

Date : 2024-01-22

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24A15-PTH12

Customer Identification : Cinnamon Leaf - Sri Lanka - CB0108R

Type : Essential Oil

Source : *Cinnamomum zeylanicum* [syn. *Cinnamomum verum*]

Customer : Plant Therapy

Checked and approved by:

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

✳ISO

Results : See analysis summary (next page)

Analyst : Sylvain Mercier, M. Sc., Chimiste 2014-005

Date : 2024-01-18

PHYSICOCHEMICAL DATA

Refractive index : 1.5351 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2024-01-16

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY - CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

| Identification | % | Class |
|-------------------------------------|------|----------------------|
| Toluene | tr | Simple phenolic |
| Hexanal | tr | Aliphatic aldehyde |
| Ethyl 2-methylbutyrate | tr | Aliphatic ester |
| Styrene | 0.02 | Simple phenolic |
| Tricyclene | tr | Monoterpene |
| α -Thujene | 0.07 | Monoterpene |
| α -Pinene | 0.79 | Monoterpene |
| Camphene | 0.19 | Monoterpene |
| α -Fenchene | 0.02 | Monoterpene |
| Benzaldehyde | 0.16 | Simple phenolic |
| β -Pinene | 0.37 | Monoterpene |
| Sabinene | 0.01 | Monoterpene |
| Myrcene | 0.10 | Monoterpene |
| Octanal | 0.02 | Aliphatic aldehyde |
| α -Phellandrene | 0.95 | Monoterpene |
| Δ^3 -Carene | 0.06 | Monoterpene |
| α -Terpinene | 0.09 | Monoterpene |
| <i>meta</i> -Cymene | 0.02 | Monoterpene |
| <i>para</i> -Cymene | 0.54 | Monoterpene |
| 1,8-Cineole | 0.11 | Monoterpenic ether |
| β -Phellandrene | 0.30 | Monoterpene |
| Limonene | 0.29 | Monoterpene |
| (<i>Z</i>)- β -Ocimene | 0.04 | Monoterpene |
| (<i>E</i>)- β -Ocimene | 0.04 | Monoterpene |
| γ -Terpinene | 0.03 | Monoterpene |
| Acetophenone | 0.01 | Simple phenolic |
| <i>cis</i> -Linalool oxide (fur.) | 0.02 | Monoterpenic alcohol |
| Isoterpinolene | 0.01 | Monoterpene |
| Terpinolene | 0.08 | Monoterpene |
| <i>trans</i> -Linalool oxide (fur.) | 0.03 | Monoterpenic alcohol |
| <i>para</i> -Cymenene | 0.01 | Monoterpene |
| Linalool | 1.91 | Monoterpenic alcohol |
| <i>cis-para</i> -Menth-2-en-1-ol | 0.01 | Monoterpenic alcohol |
| <i>trans</i> -Pinocarveol | tr | Monoterpenic alcohol |
| Camphor | 0.01 | Monoterpenic ketone |
| <i>trans</i> -Sabinol | tr | Monoterpenic alcohol |
| Camphene hydrate | 0.01 | Monoterpenic alcohol |
| Hydrocinnamal | 0.05 | Phenylpropanoid |
| Borneol | 0.08 | Monoterpenic alcohol |
| 3-Methylbenzofuran? | 0.02 | Phenylpropanoid |

