvachadi choornam* (powder) are very effective in the treatment of *Udavarthini Yonivyapad* (dysmenorrhea) in Ayurveda.

GC-MS analysis of Menstrosap identified 9 compounds. Out of the 9 compounds identified 6 of them shows anti-inflammatory property. This helps to reduce the pain occurring due to inflammation.

Studies suggest that supplementation with omega-3 fatty acids helps to reduce the symptom intensity in dysmenorrhea [20]. The major compound identified in Menstrosap is omega-7 fatty acids which in turn help to reduce the symptoms of dysmenorrhea.

## CONCLUSION

Out of the nine compounds identified through GC-MS of Menstrosap, six compounds show anti-inflammatory property and one is an omega-7 fatty acids. Presence of these compounds helps to reduce the symptoms of dysmenorrhea.

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