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# Chemical Composition of the Essential Oil of *Lantana camara* L. from Cuba

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**Abstract**

The essential oil obtained from leaves of *Lantana camara* L. from Cuba was analyzed by GC-FID and GC/MS. The oil was characterized by the high percentage of sesquiterpenes. The major components were (E)-nerolidol (43.4%), γ-cadinene (7.6%), α-humulene (4.9%) and β-caryophyllene (4.8%).

**Key Word Index**

*Lantana camara*, Verbenaceae, lantana, essential oil composition, (E)-nerolidol.

## Plant Name

*Lantana camara* L. (Verbenaceae). Common name: lantana.

## Source

The plant material was collected in an experimental plantation near Havana. A voucher specimen was deposited at the Herbarium of the National Botanic Garden in Havana.

## Plant Part

Leaves from flowering plants were air-dried for six days before lab-distillation. The oil (0.44%) was obtained by hydrodistillation for 4 h in a Clevenger-type apparatus.

## Previous Work

*Lantana camara* L., a common weedy plant, is used in folklore remedies and traditional medicine for treating human diseases (1-3). The plant has been shown to have fungitoxic activity (4), to be autotoxic (5) and to be poisonous to animals (6). The oil of *L. camara* has been the object of several chemical studies in other countries (7-19). From these reports, it is clear that in different geographical regions the chemical composition of the oil varies considerably. So far no attempt has been made to examine the chemical composition of the oil of this plant growing in Cuba.

## Present Work

The oil was analyzed by GC using a Hewlett-Packard 6890 GC equipped with a flame ionization detector (FID). The separations were performed using an SPB-5 column (30 m x 0.25 mm, 0.25 μm film thickness) with an oven temperature program of 60°C (2 min), then at 4°C/min to 250°C (20 min). The carrier gas was helium with a flow-rate of 1 mL/min. The temperature of the injector and detector was 250°C. The injection was made in the split mode (1:10 ratio). Quantitative data of the constituents were obtained by FID and electronic integration without the use of these factors.

GC/MS analysis of the oil was performed on a Hewlett-Packard series 6890 gas chromatograph equipped with an HP 5973 mass-selective detector. The chromatographic conditions were the same as those described for the GC-FID. The detector operated in impact electron mode (70 eV) at 230°C. Detection was performed in the scan mode between 35 and 400 amu.

Component identification was carried out by comparing the relative retention indices and mass spectra of reference

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**Table I. Chemical composition of lantana leaf oil from Cuba**

| Compound | RI[a] | Area % | Compound | RI[a] | Area % |
|---|---|---|---|---|---|
| (Z)-3-hexenol | 857 | t | β-gurjunene | 1430 | 0.3 |
| 2-butanone | 890 | t | γ-elemene | 1433 | 0.1 |
| α-thujene | 931 | t | α-guaiene | 1439 | 0.1 |
| verbenene | 966 | t | α-humulene | 1454 | 4.9 |
| 1-octen-3-ol | 977 | 0.1 | allo-aromadendrene | 1460 | 0.2 |
| 3-octanol | 993 | t | 1,4,9-cadalatriene[b] | 1475 | 0.1 |
| γ-terpinene | 1062 | 0.2 | γ-muurolene | 1477 | 0.4 |
| terpinolene | 1088 | 0.3 | germacrene D | 1481 | 1.9 |
| linalool | 1098 | 0.3 | ar-curcumene | 1483 | 0.6 |
| p-mentha-1,3,8-triene | 1111 | 0.1 | (E)-β-ionone | 1485 | 0.1 |
| α-campholenal | 1124 | t | *cis*-β-guaiene | 1490 | 3.6 |
| *trans*-sabinol | 1140 | 0.1 | α-muurolene | 1499 | 0.5 |
| 4-ketoisophorone | 1142 | t | germacrene A | 1504 | 0.5 |
| unknown 1 | 1146 | 2.3 | β-bisabolene | 1509 | 0.1 |
| pinocarvone | 1162 | 0.2 | γ-cadinene | 1512 | 7.6 |
| borneol | 1165 | 0.2 | δ-cadinene | 1524 | 0.9 |
| terpinen-4-ol | 1178 | 0.1 | *trans*-clamenene | 1532 | 0.1 |
| α-terpineol | 1189 | 0.1 | cadina-1,4-diene | 1532 | 0.1 |
| myrtenol | 1194 | 0.1 | α-calacorene | 1541 | t |
| verbenone | 1204 | 0.3 | germacrene B | 1557 | 2.3 |
| *cis*-carveol | 1229 | 0.1 | (E)-nerolidol | 1564 | 43.4 |
| thymol | 1290 | t | unknown 2 | 1576 | 1.2 |
| δ-elemene | 1340 | 0.1 | unknown 3 | 1615 | 2.7 |
| α-cubebene | 1351 | 0.1 | unknown 4 | 1626 | 1.4 |
| α-ylangene | 1370 | t | γ-eudesmol | 1630 | 1.7 |
| α-copaene | 1376 | 0.1 | epi-α-cadinol | 1638 | 1.6 |
| β-bourbonene | 1383 | t | unknown 5 | 1640 | 2.8 |
| β-cubebene | 1390 | 0.2 | α-muurolol | 1645 | 2.1 |
| β-elemene | 1391 | 0.4 | unknown 6 | 1642 | 1.4 |
| β-caryophyllene | 1418 | 4.8 | phytol | 1949 | t |

[a]retention indices; [b]tentative identification; t = trace (< 0.1%)
mass spectra of unknown compounds [m/z (% rel. int.)]:
unknown 1: 91(100), 119(83), 134(30), 117(19), 79(15), 105(13), 115(12).
unknown 2: 159(100), 131(66), 145(52), 202(50), 105(42), 91(41), 187(40), 119(28), 205(20).
unknown 3: 159(100), 131(69), 205(55), 202(52), 145(50), 122(44), 105(39), 91(38), 187(37).
unknown 4: 91(100), 161(97), 93(97), 160(94), 187(84), 119(79), 121(79), 131(79), 159(73), 81(59), 69(51).
unknown 5: 159(100), 202(71), 131(63), 145(45), 187(41), 117(29), 91(26), 119(25), 105(21), 220(1).
unknown 6: 161(100), 105(53), 119(41), 204(36), 93(28), 91(26), 79(15), 81(14).

compounds in both columns. Mass spectra of published data were also compared (20,21).

The volatile compounds identified in the leaf oil of *L. camara* from Cuba are listed in Table I. Fifty-four compounds were identified in the oil, which was characterized by the high percentage of sesquiterpenes. The major components were (E)-nerolidol (43.4%), γ-cadinene (7.6%), α-humulene (4.9%) and β-caryophyllene (4.8%).

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