| | | |
|---|-------|------------------------|
| Benzyl acetate | 0.01 | Phenolic ester |
| Terpinen-4-ol | 0.08 | Monoterpenic alcohol |
| Cryptone | 0.01 | Normonoterpenic ketone |
| <i>para</i> -Cymen-8-ol | 0.03 | Monoterpenic alcohol |
| Myrtenal | 0.01 | Monoterpenic aldehyde |
| α -Terpineol | 0.24 | Monoterpenic alcohol |
| <i>cis</i> -Piperitol | 0.02 | Monoterpenic alcohol |
| <i>cis</i> - α -Phellandrene epoxide (iPr vs Me) | 0.04 | Monoterpenic ether |
| Hydrocinnamyl alcohol | 0.09 | Phenylpropanoid |
| <i>ortho</i> -Anisaldehyde | 0.02 | Simple phenolic |
| Phenylethyl acetate | 0.02 | Phenolic ester |
| Geraniol | 0.02 | Monoterpenic alcohol |
| Chavicol | 0.14 | Phenylpropanoid |
| (<i>E</i>)-Cinnamal | 1.28 | Phenylpropanoid |
| Safrole | 0.82 | Phenylpropanoid |
| (<i>E</i>)-Cinnamyl alcohol | 0.07 | Phenylpropanoid |
| α -Cubebene | 0.02 | Sesquiterpene |
| <i>ortho</i> -Methoxyhydrocinnamal? | 0.02 | Phenylpropanoid |
| Eugenol | 77.21 | Phenylpropanoid |
| Hydrocinnamyl acetate | 0.09 | Phenylpropanoid ester |
| α -Copaene | 0.51 | Sesquiterpene |
| β -Cubebene | 0.01 | Sesquiterpene |
| β -Elemene | 0.02 | Sesquiterpene |
| Methyleugenol | 0.05 | Phenylpropanoid |
| β -Caryophyllene | 3.24 | Sesquiterpene |
| Aromadendrene | 0.05 | Sesquiterpene |
| (<i>E</i>)-Cinnamyl acetate | 1.25 | Phenylpropanoid ester |
| α -Humulene | 0.55 | Sesquiterpene |
| allo-Aromadendrene | 0.02 | Sesquiterpene |
| (<i>E</i>)- β -Farnesene | 0.01 | Sesquiterpene |
| <i>trans</i> -Cadina-1(6),4-diene | 0.01 | Sesquiterpene |
| γ -Muurolene | 0.02 | Sesquiterpene |
| Germacrene D | 0.02 | Sesquiterpene |
| <i>ar</i> -Curcumene | 0.02 | Sesquiterpene |
| Viridiflorene | 0.06 | Sesquiterpene |
| Bicyclogermacrene | 0.10 | Sesquiterpene |
| α -Muurolene | 0.02 | Sesquiterpene |
| γ -Cadinene | 0.04 | Sesquiterpene |
| δ -Cadinene | 0.11 | Sesquiterpene |
| <i>trans</i> -Calamenene | 0.02 | Sesquiterpene |
| <i>trans</i> -Cadina-1,4-diene | 0.02 | Sesquiterpene |
| Eugenyl acetate | 1.93 | Phenylpropanoid ester |
| α -Calacorene | 0.01 | Sesquiterpene |
| Isocaryophyllene epoxide B | 0.02 | Sesquiterpenic ether |
| β -Calacorene | 0.02 | Sesquiterpene |

| | | |
|---|--------------|--------------------------|
| Spathulenol | 0.05 | Sesquiterpenic alcohol |
| Caryophyllene oxide | 0.40 | Sesquiterpenic ether |
| Unknown | 0.01 | Oxygenated sesquiterpene |
| Viridiflorol | 0.01 | Sesquiterpenic alcohol |
| Humulene epoxide II | 0.09 | Sesquiterpenic ether |
| Tetradecanal | 0.01 | Aliphatic aldehyde |
| 10-epi-Cubenol? | 0.02 | Sesquiterpenic alcohol |
| Caryophylladienol I | 0.02 | Sesquiterpenic alcohol |
| Caryophylladienol II | 0.02 | Sesquiterpenic alcohol |
| τ -Muurolol | 0.03 | Sesquiterpenic alcohol |
| τ -Cadinol | 0.02 | Sesquiterpenic alcohol |
| Unknown | 0.01 | Sesquiterpenic alcohol |
| α -Cadinol | 0.02 | Sesquiterpenic alcohol |
| (3Z)-Caryophylla-3,8(13)-dien-5 β -ol | 0.03 | Sesquiterpenic alcohol |
| (E)-Coniferyl alcohol | 0.02 | Phenylpropanoid |
| (E)-Coniferaldehyde | 0.01 | Phenylpropanoid |
| Benzyl benzoate | 3.20 | Phenolic ester |
| Phenylethyl benzoate | 0.04 | Phenolic ester |
| Unknown | 0.01 | Unknown |
| Unknown | 0.01 | Unknown |
| Unknown | 0.01 | Unknown |
| Unknown | 0.01 | Unknown |
| Unknown | 0.03 | Lignan |
| Unknown | 0.01 | Lignan |
| Consolidated total | 98.96 | |

