

Phytochemical and GC-MS analysis of *Hamiltonia suaveolens* (ROXB)

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Abstract: The aim of the study was to investigate the *Hamiltonia suaveolens* stem for phytochemical compounds and GC-MS analysis. The presence of phytochemical compounds was screened by qualitative method. The results showed the presence of phytochemical compounds of carbohydrates, terpenoids, steroids, flavonoids, phenols. Alkaloids were not detected. In GC-MS analysis, 30 bioactive phytochemical compounds were identified in the pet ether, chloroform & ethyl acetate extracts of *Hamiltonia suaveolens*. The components were identified by comparing their retention indices and mass spectra fragmentation pattern with those stored on the MS-computer library of Doctors' Analytical Laboratories PVT.LTD.Pune. The major constituents were Azulene 9-Nonadecane, n-hexadecanoic acid, Phenol, 2-methoxy-4-(1-propenyl)-, (E), Tritetracontane Ergost-5-en-3-ol, 22,23-dimethyl-, acetate, (3)-. Other major and minor constituents were also present.

Key words: *Hamiltonia suaveolens*, Serial extractions, Phytochemical compounds, GC-MS Analysis, n-hexadecanoic acid, 9-Nonadecane, Tritetracontane, Ergost-5-en-3-ol, 22,23-dimethyl-, acetate, (3)-.

Introduction

The knowledge of herbal medicine is very ancient & developed by ancient civilization of Indus valleys. Understanding of active principles involved in the herbal medicines has begun only in the last century. Several phytochemists and chemists interested in natural compounds in the recent past have tried to identify chemical compounds of extracts of different medicinal plants.

The number of such medicinal plants whose phytochemical analysis has been completed runs in thousands. India is in an advantageous position in phytochemical research because of the well-known medicinal system Ayurveda, Siddha and Unani. Besides, tribal medicinal system of this country helps us in identifying new medicinally important plants. The present research work has

been based on the information of one such tribal medicine used to cure viral infections.

In the region of North Maharashtra there is contrasting climate condition. The susceptibility of viral infections in this region is more. One particular disease predominantly observed is Herpes Zoster known as Nagin in local language. The practitioners in herbal medicines or Vaidyas use the stem powder of the plant *Hamiltonia suaveolens* to cure this disease. It is also used to cure wounds inflicted due to acute blood sugar in diabetic patients.

A survey of literature showed that there are only two research articles (1,2) published so far on the phytochemical investigation of this plant. These references reveal that the root extract has

hypoglycemic activity. This interesting report generated a quest for further investigation.

The plant *Hamiltonia suaveolens* (3)Roxb. is a small shrub, 1-2 m tall, branches divaricate, more or less herbaceous, leaves elliptic lanceolate, narrowed at base, Flowers numerous, corolla white, pale blue or pale pink. Seeds few, triquetrous, surrounded by a loose lace like covering. Common on rocky soil of hill slopes. Fls. & Frts. -Feb to July. Distribution –Aurangabad, Beed, Nanded, Amravati Parbhani districts.

Materials and Methods:

Collection of the plant material: The plant was collected from wild of the Melghat. The taxonomic identification of the plant was confirmed by a plant taxonomist.

Preparation of plant Extracts: The plant parts were separated and air dried at room temperature. The stem after drying was powdered and taken for the serial extractions.

The serial extractions(4) were carried out in Soxhlet apparatus starting with pet.ether –chloroform- ethyl

acetate.(Table 1) The extracts were collected and stored in vials for further analysis.

The phytochemical Screening(4):

The extracts were subjected to qualitative chemical analysis.(Table 2)

Gas chromatography-Mass spectrometry analysis

The gas chromatography-Mass spectrometry analysis of the extracts was performed using a GC-MS equipment.

Identification of the Components:

The identity of the components in the extracts was assigned by the comparison of their retention indices and mass spectra fragmentation patterns with those stored on the computer library and also with published literature. Library sources were used for matching the identified components from the plant material.

