



GC-MS Analysis and High Profile Thin Layer Chromatography Study of *Hyptis suaveolens* (L.) Poit leaves from Nagpur Region (M.S.)

S. K. Ulhe¹ and S. D. Narkhede²

¹Department of Botany, Institute of Science, Nagpur

²Government Institute of science, Nagpur

botanysharu@rediffmail.com; sushama_narkhede@yahoo.com

Abstract

Plants constitute as major source of drugs for prevention and spread of wide range of pathogenic carriers and also treating various human diseases. Modern people increasingly prefer drugs of natural origin, mostly from plant origin due to abundant accessibility and fewer side effects. To search novel active compounds from plant origin and to access the valuable therapeutic properties with minimum side effects, application of advanced method like GC-MS computational techniques plays an important role in the development of drug of interest. 6 compounds were identified in aerial parts of *Hyptis suaveolens* L. Out of the 6 compounds identified in ethanolic extract, 7-Isopropyl-1,1,4a-trimethyl-1,2,3,4,4a,9,10,10a-octahydrophenanthrene, 1-Phenanthrene, 1,2,3,4,4a,9,10a-Octahydro, 1,1,4a-trimethyl-7-(1-methylethyl)-(4aS-trans), 1-Phenanthrenemethanol, 1,2,3,4,4a,9,10,10a-Octahydro-1,4a-dimethyl-7-(1-methylethyl)-[1S-(1 α ,4 α ,10 $\alpha\beta$)], Phenanthrenemethanol, 1,2,3,4a, 9, 10, 10 a-Octahydro-1,4a-dimethyl-7-(1-methylethyl)-[1R-(1 α ,4 $\alpha\beta$,10 $\alpha\alpha$)], 1,5,9-Undecatriene, 2,6,10-trimethyl-(Z)-, Squalene. It was found that the constituents differed in quantity of *Hyptis suaveolens* (L.) in the Nagpur region which may be due to the local geographical difference. The HPTLC chromatograms of different coloured plates show different Rf values. Ethnobotanical uses - juice of leaves is used for athlete's foot, leaf paste is applied on sores and fungal skin infections etc.

Keywords- *Hyptis suaveolens* (L.), GC-MS, ethnobotany, compounds.

Introduction:

The plant *Hyptis suaveolens* (L.) Poit, commonly known as "Rantuli" belongs to the family Lamiaceae and is an ethnobotanically important medicinal plant. Almost all parts of this plant are being used in traditional medicines to treat various diseases. The plant has been considered as an obnoxious weed. The leaves have been utilized as a stimulant, carminative, sudorific, galatogogue and as a cure for parasitic cutaneous diseases (Mandalet al., 2007). *Hyptis suaveolens* (L.) Poit are considered to be anti-inflammatory and also applied as an antiseptic in burns, wounds and various skin complaints (Chatterjee and Pakrashi, 1997). *Hyptis suaveolens* is known to be used in traditional medicines for the treatment of various diseases and has been found to possess significant pharmacologic properties (Kuhnt., et al 1995). In addition to these, it also has insecticidal properties and said to be mosquito repellent (Mudgalet al., 1997). The aim of the current study is to determine Rf value and chemical compounds or compositions of *Hyptis suaveolens* (L.) Poit collected from Gorewada Lake forest, Nagpur district (Maharashtra state).



Figure 1: *Hyptis suaveolens*(L.)Poit.

Materials and methods:

Materials

The leaves of *Hyptis suaveolens* (L.) were identified and collected from Gorewada forest areas of the Nagpur district.