tr: The compound has been detected below 0.005% of the total signal

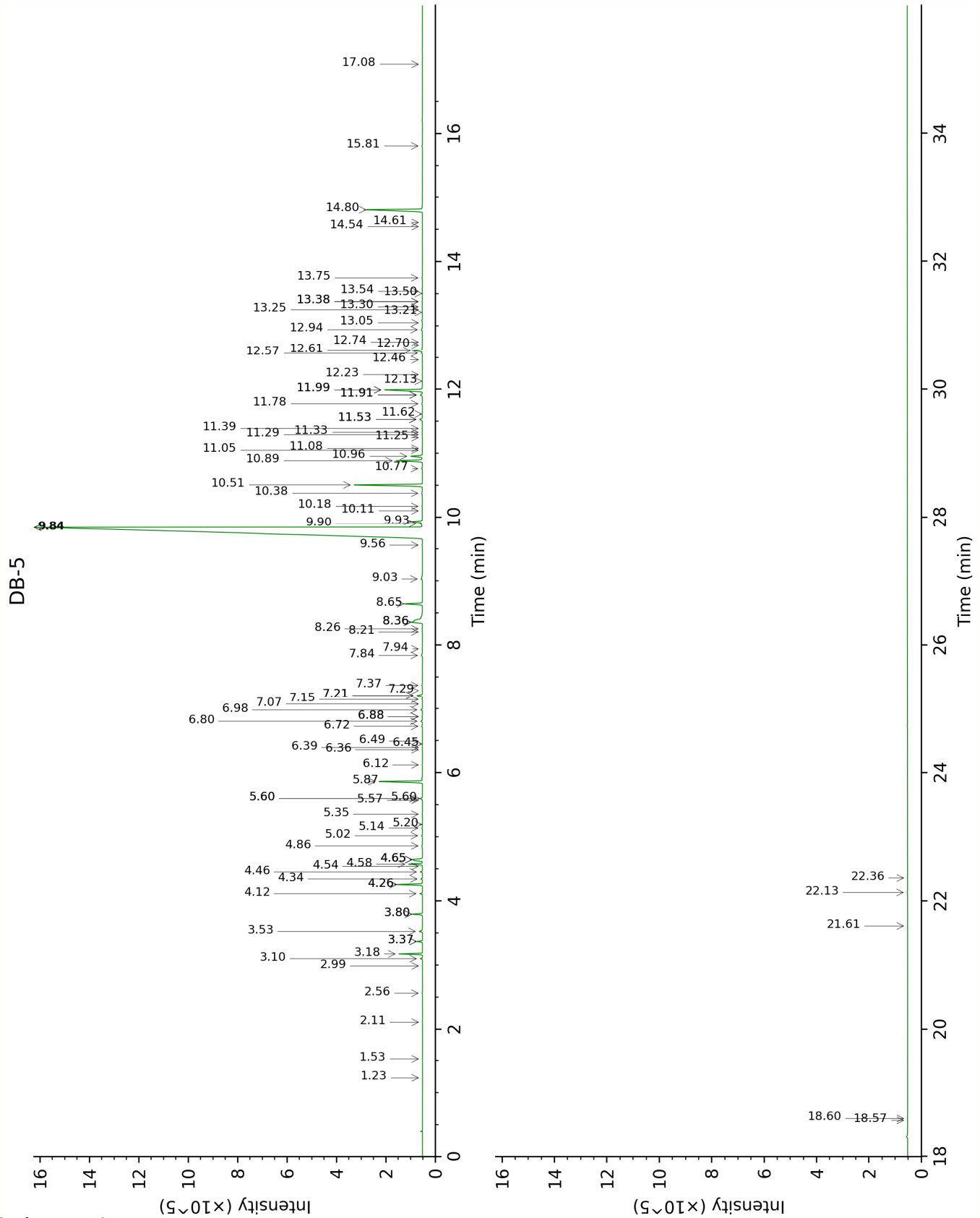
Note: no correction factor was applied

About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm is set to prioritize data from the most standard DB-5 column, and smallest values so as to avoid overestimating individual content. This process is semi-automatic. Advanced users are invited to consult the "Full analysis data" table after the chromatograms in this report to access the full untreated data and perform their own calculations if needed.

Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

Bracketed value ([xx]): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

This page was intentionally left blank. The following pages present the complete data of the analysis.



FULL ANALYSIS DATA

| Toluene | Column DB-WAX | | | Column DB-5 | | |
|-------------------------------------|---------------|--------|--------|-------------|--------|--------|
| | 1.54* | 1000.6 | [0.07] | 1.23 | 760.0 | tr |
| Hexanal | 2.00 | 1043.6 | tr | 1.53 | 800.5 | tr |
| Ethyl 2-methylbutyrate | 1.77* | 1021.5 | [0.01] | 2.11 | 850.3 | tr |
| Styrene | 4.02 | 1207.1 | 0.02 | 2.56 | 887.3 | 0.02 |
| Tricyclene | 1.35 | 972.4 | tr | 2.99 | 918.8 | tr |