Table 1: First Serial extractions

Weight of the stem powder in gms	Name of the solvent	Weight of the extract in gms.
135	Pet- ether	1.171
Mark	Chloroform	1.558
Mark	Ethyl acetate	1.552

Extractive value :

P.E = 0.87%, CHL= 1.15%, EA=1.15%,

Table 2 : Qualitative chemical test

TEST	Pet ether extract	Chloroform extract	Ethyl acetate extract
Steroids	+	+	+
Alkaloids	-	-	-
Protein	-	-	-
Tannins	-	-	+
Flavonoids	-	-	+
Carbohydrate	-	-	+
Saponins	-	-	-

Table 3 Phytocompounds identified in Pet.Ether.Extract

Sr.no	Phytocompound	R.T	M.W
1	Azulene	7.78	128
2	1-(+)- Ascorbic acid 2,6-dihexadecanoate	21.02	652
3	Heptasiloxane,hexadecamethyl	30.46	532
4	Tetratetracontane	31.17	618
5	Triphenyl phosphate	34.25	326
6	Squalene	44.96	410
7	Stigmastan-3,5,2-trien	47.83	394

Table 4 Phytocompounds identified in chloroform Extract

Sr.no	Phytocompound	R.T	M.W
1	Cyclopentasiloxane ,decamethyl-	6.84	370
2	Vaniline	10.02	152
3	Phenol,2-methoxy-4-(1-propenyl)-,(E)	10.56	202
4	Phenol,2,4-bis(1,1 dimethylethyl)-	11.32	206
5	1H-2-Benzopyran-1-one,3,4-dihydro-8-hydroxy-3-methyl	12.03	178
6	Benzeneacetaldehyde. , -dimethyl-	12.88	148
7	9-Nonadecane	16.41	266
8	n-hexadecanoic acid	21.08	256
9	9- octadecanoic acid,1,2,3- propanetriyl esters	21.44	884
10	8aH-2,4a-methanonaphthalene-8a-ol,octahydro-1,1.5.5-tetramethyl-	24.51	222
11	Heptasiloxane,hexadecamethyl	25.25	532
12	9.12-octadecadienoicacid(z,z)-2,3 dihydroxypropyl ester	26.22	354
13	22-Tritetracontane	27.58	618
14	10,11-(4,5-dimethylbenzo(3,2)paracyclophane	34.56	298
15	Cholest-1-eno(2,1-a)naphthalene,3,4-dihydro	45.17	472

Table 5 Phytocompounds identified in ethyl acetate Extract

Sr.no	Phytocompound	R.T	M.W
1	11-Oxo-9-thiocyanato-testosterone	8.51	359
2	Cyclohexane,1,3,5-trimethyl-2-octadecyl-	16.39	378
3	Phthalic acid,butyl 2-pentyl ester	20.48	292
4	Ethanol,2-(9-Octadecenyloxy)-,(z)-	21.43	312
5	Ethanol,2-(9-Octadecenyloxy)-,(z,z)-	23.74	310
6	Cyclohexane,1,1'-dodecylidenebis(4-methyl-	27.57	362
7	Triphenyl phosphate	34.25	326
8	Ergost-5-en-3-ol,22,23-dimethyl-,acetate,(3)-	46.47	470

Results and Discussion:

The present study was carried out in Pet ether, Chloroform, Ethyl acetate extracts of *Hamiltonia suaveolens* (Roxb) stem. It revealed the presence of medicinal active constituents. The phytochemical screening of qualitative analysis revealed the presence of carbohydrates, Tannins, flavonoids & steroids. Alkaloids were not detected. The results are tabulated in table 2. The GC-MS analysis of pet-ether, chloroform and ethyl acetate extracts revealed the presence of 30 bioactive phytoconstituents, major constituents along with minor constituents are tabulated in table 3,4,5. The GC-MS chromatogram with retention time are shown in figure.1,2,3. The major constituents are:

Azulene(5), the compound dates to the 15th century, when it was derived from the steam distillation of German chamomile. It was later discovered to be present in several other plants, including yarrow and blue tansy, during the late 1800s. It was officially named in 1863 by Septimus Piesse of France, and it has been used over the centuries in various herbal remedies. as an additive to its use in salves and ointments, azulene is thought to assist in calming a wide variety of skin irritations and conditions because of its soothing properties, anti-inflammatory effects and antibacterial properties.

Tetratetracontane(6), Neutral components in the leaves and seeds of *Syzygium cumini*, the plant which has medicinal importance as an anti-inflammatory, antibacterial, antiulcerogeni.

