GC-MS study of *Artabotrys odoratissimus* fatty oil (leaves)

By Megha Sharma¹, Srilakshami Desiraju², Dilip Chaurey¹ and B.K. Mehta¹*

¹ School of Studies in Chemistry, Vikram University, Ujjain, India.
² Molecular Biology Unit, Chemistry Department Indian Institute of Science, Bangalore- 560 012

RESUMEN

Estudio por GC-MS del aceite de la hoja de *Artabotrys odoratissimus*.

El estudio por GC-MS de dos fracciones del aceite de la hoja de *Artabotrys odoratissimus* indicó la presencia de quince compuestos tales como: ácido nonanoico; fenil propionato de metilo; ácido decanoico; dialato de dietilo; dialato de dibutilo; 2-amino-3-etil bifeno; 5-metil-9-fenilnonan-3-ol; hexadeca-2,7,11-triene; 2,6-dimetil-1-fenilheptan-1-oa; 2,5-dimetiletradecahidrofenantreno; 1-fenilundecano; 1-isopropil-4,6-dimetil naftaleno; 5-[2-butilfenil]-3-penten-2-ol; 1-fenildecan-1-oa y 1-fenilundecan-1-oa. Algunos de estos compuestos son poco frecuentes y activos biológicamente.


SUMMARY

GC-MS study of *Artabotrys odoratissimus* fatty oil (leaves).

GC-MS study of two fatty oil fractions from *Artabotrys odoratissimus* (leaves) indicated the presence of fifteen compounds namely, nonanoic acid; methyl phenyl propanoate; decanoic acid; diethyl phthalate; dibutyl phthalate; 2-amino-3-ethyl biphenyl; 5-methyl-9-phenilnonan-3-ol; hexadeca-2,7,11-triene; 2,6-dimetil-1-fenilhepta-1-one; 2,5-dimetiltradecahidrofenantreno; 1-fenilundecano; 1-isopropil-4,6-dimetil naftaleno; 5-[2-butilfenil]-3-penten-2-ol; 1-fenildecan-1-oa and 1-fenilundecan-1-oa. Some of these compounds are rare occurring and biologically active.

KEY-WORDS: *Artabotrys odoratissimus* – Gas chromatography-Mass spectrometry – Leaves – Oil.

1. INTRODUCTION

*Artabotrys odoratissimus* locally known as “Kantili champa” is an ornamental plant and belongs to family Annonaceae. Its flowers are used in the treatment of vomiting, biliousness, blood and heart disease, itching, sweating, foul breath, thirst and headache. Decoction of its leaves are given for the treatment of cholera (1, 2).

The antifertility activity of *A. odoratissimus* has been confirmed in rats (3). The essential oil of leaves of *A. odoratissimus* has shown excellent to good anthelmintic property against tape worms, earthworms and round worms (4). From the stem bark of *A. odoratissimus* two steroids, β-sitosterol and stigmasterol, an aromatic compound benzyl benzoate and a noraporphine alkaloid asimilabine were isolated (5).

*A. odoratissimus* stem bark yielded spathulenol (0.006%), norstephalazine (0.004%), isopiline (0.002%), annonaine (0.002%), antherospermidine (0.004%), liridine (0.002%) and N-methyl cochlaurine (0.006%) (6). Some novel compounds namely pentadecyl-7-hydroxycarboxanoate, 4-epoxydodecanolate, 2,6-dimetil-tetradecahidrofenantreno-7,8-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-dietil, 2,6-dimetil-heptano-3,7-di...
maintained at 300°C and 200°C, respectively. Significant operating parameters of the MS were: ionisation voltage 70eV; ionisation current 100 µA; source temperature 225°C, accelerating voltage 1.33 kV; resolution 1000; scan speed 3 sec/decade. Data were processed on a Kratos DS-50 data processing system.

3. RESULTS

The GC-MS analysis of both fractions, AOGM-1 and AOGM-3 revealed the presence of nine and seven peaks respectively, corresponding to sixteen compounds in all, out of which fifteen compounds were identified by comparing their retention times, covet indexes and by interpretation of their mass spectra (9,10,11). The peak value of one compound was poor and hence rejected. Compounds I to VI were isolated from fraction code AOGM-3 and compounds VII to XV were isolated from fraction code AOGM-1.

