

## Identification of Phytoconstituents in the Ethanol Extract of *Vetiveria Lawsonii* Roots

Ramachandran P<sup>1\*</sup>, Geetha N<sup>2</sup> and Viji Saral Elezabeth D<sup>3</sup>

<sup>1</sup>Jairams Arts and Science College, Karur, Tamil Nadu, India.

<sup>2</sup>Paavaai Engineering College, Namakkal, Tamil Nadu, India.

<sup>3</sup>Nehru Memorial College, Puthanampatti, Trichy, Tamil Nadu, India.

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### ABSTRACT

Plants are playing an important role for the medicinal treatments due to the presence of bioactive compounds. The folk medicinal system is more effective than the modern medicinal systems because of their very low side effects. The selected plant, *Vetiveria lawsonii* is an Indian plant belongs to the family Poaceae. The plants of Poaceae family are used as analgesic, antibacterial, antiperspirant/ deodorants, astringent, depurative, digestive, emmenagogue, galactagogue, insect repellents and skin tonic. The present work dealt with the identification of phytoconstituents in the ethanol extract of the selected plant. The Soxhlet extraction was used for the preparation of ethanolic extract. The bioactive constituents were screened by the standard method, qualitatively. The GC-MS study was performed which revealed the presence of 6 phytoconstituents in the ethanol extract which can be the cause for the medicinal values of the plant. These results prominence further research on the isolation of the bioactive compounds.

**Keywords:** Soxhlet, GC-MS study, antibacterial, isolation, phytoconstituents, analgesic.

### INTRODUCTION

The traditional systems of medicine together with folklore systems continue to serve a large portion of the population, particularly in rural areas, in spite of the advent of the modern medicines. It is worthwhile to note that, about 80% of the human populations in India are still dependent on nature for remedies and this can be well understood from the fact that almost all systems of medicine are largely based on drugs of plant origin.

Vetiver is a tall, perennial grass which grows wild in drier, periodically flood inundated tracts, of western and north-central India. It produces spongy, much branched, root system (khus roots) with fine rootlets, containing fragrant oil which is a perfume by itself. The dry aromatic roots are also used to make curtains, mats, fans and other fancy goods as the product emits a sweet cooling aroma for a long period when moistened. The oil is used as a valuable fixative in blending of perfumes, cosmetics and scenting of soaps.

Its cultivation is largely scattered over small holdings in Kerala, Karnataka, Tamil Nadu and Andhra Pradesh and to a lesser extent in Uttar Pradesh. Considering the high quality of oil produced in India compared to Indonesia, Pakistan, Senegal, Sri Lanka, Brazil and Haiti. The north Indian type vetiver oil has a good potential for export. It also highlights the utilization of vetiver as MAP in Thailand that includes the utilization of vetiver in traditional medicine, in pest control, and as fragrant materials.

The present study is the investigation of the presence of various phytoconstituents in the ethanol extract of the

selected plant, *Vetiveria lawsonii* roots by GC-MS study along with the qualitative screening.

### MATERIALS AND METHODS

#### Extraction

The pulverized plant material was successively extracted with ethanol (1:10 w/v) by hot continuous percolation method using Soxhlet extractor. The extract was concentrated by using a rotary vacuum evaporator and subjected to dryness to yield crude residue. These residues were used for preliminary phytochemical screening of secondary metabolites.

#### Preliminary Qualitative Phytochemical Screening

The ethanol extract of *Vetiveria lawsonii* roots was analyzed for the presence of phytochemicals according to standard methods<sup>1</sup>.

#### GC – MS Study

The ethanol extract was filtered with sodium sulphate [2 g] 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 1 mL/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 (70 eV) were 280 °C and 300 °C, respectively. Each plant extract of 1 µL 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 AND DISCUSSION**

**Qualitative Phytochemical Screening**

The results of qualitative phytochemical screening of the plant extract are furnished in the following table.

Table 1: Results of qualitative phytochemical screening of ethanol extract of *Vetiveria lawsonii* roots

| S. No. | Phytoconstituents  | Result |
|--------|--------------------|--------|
| 1      | Alkaloids          | +      |
| 2      | Flavonoids         | +      |
| 3      | Carbohydrates      | +      |
| 4      | Saponins           | +      |
| 5      | Phenols            | -      |
| 6      | Tannins            | -      |
| 7      | Terpenoids         | +      |
| 8      | Proteins           | +      |
| 9      | Cardiac Glycosides | +      |
| 10     | Steroids           | +      |
| 11     | Anthocyanins       | -      |

- Absent      + Present

The positive results of phytochemical screening indicate the presence of alkaloids, flavonoids, carbohydrates, saponins, terpenoids, proteins, cardiac glycosides and steroids in ethanol extract of *Vetiveria lawsonii* roots.

