Chemical composition of the leaf oil of *Litsea glutinosa* (Lour.) C. B. Rob. from Ha Tinh province

Nguyen Thi Hien¹, Tran Dinh Thang², Do Ngoc Dai³*, Tran Huy Thai³

¹Faculty of Biology, Vinh University, 182 Le Duan, Vinh, Nghe An, Vietnam
²Faculty of Chemistry, Vinh University, 182 Le Duan, Vinh, Nghe An, Vietnam
³Institute of Ecology and Biological Resources, Vietnamese Academy of Science and Technology, 18 Hoang Quoc Viet, Hanoi, Vietnam

Nhận ngày 1 tháng 3 năm 2010

Abstract. Fresh leaves of *Litsea glutinosa* (Lour.) C. B. Rob. from Ha Tinh were steam distilled to produce an oil in 0.15% yield. The essential oil was analysis by a combination of capillary GC and GC/MS. Seventy eight compounds were detected in the oil, of which more than 95.18% were terpenoids. The major components were (E)-β-ocimene (13.35%), β-caryophyllene (27.20%) and bicyclogermacrene (18.16%).

Keywords: *Litsea glutinosa*, Lauraceae, essential oil composition, (E)-β-ocimene, β-caryophyllene, bicyclogermacrene.

1. Introduction

The genus Litsea is a member of the Lauraceae and comprises more than 400 species which are distributed widely throughout tropical and subtropical Asia, Australia, North America to subtropical South America; 73 species have been recorded in China, most of them located in south and southwest warm regions [1]; 45 species have been found in Vietnam, until now [2].

*Litsea glutinosa* is an evergreen medium-sized tree. Its barks and leaves are used as a demulcent and mild astringent for diarrhea and dysentery, the roots are used for poulticing sprains and bruises, and the oil extracted from the seeds is used in the treatment of rheumatism [3]. Some psychopharmacological actions of the essential oil of *Litsea glutinosa* (Lour.) C. B. Rob. have been studies by Menon K. M. et al. [4]. Effect of essential oil of *Litsea glutinosa* (Lour.) C. B. Rob. on cardiovascular system and isolated tissues have been investigated by same authors [5]. Flavonoids and aporphine alkaloids were isolated from *Litsea glutinosa* [6, 7]. A water-soluble arabinoxylan (D-xylose and L-arabinose in the molar ratio 1.0:3.4) was isolated from the mucilaginous bark of *Litsea glutinosa* [8].

Recently, research disclosed that the MeOH extract of *Litsea glutinosa* bark effectively inhibited both Gram-positive and Gram-
negative bacteria. The results justify the reported uses in diarrhea and dysentery [9].

The BuOH extract of the leaves and twigs of *Litsea glutinosa* were shown to exhibit significant cytotoxic activity against human Hela cell lines in vitro. Chemical examination of the BuOH extract of the leaves and twigs of *Litsea glutinosa* collected from Xishuangbanna resulted in the isolation of two new aporphine alkaloids, namely litseglutine A and B, along with two known aporphine alkaloids, boldine and laurolitsine [10].

In the course of the systematic study of *Litsea* in Indochina, monoterpenes, sesquiterpenes and other components of the leaf oil of *Litsea glutinosa* from Ha Tinh province have been investigated.

2. Experimental

1. **Source** - *Litsea glutinosa* (Lour.) C. B. Rob. (Lauraceae), is a shrub tree up to 7-10 m high, growing in Vietnam. The leaves of *Litsea glutinosa* were collected in April 2009, in Vu Quang National park, Ha Tinh province. A voucher specimen (NH110) was deposited at the Herbarium of the Faculty of Biology, Vinh University.

   Fresh leaves were shredded and their oil were obtained by steam distillation for 3 h at normal pressure, according to the Vietnamese Pharmacopoeia [11]. The yield of the fresh leaf oil was 0.15%.

2. **GC** - About 15 mg of oil, which was dried with anhydrous sodium sulfate, was dissolved in 1 ml of n-hexane (for spectroscopy or chromatography).

   GC analysis was performed on a HP 6890 Plus Gas chromatograph equipped with a FID and fitted with HP-5MS column (L = 30 mm, ID = 0.25 mm, film thickness = 0.25 µm). The analytical conditions were: carrier gas H₂, injector temperature (PTV) 250 °C, detector temperature 260 °C, temperature programmed 60 °C (2 min hold) to 220 °C (10 min hold) at 4 °C/min.