| α -Thujene | 1.54* | 1000.6 | [0.07] | 3.10 | 926.3 | 0.07 |
| α -Pinene | 1.48 | 991.7 | 0.78 | 3.18 | 931.2 | 0.79 |
| Camphene | 1.83 | 1027.8 | 0.19 | 3.37* | 943.9 | [0.21] |
| α -Fenchene | 1.77* | 1021.5 | [0.01] | 3.37* | 943.9 | [0.21] |
| Benzaldehyde | 7.49 | 1458.2 | 0.17 | 3.53 | 954.2 | 0.16 |
| β -Pinene | 2.24 | 1066.2 | 0.37 | 3.80* | 971.9 | [0.39] |
| Sabinene | 2.42 | 1083.7 | 0.01 | 3.80* | 971.9 | [0.39] |
| Myrcene | 3.03 | 1132.3 | 0.10 | 4.12 | 993.0 | 0.10 |
| Octanal | 4.63 | 1250.4 | 0.02 | 4.26* | 1002.4 | [0.96] |
| α -Phellandrene | 2.94 | 1125.6 | 0.95 | 4.26* | 1002.4 | [0.96] |
| Δ^3 -Carene | 2.74 | 1110.3 | 0.06 | 4.34 | 1007.9 | 0.06 |
| α -Terpinene | 3.11 | 1139.0 | 0.09 | 4.46 | 1014.8 | 0.09 |
| <i>meta</i> -Cymene | 4.27* | 1224.6 | [0.55] | 4.54 | 1020.2 | 0.02 |
| <i>para</i> -Cymene | 4.27* | 1224.6 | [0.55] | 4.58 | 1022.3 | 0.54 |
| 1,8-Cineole | 3.46 | 1165.3 | 0.11 | 4.65* | 1026.8 | [0.70] |
| β -Phellandrene | 3.44 | 1163.7 | 0.30 | 4.65* | 1026.8 | [0.70] |
| Limonene | 3.34 | 1156.5 | 0.29 | 4.65* | 1026.8 | [0.70] |
| (<i>Z</i>)- β -Ocimene | 3.97 | 1203.7 | 0.03 | 4.86 | 1040.1 | 0.04 |
| (<i>E</i>)- β -Ocimene | 4.15 | 1216.1 | 0.04 | 5.02 | 1050.0 | 0.04 |
| γ -Terpinene | 3.94 | 1201.4 | 0.03 | 5.14 | 1057.4 | 0.03 |