1. Preliminary screening - The shade dried leaf material was powdered using mortar and pestle. It was continuously extracted with 100ml of petroleum ether, chloroform, acetone, ethyl alcohol and water for 3hrs at 60° to 80°C using Soxhlet apparatus. The condensed extracts were used for preliminary screening of phytochemicals such as alkaloids, tannins, saponins and glycosides.
2. HPTLC -

3. The HPTLC studies of secondary metabolites. The extracts to be analysed were spotted on the plate. The plates were placed in TLC chamber and the chromatogram was developed with the solvent mixture. The TLC plates were taken out and visualized in visible light, UV light (254 nm & 366 nm) and iodine chamber and spots were marked.
4. Data analysis - Rf value of each spot was calculated using the formula, Rf value = Distance travelled by the solute/Distance travelled by the solvent and the values were tabulated.
5. GC-MS Analysis - The test plant extracts were subjected to GC-MS analysis

Result and Discussion

Table No. 1:

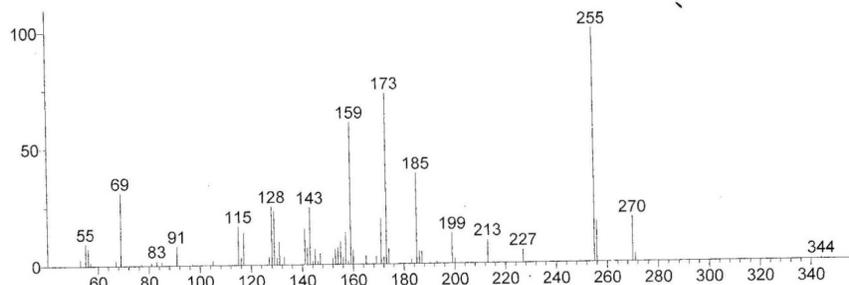
The chemical Composition *Hyptis suaveolens*(L.)Poit

S N	R.T	Name of compound	Molecular formula	Mol. Weight	Peak Area
1	9.2	7-Isopropyl-1,1,4a-trimethyl-1,2,3,4,4a,9,10,10a-octahydrophenanthrene	C ₂₀ H ₃₀	270	405668
2	9.2	Phenanthrene,1,2,3,4,4a,9,10a-Octahydrophenanthrene-1,1,4a-trimethyl-7-(1-methylethyl)-(4aS-trans)	C ₂₀ H ₃₀	270	405668
3	12.7	Phenanthrene methanol,1,2,3,4,4a,9,10,10a-Octahydro-1,4a-dimethyl-7-(1-methylethyl)-,[1S-(1 α ,4 α ,10 α)]	C ₂₀ H ₃₀ O	286	1749455
4	12.7	Phenanthrene methanol, 1, 2, 3,4a, 9, 10, 10 a-Octahydro-1, 4a-dimethyl-7 - (1 methylethyl)-[1R-(1 α ,4 α ,10 α)]	C ₂₀ H ₃₀ O	286	1749455
5	18.9	5,9-Undecatriene,2,6,10-trimethyl-(Z)-	C ₁₄ H ₂₄	192	305046
6	18.9	Squalene	C ₃₀ H ₅₀	410	305046

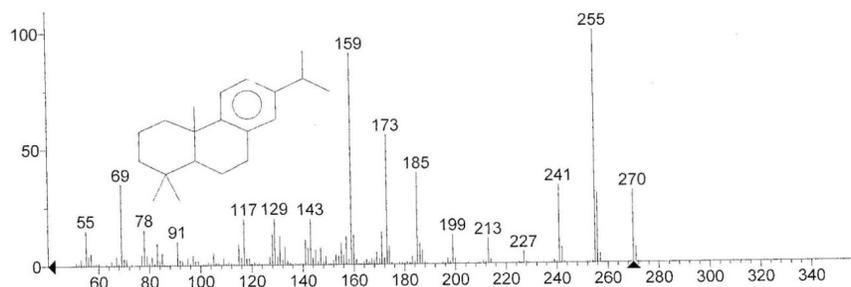
Table No. 2: Resolution factor (Rf.) values of HPTLC for Alkaloids in Leaves of plants.

Sr. No.	Name of the species	Part of the plant used	Resolution factor (Rf.) Value
1	<i>Hyptis suaveolens</i>	Leaves	0.53

Unknown: MDT[CTR[1.0000..1.0000,80,Center,15,2.0,Area];BCK[DF];SMT[SA,5]] E111VBMamravati.7file111VB2.7n 97
Compound in Library Factor = 102



Hit 1 : 7-Isopropyl-1,1,4a-trimethyl-1,2,3,4,4a,9,10,10a-octahydrophenanthrene
C₂₀H₃₀; MF: 806; RMF: 806; Prob 96.2%; Lib: mainlib; ID: 166874.