**GC – MS Study**

The compounds present in the ethanol extract of *Vetiveria lawsonii* roots are identified by GC – MS analysis. The following is the chromatogram of ethanol extract of *Vetiveria lawsonii* roots.

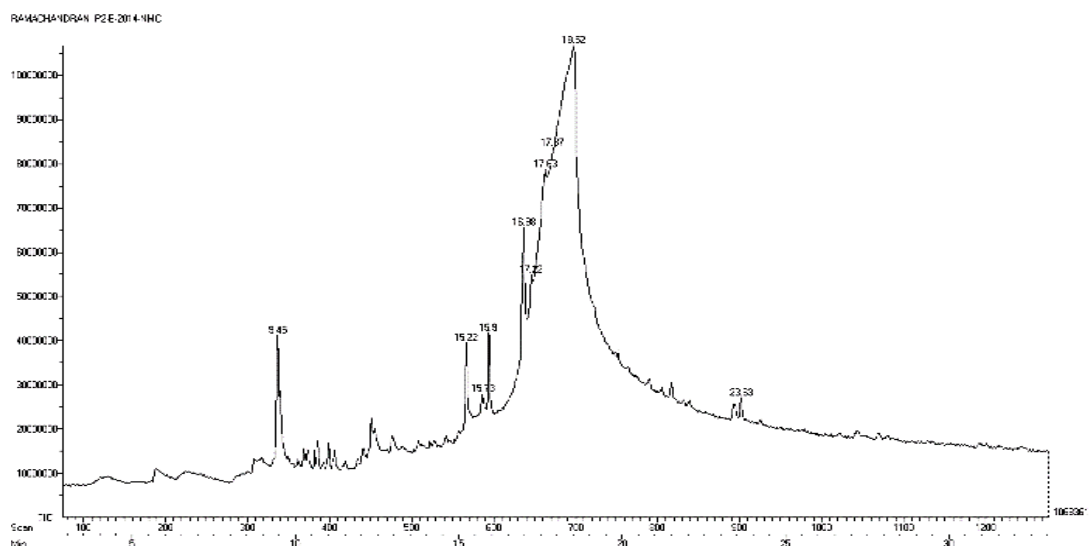


Figure 1: Chromatogram of ethanol extract of *Vetiveria lawsonii* roots

Gas Chromatography – Mass Spectrometry (GC – MS) is a valuable tool for reliable identification of phytocompounds. In this present research, 6 compounds have been identified from the ethanol extract of *Vetiveria lawsonii* roots by GC – MS analysis.

The name, retention time (RT), molecular formula, molecular weight (MW) and peak area % of the compounds present in the ethanol extract of *Vetiveria lawsonii* roots are presented in the following table.

Table 2: Compounds of *Vetiveria lawsonii* roots in ethanol extract

| S. No. | RT    | Name of the Compound                       | Molecular formula                              | MW  | Peak area % |
|--------|-------|--|--|-----|-------------|
| 1      | 9.5   | Cis- Linceol                               | C <sub>15</sub> H <sub>24</sub> O              | 220 | 9.22        |
| 2      | 15.25 | 13-Methyl-pentadecanoic acid, methyl ester | C <sub>17</sub> H <sub>34</sub> O <sub>2</sub> | 270 | 9.79        |
| 3      | 15.9  | Hexadecanoic acid, ethyl ester             | C <sub>18</sub> H <sub>36</sub> O <sub>2</sub> | 284 | 14.00       |
| 4      | 16.98 | 10-Octadecenoic acid, methyl ester         | C <sub>19</sub> H <sub>16</sub> O <sub>2</sub> | 296 | 22.03       |
| 5      | 18.52 | (E)-9-Octadecenoic acid                    | C <sub>18</sub> H <sub>34</sub> O <sub>2</sub> | 282 | 35.89       |
| 6      | 23.63 | Oleic acid                                 | C <sub>18</sub> H <sub>34</sub> O <sub>2</sub> | 282 | 9.08        |

The prevailing compounds in ethanol extract of *Vetiveria lawsonii* roots are as follows,

1. Hexadecenoic acid, ethyl ester – 14%
2. 10-Octadecenoic acid, methyl ester – 22.03%
3. (E)-9-Octadecenoic acid – 35.89%

### CONCLUSION

The GC-MS investigation confirmed that the presence of six phytoconstituents in the selected plant, *Vetiveria lawsonii* roots. These bioactive compounds might be the reason for its medicinal potential of the plant. This study is also encouraging the further research on the isolation of the identified phytoconstituents.

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