9-Nonadecane(7) a phytoconstituent present in the Essential oil of *Rosa damascene*.

n-hexadecanoic acid(8), (Palmitic acid) It is now pertinent to identify the possible roles of these constituent compounds in the curative properties

attributed to the plant by herbal medical practitioners. Oleic acid is an unsaturated fatty acid present in several plants and being unsaturated is considered as a healthy source of fat in the diet. Many fatty acids are known to have antibacterial and antifungal properties. Dodecanoic acid, tetradecanoic acid, hexadecanoic acid, octadecanoic acid and oleic acids are among the fatty acids known to have potential antibacterial and antifungal activity.

Phenol,2-methoxy-4-(1-propenyl)-,(E)(9), This phyto compound was identified in GC-MS analysis of bio active components on the bark extract of *Alseodaph nesemecarpifolia* Nees (Lauraceae).

Tritetracontane(10) an important medicinal compound of *Dichrocephala integrifolia* (L.).

Ergost-5-en-3-ol,22,23-dimethyl-,acetate,(3)- This compound has structural similarity with Lupenyl acetate (11) which is found in *Ficus* species having antioxidant properties. Hence the Activities of this compound should be investigated. The study has revealed the presence of many important phyto compounds in the stem of *Hamiltonia suaveolens*, which has wound healing ability for diabetic patients and might be of very important medicinal value.