The fifteen compounds identified were: nonanoic acid (I), methyl phenyl propanoate (II), decanoic acid (III), diethyl phthalate (IV), dibutyl phthalate (V), 2-amino-3-ethyl biphenyl (VI), 5-methyl-9-phenyl nonan-3-ol (VII), hexadeca -2,7,11-triene (VIII), 2,6-dimethyl-1-phenyl hepta-1-one (IX), 2,5-dimethyltetradecahydrophenanthrene (X), 1-phenylnundecane (XI), 1-isopropyl-4,6-dimethyl naphthalene (XII), 5-(2-butyl phenyl) pent -3-en-2-ol (XIII), 1-phenyldeca-1-one (XIV) and 1-phenylnundecan-1-one (XV).

Some of the compounds identified are rare and quite useful. This oil can be used as bactericide, since it contains a good amount of nonanoic acid.

<table>
<thead>
<tr>
<th>Peak No.</th>
<th>RT (min)</th>
<th>% in oil</th>
<th>Mol.ion peak</th>
<th>Base peak</th>
<th>Other important fragments</th>
<th>Identified Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>7.18</td>
<td>19.25</td>
<td>158</td>
<td>60</td>
<td>130,129,115,101,87,74,73,57.</td>
<td>nonanoic acid.</td>
</tr>
<tr>
<td>2.</td>
<td>7.39</td>
<td>11.64</td>
<td>164</td>
<td>104</td>
<td>164,133,121,91,77,65,51.</td>
<td>methyl phenyl propanoate.</td>
</tr>
<tr>
<td>3.</td>
<td>9.21</td>
<td>14.01</td>
<td>172</td>
<td>60</td>
<td>143, 129, 115, 101, 87, 74, 73, 59, 57.</td>
<td>decanoic acid.</td>
</tr>
<tr>
<td>4.</td>
<td>14.22</td>
<td>15.09</td>
<td>222</td>
<td>149</td>
<td>178,177,121,120,105,104,93,76,65,43.</td>
<td>diethyl phthalate .</td>
</tr>
<tr>
<td>5.</td>
<td>32.59</td>
<td>16.77</td>
<td>278</td>
<td>149</td>
<td>249,220,222,193,165,120,76,57.</td>
<td>dibutyl phthalate.</td>
</tr>
<tr>
<td>6.</td>
<td>19.92</td>
<td>19.08</td>
<td>197</td>
<td>182</td>
<td>168,152,141,128,115,89,63,51.</td>
<td>2-amino-3-ethyl biphenyl .</td>
</tr>
<tr>
<td>7.</td>
<td>13.12</td>
<td>5.43</td>
<td>234</td>
<td>91</td>
<td>219,203,191,159,133,119,105,91,85.</td>
<td>5-methyl-9-phenyl nonan-3-ol .</td>
</tr>
<tr>
<td>9.</td>
<td>13.97</td>
<td>5.48</td>
<td>218</td>
<td>134</td>
<td>203,175,147,133,134,119,91,79,77.</td>
<td>2,5-dimethyl(1-phenylheptan-1-one.</td>
</tr>
<tr>
<td>10.</td>
<td>14.65</td>
<td>33.02</td>
<td>220</td>
<td>81</td>
<td>205,177,159,149,135,121,107,93,67.</td>
<td>2,5-dimethyltetradecahydronaphthrene.</td>
</tr>
<tr>
<td>13.</td>
<td>16.21</td>
<td>13.30</td>
<td>218</td>
<td>147</td>
<td>204,203,175,161,133,122,105,91,77.</td>
<td>5-(2-butylphenyl) pent-3-en-2-ol.</td>
</tr>
<tr>
<td>14.</td>
<td>16.52</td>
<td>7.08</td>
<td>232</td>
<td>105</td>
<td>217,198,161,147,119,91.</td>
<td>1-phenyl dec-1-one.</td>
</tr>
<tr>
<td>15.</td>
<td>18.65</td>
<td>7.91</td>
<td>246</td>
<td>105</td>
<td>231,216,183,174,158,145,91.</td>
<td>1-phenyl undecan-1-one.</td>
</tr>
</tbody>
</table>
(19.15 %), which is being reported as a good bactericide and fungicide. It is used in the preparation of snail repellents and also isolated from Ajania, Rhamnus (12), Artimisia spp. (13), and human skin. Its simple esters are used as flavoring ingredients. The oil also contains a fungistat active compound identified as 2-amino-3-ethylbiphenyl (1.13 %), especially used for oranges (14).

The oil also contains diethyl phthalate (16.77 %) which is a toxic compound used as plasticiser (14). Decanoic acid (14 %) is also found as a glyceroids in some milks. It is used as corrosion inhibitor and surfactant. Its simple esters have perfume and flavor properties (15,16). The results and mass fragmentation data are being given in Table 1.

REFERENCES


Recibido: Octubre 2000
Aceptado: Octubre 2001