

The Journal of Phytopharmacology

(Pharmacognosy and phytomedicine Research)

Research Article

ISSN 2230-480X
JPHYTO 2016; 5(3): 108-111
May- June
© 2016, All rights reserved

Ramachandran P

Assistant Professor, Department of Chemistry, V.S.B. Engineering College, Kanur, Tamilnadu-639111, India

Viji Saral Elezabeth D

PG & Research Chemistry, Department of Nehru Memorial College, Puthanampatti, Tiruchirappalli, Tamilnadu-621007, India

Correspondence:

Ramachandran P

Assistant Professor, Department of Chemistry, V.S.B. Engineering College, Kanur, Tamilnadu-639111, India

Email:
psrchan47[at]gmail.com

GC–MS study on ethanolic extract of *Vetiveria lawsonii* root

Ramachandran P*, Viji Saral Elezabeth D

ABSTRACT

The present study was focused to scrutinize the presence of phytoconstituents in the ethanolic extract of *Vetiveria lawsonii* root using GC-MS. The GC-MS analysis of *Vetiveria lawsonii* root was performed using Agilent 6890-JEOL GC-Mate-II Mass Spectrometer. The result of the study showed the presence of six bioactive compounds in the ethanolic extract. On account of this investigation, we can conclude that the ethanolic extract of *Vetiveria lawsonii* root shows the presence of 6 bioactive phytoconstituents. This might be the cause for the various pharmacological activities of the plant.

Keywords: *Vetiveria lawsonii* root, Mass spectrometer, Phytoconstituents, Pharmacological activity.

INTRODUCTION

According to World Health Organization (WHO) still about 80% of the world population rely mainly on plant-based drugs. India is a mega rich biodiversity country with large number of species of herbal plants which are still to be undergone through various scientific approaches. The Poaceae is one of the family which having more medicinal value. *Vetiveria lawsonii* is an Indian plant belongs to the family Poaceae.

Kingdom	-	Plantae
Group	-	Angiosperms
Family	-	Poaceae
Genus	-	<i>Vetiveria</i>
Species	-	<i>lawsonii</i>



There was no report about the GC-MS study on this plant. Hence, in the present study the ethanolic extract of *Vetiveria lawsonii* was taken for GC-MS investigation.

MATERIALS AND METHODS

Collection of Plant material

The powdered plant material of *Vetiveria lawsonii* was collected from Sri Venkateswara Agencies, Siddha & Ayurvedic Medical in Tiruchirappalli District, Tamilnadu State, India and authenticated by Dr. K. G. Sathishbabu MD (Siddha), Tiruchirappalli District, Tamilnadu State, India.

Preparation of Extract

The ethanol extract of the plant was prepared by hot continuous percolation method using soxhlet extractor. It was concentrated by using a rotary vacuum evaporator and subjected to dryness to yield crude residue. This residue was used for the investigation.

GC – MS analysis

The ethanol extract was filtered with sodium sulphate [2g] and concentrated the extract to 1mL by bubbling nitrogen into the solution. The extracted material was taken for GC MS analysis. The Gas chromatography–Mass spectroscopy (Agilent 6890-JEOL GC-Mate-II Mass Spectrometer) was fitted with electron impact (EI) mode. The Helium was used as the carrier gas at a flow rate of 1mL/min.

The temperature was programmed at 70°C for 5 min then increased to 300°C at the rate of 15°C/min. The temperature of injector and EI detector (70eV) were 280°C and 300°C, respectively. Each plant extract of 1µL was injected with a Hamilton syringe to the GC /MS manually. The relative % amount of each component was calculated by comparing its average peak area to the total areas.

Interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and technology (NIST) having more than 62,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library. The Name, Molecular weight and structure of the components of the test materials were ascertained.

RESULTS

The active compounds present in the ethanolic extract of *Vetiveria lawsonii* were identified by GC-MS analysis. The chromatogram of the ethanolic extract of *Vetiveria lawsonii* is shown in the following Figure-1.