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Fig.1

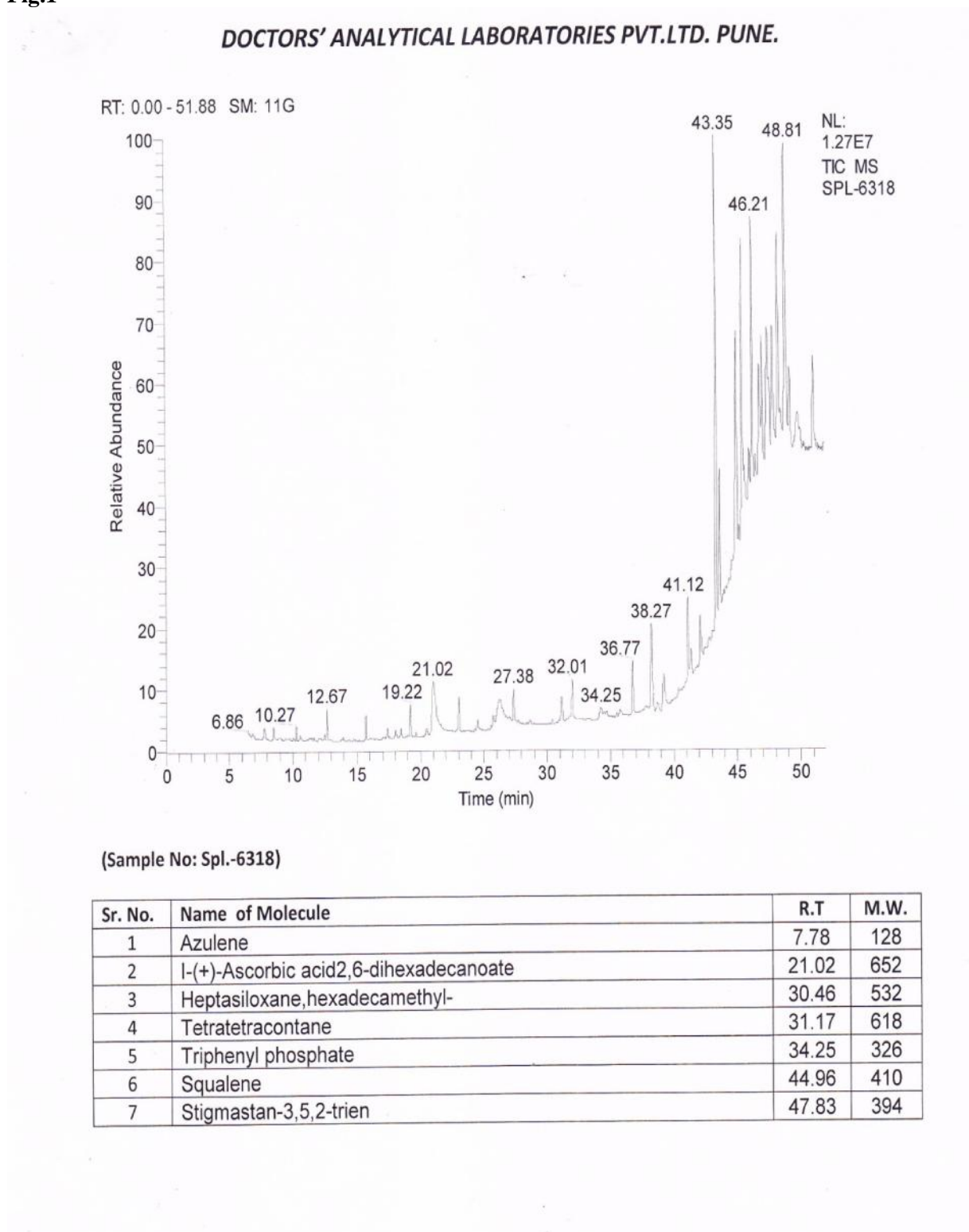
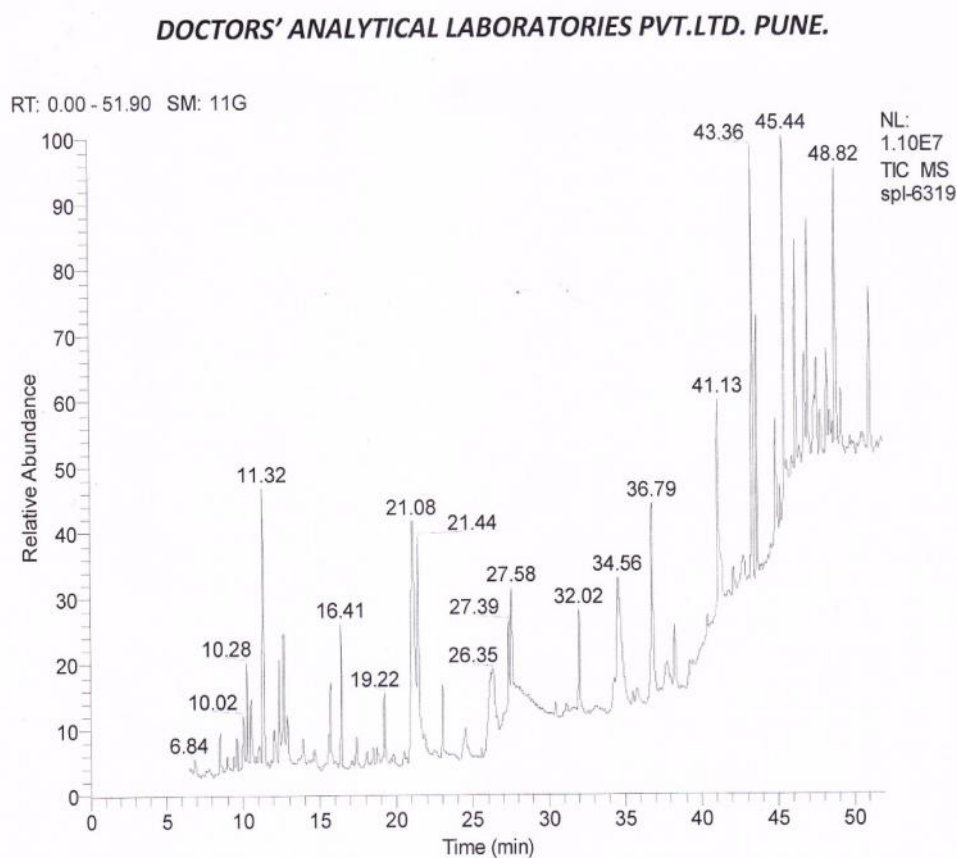
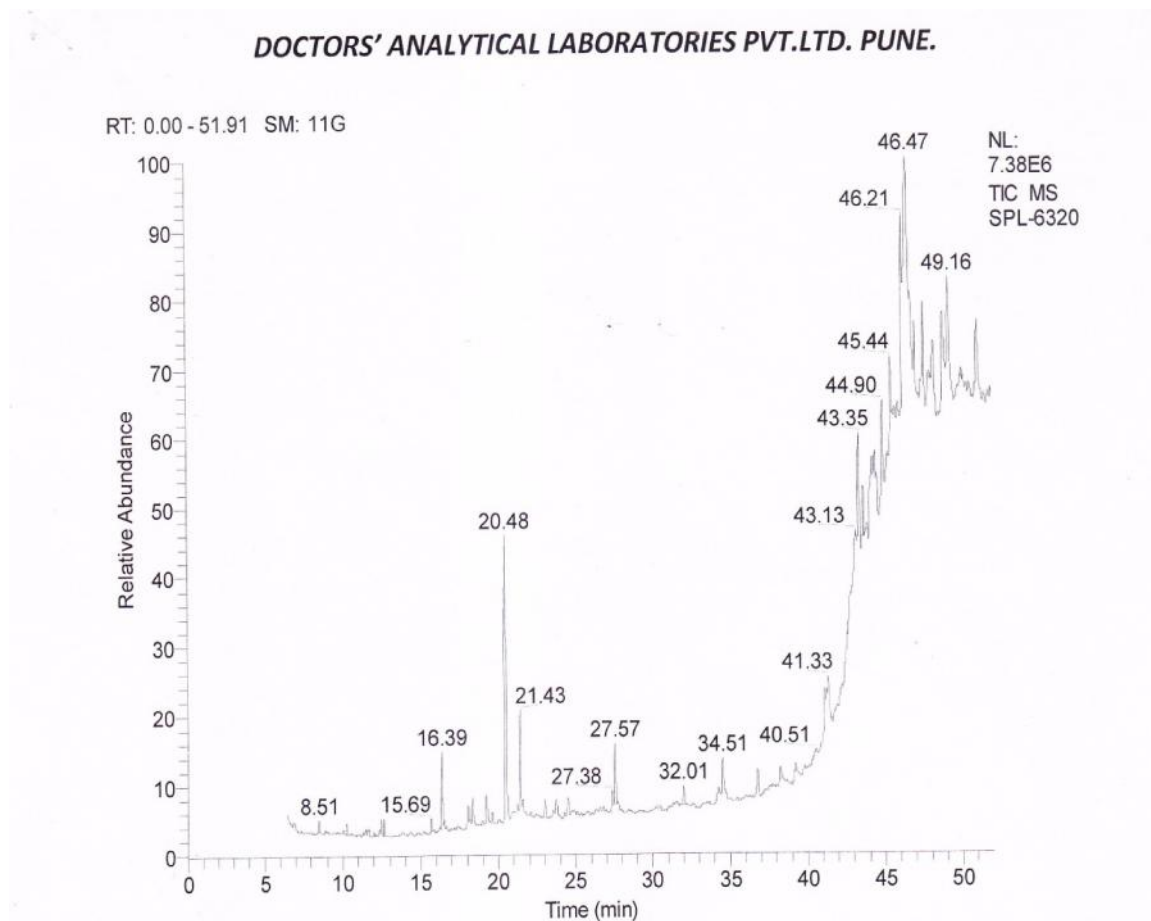