| Acetophenone | 9.14 | 1583.3 | 0.01 | 5.20 | 1061.0 | 0.01 |
| <i>cis</i> -Linalool oxide (fur.) | 6.71 | 1400.6 | 0.02 | 5.35 | 1071.0 | 0.02 |
| Isoterpinolene | 4.39 | 1233.3 | 0.01 | 5.57 | 1084.6 | 0.01 |
| Terpinolene | 4.45 | 1237.9 | 0.08 | 5.60* | 1086.2 | [0.12] |
| <i>trans</i> -Linalool oxide (fur.) | 7.09 | 1428.2 | 0.03 | 5.60* | 1086.2 | [0.12] |
| <i>para</i> -Cymenene | 6.50 | 1385.5 | 0.01 | 5.60* | 1086.2 | [0.12] |
| Linalool | 8.24 | 1514.4 | 1.91 | 5.86 | 1102.9 | 1.91 |
| <i>cis-para</i> -Menth-2-en-1-ol | 8.30 | 1519.0 | 0.02 | 6.12 | 1119.3 | 0.01 |
| <i>trans</i> -Pinocarveol | 9.35* | 1599.6 | [0.02] | 6.36 | 1134.5 | tr |
| Camphor | 7.40 | 1451.2 | 0.01 | 6.39 | 1136.6 | 0.01 |
| <i>trans</i> -Sabinol | 10.01 | 1653.1 | 0.01 | 6.45 | 1140.2 | tr |
| Camphene hydrate | 8.63* | 1544.0 | [3.23] | 6.49 | 1143.0 | 0.01 |
| Hydrocinnamal | 10.68 | 1708.0 | 0.05 | 6.72 | 1157.7 | 0.05 |
| Borneol | 9.96* | 1649.1 | [0.30] | 6.80 | 1162.8 | 0.08 |
| 3-Methylbenzofuran? | 10.36 | 1681.2 | 0.02 | 6.88* | 1167.4 | [0.03] |
| Benzyl acetate | 10.23 | 1670.8 | 0.01 | 6.88* | 1167.4 | [0.03] |
| Terpinen-4-ol | 8.75* | 1553.5 | [0.11] | 6.98 | 1174.1 | 0.08 |
| Cryptone | 9.35* | 1599.6 | [0.02] | 7.07 | 1180.0 | 0.01 |