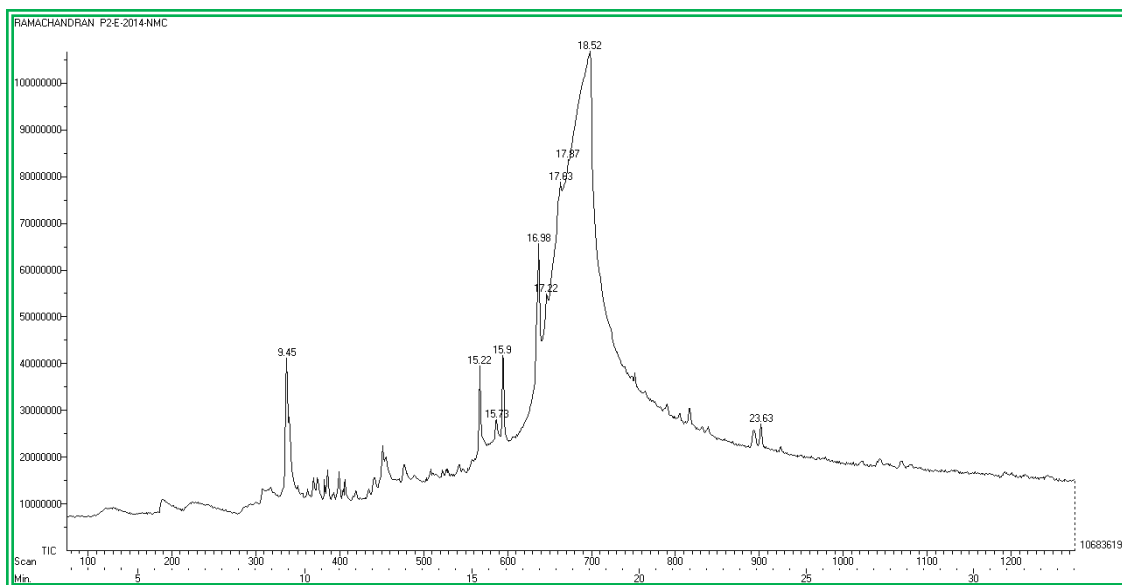


Figure 1: GC-MS Chromatogram of the ethanolic extract of *Vetiveria lawsonii*

The active principles with their name, retention time (RT), molecular formula, molecular weight (MW) and the peak area percentage of the

bioactive compounds those present in the ethanolic extract of *Vetiveria lawsonii* are furnished in Table-1.

Table 1: Names and their RT value, Molecular formula, Molecular weight, Peak area % of the bioactive compounds in ethanolic extract of *Vetiveria lawsonii*

No.	RT	Name of the Compound	Molecular formula	MW	Peak area %
1	9.5	Lanceol, cis	C ₁₅ H ₂₄ O	220	9.22
2	15.25	Pentadecanoic acid, 13-methyl-, methyl ester	C ₁₇ H ₃₂ O ₂	270	9.79
3	15.9	Hexadecanoic acid, ethyl ester	C ₁₈ H ₃₆ O ₂	284	14.00
4	16.98	10-Octadecenoic acid, methyl ester	C ₁₉ H ₃₆ O ₂	296	22.03
5	18.52	9-Octadecenoic acid, (E)-	C ₁₈ H ₃₄ O ₂	282	35.89
6	23.63	Oleic acid	C ₁₈ H ₃₄ O ₂	282	9.08

The bioactive compounds are arranged in the increasing order of their RT value. The Retention Time of cis-Lanceol is very low of 9.5 while the oleic acid showing a very high value such as 23.63. The compounds Pentadecanoic acid, 13-methyl-methyl ester and Hexadecanoic acid-ethyl ester are having very closer RT value. From

the obtained value, there are three bioactive compounds might be considered as prevailing compounds. The following Figure-2 to Figure-4 shows the mass spectrum and the structures of prevailing compounds of *Vetiveria lawsonii*.