Hit 2 : Phenanthrene, 1,2,3,4,4a,9,10,10a-octahydro-1,1,4a-trimethyl-7-(1-methylethyl)-, (4aS-trans)-
C₂₀H₃₀; MF: 658; RMF: 705; Prob 2.76%; CAS: 19407-28-4; Lib: mainlib; ID: 166983.

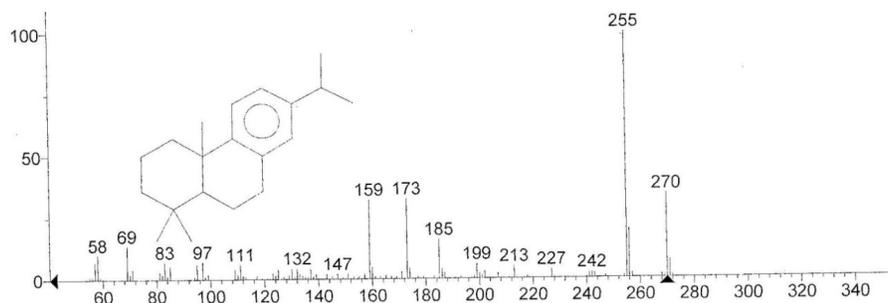


Figure 2: GC-MS Chromatogram of *Hyptis suaveolens* (L) Poit Plant.

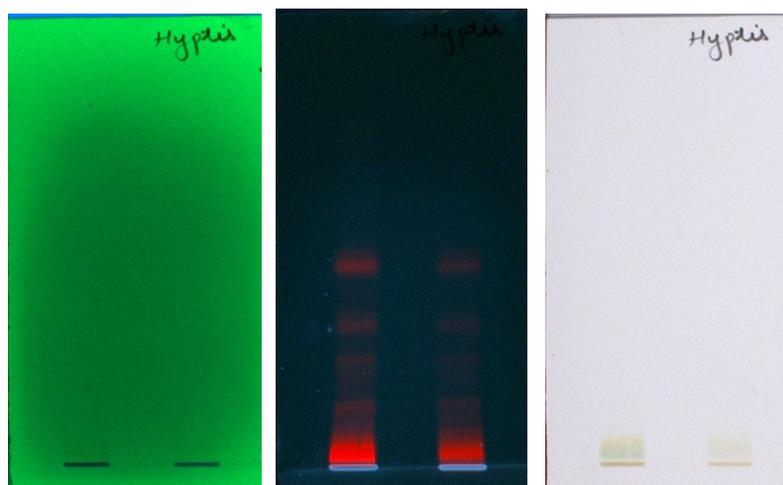


Figure 3: HPTLC Plates (High profile Thin Layer Chromatography) of *Hyptis suaveolens* plant.

The present investigation was carried out on *Hyptis suaveolens* plant of Lamiaceae family to study the presence of medicinally active phytochemicals in the leaves. The chemical composition of the essential compounds from the leaves of *Hyptis suaveolens* (L.) Poit collected from Gorewada forest which experienced different climatic and geographic circumstances, were determined by GC-MS. It has been already reported by various workers (Jennings W and Shibamoto T, 1981, Sharma *et al.*, 2007, Mallavarapu *et al.*, 1993). As seen in the table 1, different compounds were determined from the leaves of *Hyptis suaveolens* (L.) Poit. The present investigations concluded that the leaf of *Hyptis suaveolens* contains alkaloids. These chemicals are widely used in Ayurvedic traditional medicines. The presence of tannin in this plant may be the reason, why most of the animals do not graze this plant.

Conclusion:

Our study has shown that the qualitative and quantitative properties of compounds of *Hyptis suaveolens* plant of Gorewada forest (Nagpur region) is mainly due to the local geographical differences.

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