COMPARISON OF PHYTOCHEMICAL COMPONENTS IN LEAVES AND STEMS OF EXACUM BICOLOR ROXB. BY GCMS

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ABSTRACT
Gas Chromatography Mass Spectrometry (GCMS) analysis of the plants leaf and stem extract confirmed the presence of six and four major compounds in leaves and stem respectively. The presence of these compounds is a scientific indication that the plant can be used for therapeutic purposes. Further study in this regard is in progress to understand the complete potential of the bioactive compounds in this plant.

KEYWORDS: Exacum bicolor Roxb, bioactive compounds, GCMS, TLC.

INTRODUCTION
Exacum bicolor Roxb. (Gentianaceae) is a phytochemicaly unexplored traditional, medicinal herb which is endemic.\textsuperscript{1,2,3}

This plant is used as a traditional medicine for various ailments and diseases like diabetes fever, eye and skin diseases, urinary disorders and malaria.\textsuperscript{4,5,6,7,8} All the parts of this plant (from the flowers to the roots) are known to possess traditional uses.\textsuperscript{9,10} Even though the medicinal properties of this plant have been known from a long time, the active principles involved and their mechanism of action has not been studied. The present paper reports the GCMS analysis of the leaf and stem extracts of this plant.
MATERIALS AND METHODS

Collection and authentication of the plant material
The plant *Exacum bicolour* Roxb. was obtained from Bisele ghat in Sakaleshupura taluk Karnataka district. The plant was submitted and certified by National Ayurveda Dietetics Research Institute (NADRI) – Bengaluru.

Preparation of the plant material for analysis
The leaves and stems were shade dried under room temperature for 8 to 10 days. These were then powdered in an electric blender separately and sieved to obtain fine powder. This powder was stored in dry conditions for further analysis.

Gas Chromatography-Mass Spectrometry analysis
0.1g of the finely powdered material was dissolved in 1ml of hexane (SDFCL) and incubated for 72 hours.\(^5\) GCMS analysis was carried out using Agilent system with the following specifications: HP column-5MS, length 30m, inner diameter of 0.25 mm, film 0.25µm and carrier gas as helium with flow rate at 1ml/min. The inject volume is of 1µl with the inlet temperature at 240°C and detector (MS) at 230°C. The total run time was 55 minutes. Interpretation of 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 components was compared with the spectrum of known components stored in the NIST library.

RESULTS AND DISCUSSION
The GCMS analysis of leaves and stems of *E.bicolor* revealed the presence of six unique compounds in leaves (Table 1) and four unique compounds in stems (Table 2). The identification of the compounds was confirmed based on the retention time, peak area and the molecular formula.

**TABLE 1: GCMS Analysis of *Exacum Bicolor* Hexane Extract of Leaf**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>RT</th>
<th>Compound</th>
<th>Chemical formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>9.115</td>
<td>1-iodo-2-methylundecane</td>
<td>C12H25I</td>
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<tr>
<td>2.</td>
<td>10.641</td>
<td>sulfurous acid, pentyl undecyl ester</td>
<td>C16H34O3S</td>
</tr>
<tr>
<td>3.</td>
<td>9.831</td>
<td>2-hexyl-1-octanol</td>
<td>C14H30O</td>
</tr>
<tr>
<td>4.</td>
<td>7.19</td>
<td>sulfurous acid, hexyl undecyl ester</td>
<td>C17H36O3S</td>
</tr>
<tr>
<td>5.</td>
<td>10.062</td>
<td>1,1,1,5,7,7,7-heptamethyl-3,3 bis(trimethylsilox)tetrasiloxane</td>
<td>C13H40O5Si6</td>
</tr>
<tr>
<td>6.</td>
<td>8.126</td>
<td>hydroxylamine, o-decyl</td>
<td>C10H23NO</td>
</tr>
</tbody>
</table>
TABLE: 2 GCMS Analysis of Exacum Bicolor Hexane Extract of stem

<table>
<thead>
<tr>
<th>SL.No</th>
<th>RT</th>
<th>Compound</th>
<th>Chemical formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>9.841</td>
<td>eicosane, 10 methyl-</td>
<td>C21H44</td>
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<td>2.</td>
<td>12.451</td>
<td>ethanol, 2-(octadecyloxy)</td>
<td>C20H42O2</td>
</tr>
<tr>
<td>3.</td>
<td>13.472</td>
<td>methoxyacetic acid, 3-tetradecyl ester</td>
<td>C17H34O3</td>
</tr>
<tr>
<td>4.</td>
<td>10.062</td>
<td>cyclononaciloxane, octadecamethyl</td>
<td>C18H54O9S9</td>
</tr>
</tbody>
</table>

The compounds present in the leaf sample were 1-iodo-2-methylundecane (0.069%), sulfuric acid, pentyl undecyl ester, 2-hexyl-1-octanol, sulfuric acid (0.069%), hexyl undecyl ester (0.034%), 1,1,1,5,7,7,7-heptamethyl-3,3 bis (trimethylsiloxy) tetrasiloxane (0.039%), hydroxylamine, o-decyl (0.027%) and the compounds in the stem sample were eicosane, 10 methyl- (0.039%), ethanol, 2-(octadecyloxy) (0.049%), methoxyacetic acid, 3-tetradecyl ester (0.050%), cyclononaciloxane, octadecamethyl (0.039%). Certain compounds like pthalic acid butyl dodecyl ester, eicosane, 7 hexyl, tetradecane, 2-6-10 trimethyl, methoxyacetic acid, 4-tetradecyl ester and phenol 2-4-bis (1,1- dimethyl) were found to be present in both the samples.(Fig.1&2.).

Fig. 1: GCMS of Exacum bicolor Roxb.stems in hexane extract
The GCMS study indicated the presence of derivatives of phthalic acid and eicosanes in the plant, which have therapeutic value. Phenol, 2, 4-bis (1, 1-dimethylethyl) and derivatives present in plant is known for its hypolipidemic, antiarthritic and anti-inflammatory activities.\textsuperscript{2}\textsuperscript{9} Ethanol, 2-(octadecyloxy) and 2-hexyl-1-octanol contains antithrombotic and cholesterol lowering abilities along with flavor and fragrance enhancing agents. Sulfurous acid, pentyl undecyl ester contains antiseptic property. Compounds found to be exclusively present in stem, such as Cyclononaciloxane (octadecamethyl) is naturally used as a lubricant and contains antiperspirant property, Eicosane, 10 methyl- contains antioxidant property and Ethanol, 2-(octadecyloxy) has antipsoriatics property.

REFERENCES