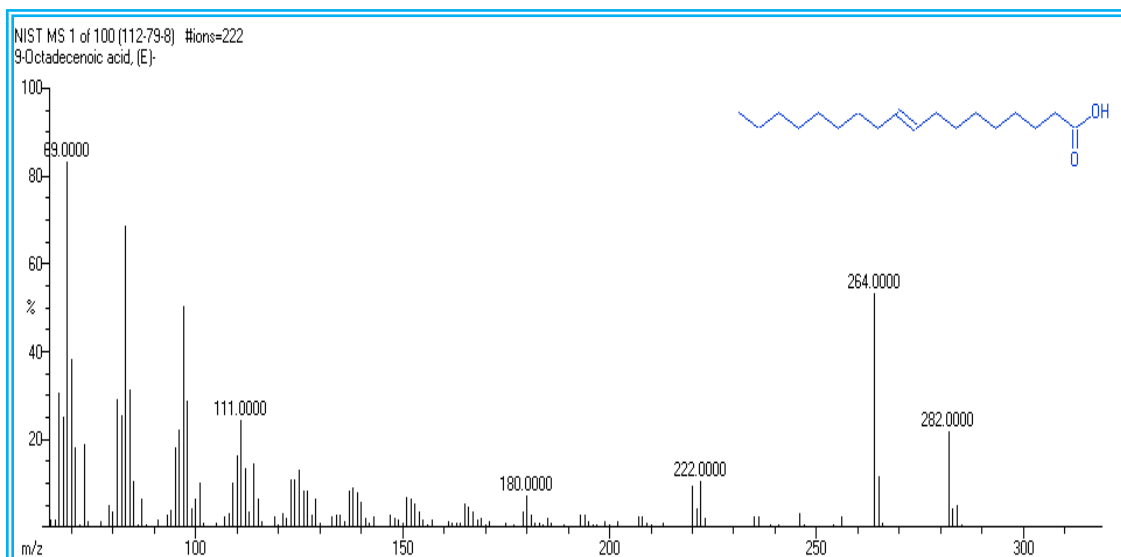


Figure 2: Mass spectrum of 9-Octadecenoic acid, (E)-

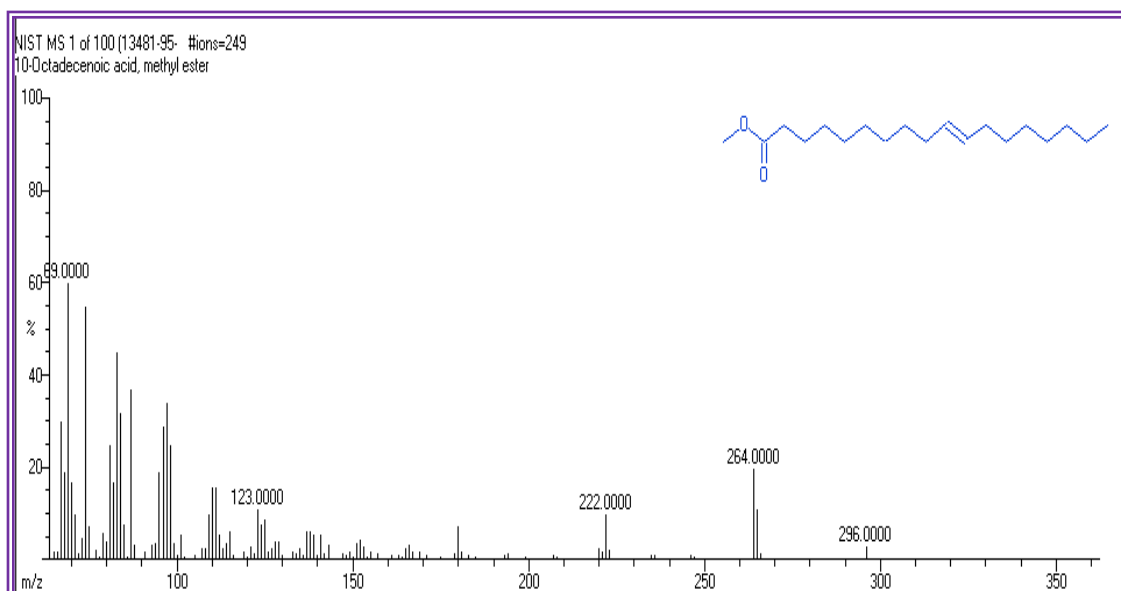


Figure 3: Mass spectrum of 10-Octadecenoic acid, methyl ester

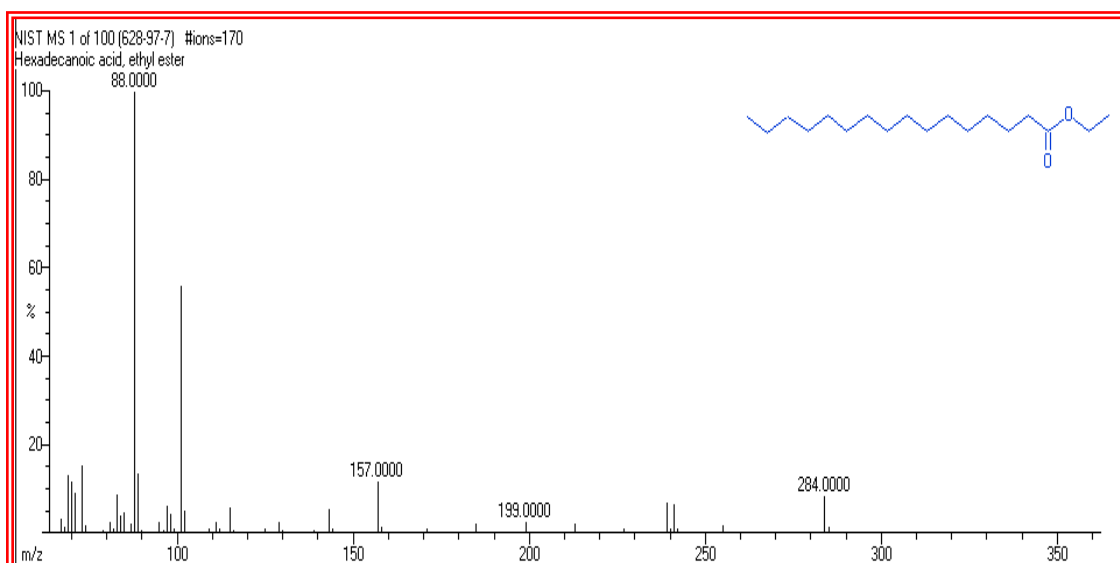


Figure 4: Mass spectrum of Hexadecanoic acid, ethyl ester

DISCUSSION

From the mass is also found by the comparison with the standard. From the name and their structure, it is confirmed that the bioactive compounds might be higher fatty acids. Fatty acids plays three major roles like as the components of more complex membrane lipids, as the major components of stored fat in the form of triglycerides and as the precursors for the production of bioactive lipids. These compounds are long-chain hydrocarbon molecules containing a carboxylic acid moiety at one end. The two compounds with same molecular weight are Oleic acid and (E)-9-Octadecenoic acid. When comparing these two bioactive compounds, it clearly showed that the E-isomeric compound such as (E)-9-Octadecenoic acid (35.89%) is a prevailing compound. Also the derivatives of decenoic and decanoic acids are only being as prevailing compound when compared with others. The prevailing compounds in ethanolic extract of *Vetiveria lawsonii* are (E)-9-Octadecenoic acid (35.89%), 10-Octadecenoic acid-methyl ester (22.03%), Hexadecanoic acid-ethyl ester (14.0%)^[1]. This investigation emphasizes further research to evaluate the pharmacological activities of the identified compounds.

CONCLUSIONS

Gas Chromatography-Mass Spectrometry (GC-MS) is a precious contrivance for the consistent identification of phytoconstituents in plants. In the present inquiry, 6 bioactive compounds have been identified from the ethanolic extract of *Vetiveria lawsonii* by Gas Chromatography-Mass Spectrometry (GC-MS) analysis^[2]. Thus this sort of GC-MS investigation is the gateway