Fig 2



(Sample No: Spl.-6319)

Sr. No.	Name of Molecule	R.T	M.W.
1	Cyclopentasiloxane,decamethyl-	6.84	370
2	Vanillin	10.02	152
3	Phenol,2-methoxy-4-(1-propenyl)-,(E)-	10.56	202
4	Phenol,2,4-bis(1,1-dimethylethyl)-	11.32	206
5	1H-2-Benzopyran-1-one,3,4-dihydro-8-hydroxy-3methyl-	12.03	178
6	Benzeneacetaldehyde,α,α-dimethyl-	12.88	148
7	9-Nonadecene	16.41	266
8	n-Hexadecanoic acid	21.08	256
9	9-Octadecenoic acid,1,2,3-propanetriyl ester	21.44	884
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11	Heptasiloxane,hexadecamethyl-	25.25	532
12	9,12-Octadecadienoic acid(z,z)-2,3-dihydroxypropyl ester	26.22	354
13	22-Tritetracontanone	27.58	618
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15	Cholest-1-eno(2,1-a)naphthalene,3'4'-dihydro-	45.17	472

Fig 3

(Sample No: Spl.-6320)

Sr. No.	Name of Molecule	R.T	M.W.
1	11-Oxo-9-thiocyanato-testosterone	8.51	359
2	Cyclohexane,1,3,5-trimethyl-2-octadecyl-	16.39	378
3	Phthalic acid,butyl 2-pentyl ester	20.48	292
4	Ethanol,2-(9-octadecenyloxy)-(Z)-	21.43	312
5	Ethanol,2-(9-octadecenyloxy)-(Z,Z)-	23.74	310
6	Cyclohexane,1,1'-dodecylidenebis(4-methyl-	27.57	362
7	Triphenyl phosphate	34.25	326
8	Erost-5-en-3-ol,22,23-dimethyl-,acetate,(3 β)-	46.47	470

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