3. **GC/MS** - An Agilent Technologies HP 6890 N Plus Chromatograph was fitted with a fused silica capillary column HP-5MS column (L = 30 mm, ID = 0.25 mm, film thickness = 0.25 µm). The condition of use were the same as described above with He as carrier gas, and interface with a mass spectrometer HP 5973 MSD (70 eV). Component identification was carried out by comparing MS data with those reported in Library Willey on Chemstation HP, and in some cases substances identified from oils known composition and also with standard substances [12-17].

3. Results and discussion

Of the more than 90 leaf oil components of *Litsea glutinosa* that were separated by capillary GC in this study, 78 were identified after GC/MS analysis, representing 95.18% of the total (Table 1).

<table>
<thead>
<tr>
<th>No</th>
<th>Compounds</th>
<th>KI</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FID</td>
<td></td>
</tr>
<tr>
<td>tricylene</td>
<td>927</td>
<td>trace</td>
<td></td>
</tr>
<tr>
<td>α-thujene</td>
<td>931</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>α-pinene</td>
<td>939</td>
<td>3.38</td>
<td></td>
</tr>
<tr>
<td>camphene</td>
<td>953</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>sabinene</td>
<td>976</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>β-pinene</td>
<td>980</td>
<td>3.26</td>
<td></td>
</tr>
<tr>
<td>myrcene</td>
<td>990</td>
<td>1.91</td>
<td></td>
</tr>
<tr>
<td>α-phellandrene</td>
<td>1006</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>δ3-carene</td>
<td>1011</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>α-terpinene</td>
<td>1017</td>
<td>trace</td>
<td></td>
</tr>
<tr>
<td>p-cymene</td>
<td>1026</td>
<td>trace</td>
<td></td>
</tr>
<tr>
<td>o-cymene</td>
<td>1028</td>
<td>trace</td>
<td></td>
</tr>
</tbody>
</table>
The monoterpenes represented the most abundant component with (E)-β-ocimene (13.35%), α-pinene (3.38%), β-pinene (3.26%), (Z)-β-ocimene (2.54%), myrcene (1.91%), limonene (1.30%), (E)-anethol (1.04%) and other components with content lower than 1.00%. Among the sesqui-terpenes, there were caryophyllene (27.20%), bicyclogermacrene (18.16%), α-humulene (3.04%), nerolidol (2.73%), caryophyllene oxide (2.21%), germacrene D (1.48%) and other constituents with content lower than 1.00%.

The oxygenated compounds such as linalool, nonanal, menthone, iso-menthone, (Z)-, (E)- anethol, decanal, octyl acetate, linalyl acetate, 2-undecanone, bornyl acetate, undecanal, neryl acetate, dodecanal, (E)-nerolidol, bourboneol, germacrene-D-4-ol, spathulenol, caryophyllene oxide, cedrol, ledol, α-cedrene, 1640 trace

(+) - bicyclosesquiphellandrene

Note: trace < 0.1; KI = Kovats index

The essential oil contains also small amount of n-paraffin: n-eicosane, n-heneicosane, n-docosane and n-heptacosane.
References


Nghiên cứu thành phần hóa học tinh dầu lá cây Bội lốp nhất (Litsea glutinosa (Lour.) C. B. Rob.) ở Hà Tĩnh

Nguyễn Thị Hiền1, Trần Đình Thắng2, Đỗ Ngọc Đài3, Trần Huy Thái3

1Khoa Sinh học, Đại học Vinh, 182 Lê Duẩn, Vinh, Nghệ An, Việt Nam
2Khoa Hóa học, Đại học Vinh, 182 Lê Duẩn, Vinh, Nghệ An, Việt Nam
3Viện Sinh thái và Tài nguyên Sinh vật, Viện Khoa học và Công nghệ Việt Nam, 18 Hoàng Quốc Việt, Hà Nội, Việt Nam

Hàm lượng tinh dầu từ lá cây Bội lốp nhất là 0,15% theo nguyên liệu tươi. Nghiên cứu thành phần hóa học của tinh dầu lá cây Bội lốp nhất (Litsea glutinosa (Lour.) C. B. Rob.) ở Hà Tĩnh bằng phương pháp sắc ký khí (GC) và sắc ký khí khối phổ (GC/MS), hon 90 hợp chất được tách ra từ tinh dầu, trong đó 78 hợp chất được xác định (chiếm 95,18% tổng hàm lượng tinh dầu). Thành phần chính của tinh dầu là (E)-β-ocimene (13,35%), β-caryophyllen (27,20%) và bicyclogermacren (18,16%).