towards perceptive the nature of active principles in plants and this will be obliging for further detailed study. Further exploration into the pharmacological of *Vetiveria lawsonii* and their detailed phytochemistry may add innovative facts in the traditional medical systems^[3].

Acknowledgement

The Authors would wish to acknowledge the Management and Principal of Nehru Memorial College for providing research facilities and encouragement.

REFERENCES

1. Karuppasamy Balamurugan, Antony Nishanthini, Veerabahu Ramasamy Mohan. GC-MS analysis of *Polycapaea corymbosa* (L.) Lam whole plant. Asian Pacific Journal of Tropical Biomedicine. 2012; S1289-S1292.
2. Sermakkani M, Thangapandian V. GC-MS Analysis of *Cassia italica* leaf methanol extract. Asian journal of pharmaceutical and clinical research. 2012; 5(2): 90 – 94.
3. Norliana Ghazali, Nurul Asma Abdullah, Asiah Abu Bakar, Noor Khairiena Mohamad. GC-MS analysis of some bioactive components in the root extract of *Ixora coccinea* Linn. International journal of pharma and Bio Sciences. 2014; 5(3): 197 – 203.
4. Ayon Bhattacharya, Goutam Ghosh, Divya Agrawal, Pratap Kumar Sahu, Sanjay Kumar, Sudhanshu Sekhar Mishra. GC-MS Profiling of Ethanolic Extract of *Moringa oleifera* Leaf. International journal of pharma and Bio Sciences. 2014; 5(4): 263 – 275.
5. Abirami P and Rajendran A. GC-MS analysis of methanol extract of *Vernonia cinerea*. European Journal of Experimental Biology. 2012; 2(1): 9 – 12.
6. Raja Rajeswari N, RamaLakshmi S and Muthuchelian K. GC-MS Analysis of bioactive components from the ethanolic leaf extract of *Canthium dicocum* (Gaertn.) Teijsm & Binn. J. Chem. Pharm. Res. 2011; 3(3): 792 – 798.

HOW TO CITE THIS ARTICLE

Ramachandran P, Viji Saral Elezabeth D. GC-MS study on ethanolic extract of *Vetiveria lawsonii* Root. The Journal of Phytopharmacology 2016;5(3):108-111.