| | | | | | | |
|---|--------|--------|--------|--------|--------|---------|
| <i>para</i> -Cymen-8-ol | 11.70 | 1794.1 | 0.04 | 7.15 | 1184.7 | 0.03 |
| Myrtenal | 8.85 | 1561.4 | 0.01 | 7.21* | 1188.7 | [0.25] |
| α -Terpineol | 9.96* | 1649.1 | [0.30] | 7.21* | 1188.7 | [0.25] |
| <i>cis</i> -Piperitol | 9.78* | 1634.8 | [0.02] | 7.29 | 1193.7 | 0.02 |
| <i>cis</i> - α -Phellandrene epoxide (iPr vs Me) | 11.20* | 1751.7 | [0.07] | 7.37 | 1199.0 | 0.04 |
| Hydrocinnamyl alcohol | 13.76 | 1978.8 | 0.10 | 7.84 | 1230.0 | 0.09 |
| <i>ortho</i> -Anisaldehyde | 12.63* | 1875.6 | [0.19] | 7.94 | 1236.8 | 0.02 |
| Phenylethyl acetate | 11.20* | 1751.7 | [0.07] | 8.21 | 1254.5 | 0.02 |
| Geraniol | 11.86 | 1807.3 | 0.01 | 8.26 | 1257.7 | 0.02 |
| Chavicol | 16.65 | 2264.1 | 0.14 | 8.36*† | 1264.6 | [1.24] |
| (<i>E</i>)-Cinnamal | 13.51* | 1955.9 | [1.39] | 8.36*† | 1264.6 | [1.24] |
| Safrole | 11.82 | 1803.9 | 0.83 | 8.65 | 1283.8 | 0.82 |
| (<i>E</i>)-Cinnamyl alcohol | 16.09 | 2206.4 | 0.11 | 9.03 | 1309.9 | 0.07 |
| α -Cubebene | 6.97 | 1419.9 | 0.02 | 9.56 | 1347.2 | 0.02 |
| <i>ortho</i> -Methoxyhydrocinnamal? | 14.11 | 2011.3 | 0.02 | 9.84* | 1366.8 | [77.47] |
| Eugenol | 15.02 | 2098.6 | 77.21 | 9.84* | 1366.8 | [77.47] |
| Hydrocinnamyl acetate | 12.63* | 1875.6 | [0.19] | 9.90 | 1371.1 | 0.09 |
| α -Copaene | 7.35 | 1447.4 | 0.50 | 9.93 | 1373.4 | 0.51 |
| β -Cubebene | 7.98 | 1494.0 | 0.01 | 10.10 | 1385.5 | 0.01 |
| β -Elemene | 8.63* | 1544.0 | [3.23] | 10.18 | 1390.5 | 0.02 |
| Methyleugenol | 13.58 | 1961.9 | 0.07 | 10.38 | 1404.9 | 0.05 |
| β -Caryophyllene | 8.63* | 1544.0 | [3.23] | 10.51 | 1414.6 | 3.24 |
| Aromadendrene | 8.75* | 1553.5 | [0.11] | 10.76 | 1433.5 | 0.05 |
| (<i>E</i>)-Cinnamyl acetate | 14.82 | 2079.9 | 1.29 | 10.89 | 1442.6 | 1.25 |
| α -Humulene | 9.48 | 1610.5 | 0.53 | 10.96 | 1447.8 | 0.55 |
| allo-Aromadendrene | 9.20 | 1588.0 | 0.02 | 11.05 | 1454.8 | 0.02 |
| (<i>E</i>)- β -Farnesene | 9.73 | 1630.2 | 0.01 | 11.08 | 1457.0 | 0.01 |
| <i>trans</i> -Cadina-1(6),4-diene | 9.44 | 1607.0 | 0.01 | 11.25 | 1469.4 | 0.01 |
| γ -Muurolene | 9.78* | 1634.8 | [0.02] | 11.29 | 1472.8 | 0.02 |
| Germacrene D | 9.96* | 1649.1 | [0.30] | 11.33 | 1475.6 | 0.02 |
| <i>ar</i> -Curcumene | 10.86 | 1722.6 | 0.01 | 11.39 | 1480.0 | 0.02 |
| Viridiflorene | 9.84 | 1639.7 | 0.06 | 11.53* | 1490.5 | [0.16] |
| Bicyclgermacrene | 10.26* | 1672.9 | [0.10] | 11.53* | 1490.5 | [0.16] |
| α -Muurolene | 10.26* | 1672.9 | [0.10] | 11.62 | 1496.7 | 0.02 |
| γ -Cadinene | 10.59 | 1699.9 | 0.02 | 11.78 | 1508.9 | 0.04 |
| δ -Cadinene | 10.61 | 1702.1 | 0.11 | 11.91* | 1519.6 | [0.13] |
| <i>trans</i> -Calamenene | 11.43 | 1770.7 | 0.02 | 11.91* | 1519.6 | [0.13] |
| <i>trans</i> -Cadina-1,4-diene | 10.81 | 1718.3 | 0.02 | 11.99* | 1525.9 | [1.96] |
| Eugenyl acetate | 15.90 | 2187.0 | 1.93 | 11.99* | 1525.9 | [1.96] |
| α -Calacorene | 12.30* | 1846.6 | [0.03] | 12.13 | 1536.6 | 0.01 |
| Isocaryophyllene epoxide B | 12.30* | 1846.6 | [0.03] | 12.23 | 1544.6 | 0.02 |

