

Date : 2025-02-25

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code** : 25B11-PTH01

**Customer Identification** : Myrrh - France - M40116R

**Type** : Essential Oil

**Source** : *Commiphora myrrha*

**Customer** : Plant Therapy

Checked and approved by:

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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 :** 2025-02-20

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.5257 \pm 0.0003$  (20 °C)

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

**Analyst :** Cindy Caron B. Sc.

**Date :** 2025-02-12

## 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           |
|--------------------------------------|------|-----------------|
| <i>para</i> -Xylene                  | 0.01 | Simple phenolic |
| $\alpha$ -Thujene                    | tr   | Monoterpene     |
| $\alpha$ -Pinene                     | 0.01 | Monoterpene     |
| Myrcene                              | tr   | Monoterpene     |
| $\Delta^3$ -Carene                   | 0.01 | Monoterpene     |
| <i>para</i> -Cymene                  | tr   | Monoterpene     |
| Limonene                             | 0.01 | Monoterpene     |
| ( <i>E</i> )- $\beta$ -Ocimene       | 0.07 | Monoterpene     |
| Dimethylbenzofuran isomer I          | 0.01 | Furan           |
| $\delta$ -Elemene isomer             | 0.02 | Sesquiterpene   |
| $\delta$ -Elemene                    | 0.75 | Sesquiterpene   |
| $\alpha$ -Cubebene                   | 0.04 | Sesquiterpene   |
| $\alpha$ -Ylangene                   | 0.02 | Sesquiterpene   |
| $\alpha$ -Copaene                    | 0.11 | Sesquiterpene   |
| $\beta$ -Bourbonene                  | 0.30 | Sesquiterpene   |
| <i>cis</i> - $\beta$ -Elemene        | 0.12 | Sesquiterpene   |
| $\beta$ -Cubebene                    | 0.02 | Sesquiterpene   |
| $\beta$ -Elemene                     | 3.59 | Sesquiterpene   |
| Cyperene                             | 0.05 | Sesquiterpene   |
| $\alpha$ -Gurjunene                  | 0.02 | Sesquiterpene   |
| $\beta$ -Ylangene                    | 0.11 | Sesquiterpene   |
| $\beta$ -Caryophyllene               | 0.38 | Sesquiterpene   |
| $\alpha$ -Santalene                  | 0.15 | Sesquiterpene   |
| $\beta$ -Copaene                     | 0.11 | Sesquiterpene   |
| $\gamma$ -Elemene                    | 0.95 | Sesquiterpene   |
| <i>trans</i> - $\alpha$ -Bergamotene | 0.06 | Sesquiterpene   |
| Isogermacrene D                      | 0.08 | Sesquiterpene   |
| 6,9-Guaiadiene                       | 0.01 | Sesquiterpene   |
| Unknown                              | 0.07 | Sesquiterpene   |
| $\alpha$ -Humulene                   | 0.21 | Sesquiterpene   |
| Rotundene                            | 0.02 | Sesquiterpene   |
| allo-Aromadendrene                   | 0.05 | Sesquiterpene   |
| 4,5-diepi-Aristolochene              | 0.05 | Sesquiterpene   |
| <i>trans</i> -Cadina-1(6),4-diene    | 0.04 | Sesquiterpene   |
| Selina-4,11-diene                    | 0.16 | Sesquiterpene   |
| $\gamma$ -Muurolene                  | 0.10 | Sesquiterpene   |
| Germacrene D                         | 0.83 | Sesquiterpene   |
| $\beta$ -Selinene                    | 0.59 | Sesquiterpene   |
| $\delta$ -Selinene                   | 0.06 | Sesquiterpene   |
| $\alpha$ -Selinene                   | 0.64 | Sesquiterpene   |