| | | | | | | |
|---|--------|--------|--------|--------|--------|--------|
| β -Calacorene | 12.89 | 1898.8 | 0.01 | 12.46 | 1562.8 | 0.02 |
| Spathulenol | 14.61 | 2059.2 | 0.06 | 12.57 | 1571.1 | 0.05 |
| Caryophyllene oxide | 12.98 | 1907.0 | 0.40 | 12.61 | 1574.2 | 0.40 |
| Unknown CYSC XX [m/z 161, 159 (69), 91 (41), 187 (38), 105 (37), 146 (35), 131 (34)...] | 15.17 | 2114.4 | 0.02 | 12.70 | 1581.3 | 0.01 |
| Viridiflorol | 14.19 | 2019.5 | 0.02 | 12.74 | 1584.8 | 0.01 |
| Humulene epoxide II | 13.51* | 1955.9 | [1.39] | 12.94 | 1600.1 | 0.09 |
| Tetradecanal | | | | 13.05 | 1608.7 | 0.01 |
| 10-epi-Cubenol? | 13.62 | 1965.6 | 0.01 | 13.21 | 1622.1 | 0.02 |
| Caryophylladienol I | 16.25* | 2222.9 | [0.03] | 13.25 | 1625.5 | 0.02 |
| Caryophylladienol II | 16.25* | 2222.9 | [0.03] | 13.30 | 1629.3 | 0.02 |
| τ -Muurolol | 15.25 | 2121.7 | 0.03 | 13.38* | 1635.9 | [0.03] |
| τ -Cadinol | 15.13 | 2110.3 | 0.02 | 13.38* | 1635.9 | [0.03] |
| Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)] | 15.38 | 2134.8 | 0.01 | 13.50 | 1646.4 | 0.01 |
| α -Cadinol | 15.67 | 2164.1 | 0.02 | 13.54 | 1649.1 | 0.02 |
| (3Z)-Caryophylla-3,8(13)-dien-5 β -ol | 17.01 | 2301.8 | 0.04 | 13.75 | 1666.3 | 0.03 |
| (E)-Coniferyl alcohol | | | | 14.54 | 1733.4 | 0.02 |
| (E)-Coniferaldehyde | | | | 14.61 | 1738.9 | 0.01 |
| Benzyl benzoate | 19.06 | 2528.8 | 3.21 | 14.80 | 1756.1 | 3.20 |
| Phenylethyl benzoate | 19.77 | 2612.3 | 0.03 | 15.81 | 1844.9 | 0.04 |
| Unknown CIZE I [m/z 93, 92 (57), 136 (34), 91 (23), 77 (13), 134 (11)...] | | | | 17.08 | 1963.3 | 0.01 |
| Unknown CIZE II [m/z 69, 91 (57), 41 (49), 181 (32), 169 (25), 167 (22)...] | | | | 18.57 | 2108.9 | 0.01 |
| Unknown CIZE III [m/z 69, 91 (56), 41 (49), 169 (34), 239 (28), 93 (23)...] | | | | 18.60 | 2111.9 | 0.01 |
| Unknown CIZE IV [m/z 151, 93 (44), 153 (29), 92 (21), 179 (18)... 314? (10)] | | | | 21.61 | 2439.3 | 0.01 |
| Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117 (30), 91 (22)...] | | | | 22.13 | 2500.2 | 0.03 |
| Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)] | | | | 22.36 | 2527.3 | 0.01 |

| | | |
|----------------|--------|--------|
| Total reported | 98.86% | 99.18% |
|----------------|--------|--------|

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is taken into account in the consolidated total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index