|                               |       |                          |
|-------------------------------|-------|--------------------------|
| Curzerene                     | 22.91 | Sesquiterpenic ether     |
| ε-Amorphene                   | 0.11  | Sesquiterpene            |
| δ-Amorphene                   | 0.04  | Sesquiterpene            |
| δ-Guaiene                     | 0.05  | Sesquiterpene            |
| γ-Cadinene                    | 0.33  | Sesquiterpene            |
| δ-Cadinene                    | 0.22  | Sesquiterpene            |
| trans-Calamenene              | 0.02  | Sesquiterpene            |
| Selina-4(15),7(11)-diene      | 0.12  | Sesquiterpene            |
| Selina-4,7(11)-diene          | 0.08  | Sesquiterpene            |
| Selina-3,7(11)-diene          | 0.13  | Sesquiterpene            |
| α-Elemol                      | 0.16  | Sesquiterpenic alcohol   |
| Germacrene B                  | 2.09  | Sesquiterpene            |
| 1,5-Epoxysalvial-4(14)-ene    | 0.07  | Sesquiterpenic ether     |
| Furanoeudesma-1,4-diene       | 0.59  | Sesquiterpenic ether     |
| Caryophyllene oxide           | 0.05  | Sesquiterpenic ether     |
| Viridiflorol                  | 0.05  | Sesquiterpenic alcohol   |
| β-Elementone                  | 0.53  | Sesquiterpenic ketone    |
| Furanoeudesma-1,3-diene       | 30.54 | Sesquiterpenic ether     |
| γ-Eudesmol                    | 0.11  | Sesquiterpenic alcohol   |
| Alismol                       | 0.31  | Sesquiterpenic alcohol   |
| Lindestrene                   | 9.97  | Sesquiterpenic ether     |
| τ-Muurolol                    | 0.43  | Sesquiterpenic alcohol   |
| τ-Cadinol                     | 0.39  | Sesquiterpenic alcohol   |
| β-Eudesmol                    | 0.11  | Sesquiterpenic alcohol   |
| α-Eudesmol                    | 0.07  | Sesquiterpenic alcohol   |
| Furanodiene                   | 0.70  | Sesquiterpenic ether     |
| Atractylone?                  | 0.71  | Sesquiterpenic ether     |
| α-Elemyl acetate              | 1.35  | Sesquiterpenic ester     |
| Unknown                       | 2.68  | Oxygenated sesquiterpene |
| 2-Methoxyisofuranogermacrene? | 0.07  | Sesquiterpenic ether     |
| Germacrone                    | 0.99  | Sesquiterpenic ketone    |
| Unknown                       | 0.04  | Oxygenated sesquiterpene |
| Aromadendrane-4,10-diol       | 0.18  | Sesquiterpenic alcohol   |
| 2-Methoxyfuranodiene          | 4.46  | Sesquiterpenic ether     |
| Benzyl benzoate               | 0.06  | Phenolic ester           |
| γ-Eudesmyl acetate            | 0.10  | Sesquiterpenic ester     |
| α-Eudesmyl acetate            | 0.15  | Sesquiterpenic ester     |
| β-Eudesmyl acetate            | 0.18  | Sesquiterpenic ester     |
| Isofuranodienone              | 0.11  | Sesquiterpenic ketone    |
| Unknown                       | 0.56  | Oxygenated sesquiterpene |
| 2-Acetoxyfuranodiene?         | 0.78  | Sesquiterpenic ester     |
| Myrrhanolide C?               | 0.13  | Sesquiterpenic alcohol   |
| Unknown                       | 0.16  | Unknown                  |
| Unknown                       | 0.66  | Unknown                  |
| Cembrenol                     | 0.01  | Diterpenic alcohol       |

|                           |              |
|---------------------------|--------------|
| <b>Consolidated total</b> | <b>93.36</b> |
|---------------------------|--------------|

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

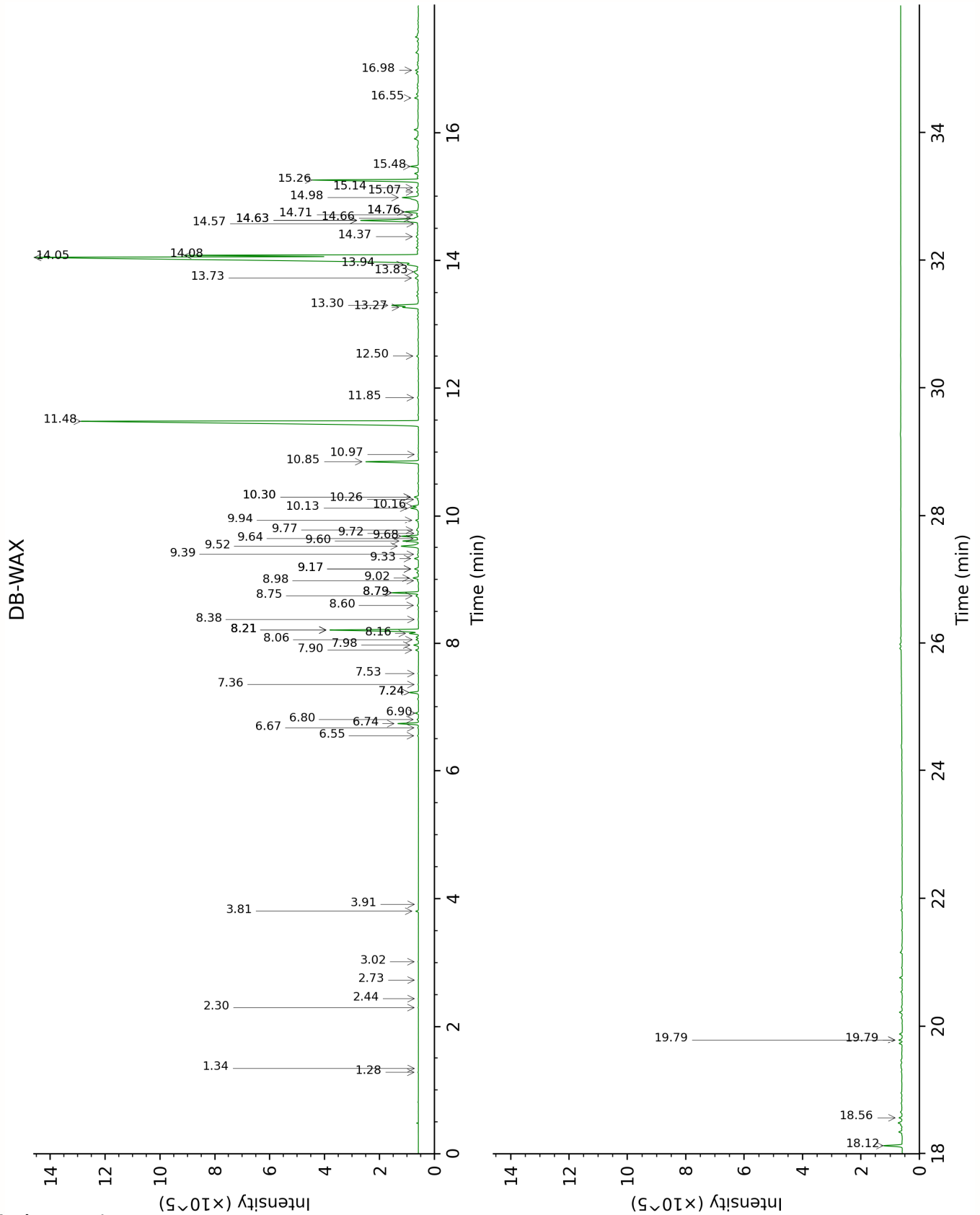
Note: no correction factor was applied

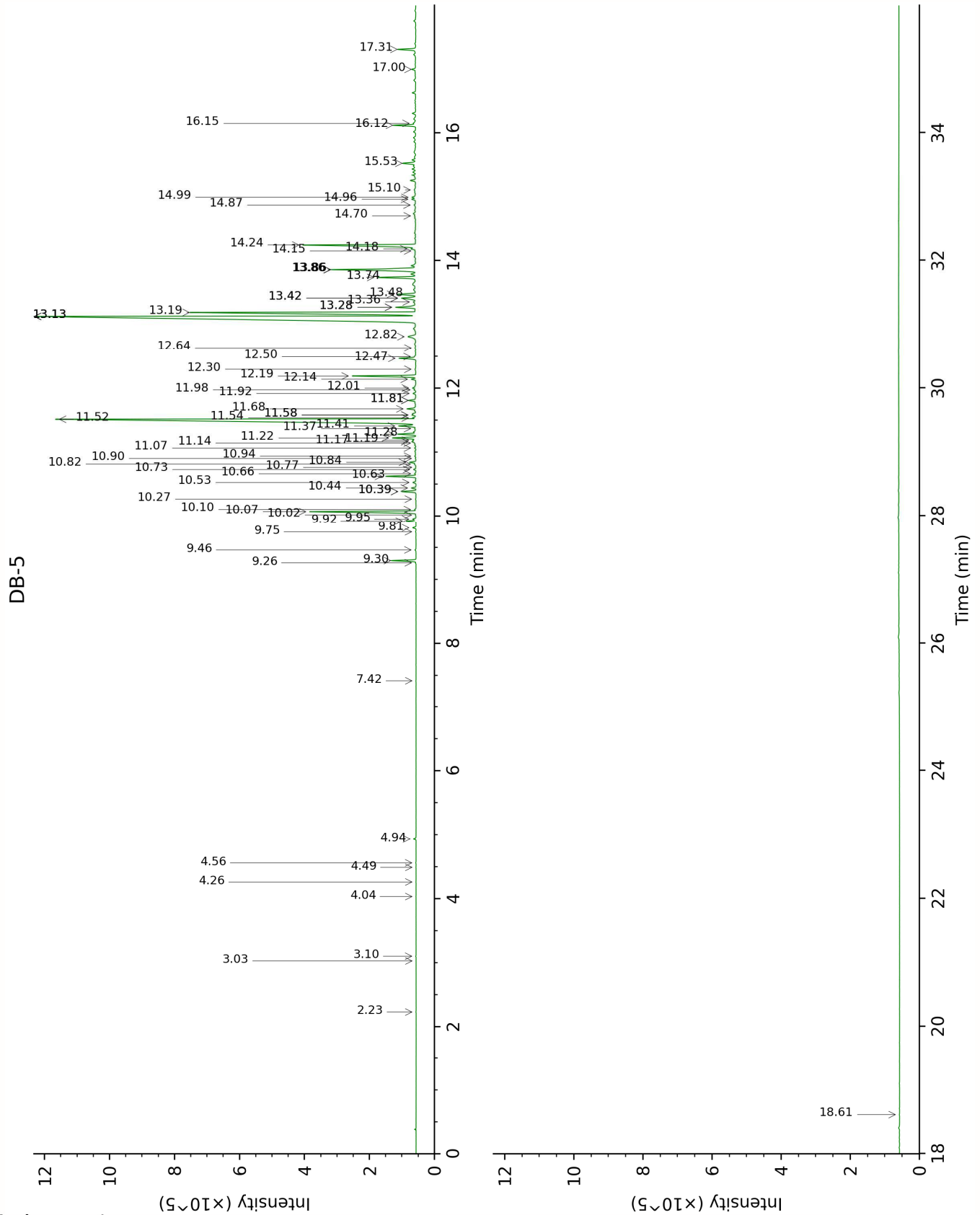
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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

| <b>para-Xylene</b>   | <b>Column DB-WAX</b> |        |        | <b>Column DB-5</b> |        |        |
|--|----------------------|--------|--------|--------------------|--------|--------|
|  | 2.30                 | 1099.6 | 0.01   | 2.23               | 866.4  | 0.01   |
| $\alpha$ -Thujene  | 1.34                 | 1001.8 | tr     | 3.03               | 927.4  | tr     |
| $\alpha$ -Pinene   | 1.28                 | 991.8  | 0.01   | 3.10               | 932.3  | 0.01   |
| Myrcene  | 2.73                 | 1134.2 | 0.01   | 4.04               | 994.1  | tr     |
| $\Delta^3$ -Carene   | 2.44                 | 1111.2 | 0.01   | 4.26               | 1008.9 | 0.01   |
| <i>para</i> -Cymene  | 3.91                 | 1226.8 | tr     | 4.49               | 1023.3 | tr     |
| Limonene   | 3.02                 | 1157.1 | 0.01   | 4.56               | 1027.7 | 0.01   |
| ( <i>E</i> )- $\beta$ -Ocimene   | 3.81                 | 1218.9 | 0.08   | 4.94               | 1051.0 | 0.07   |
| Dimethylbenzofuran isomer I  |                      |        |        | 7.42               | 1208.6 | 0.01   |
| $\delta$ -Elemene isomer   | 6.67                 | 1427.7 | 0.03   | 9.26               | 1333.4 | 0.02   |
| $\delta$ -Elemene  | 6.74                 | 1432.6 | 0.74   | 9.30               | 1335.8 | 0.75   |
| $\alpha$ -Cubebene   | 6.55                 | 1418.4 | 0.04   | 9.46               | 1347.6 | 0.04   |
| $\alpha$ -Ylangene   | 6.80                 | 1437.3 | 0.05   | 9.75               | 1367.6 | 0.02   |
| $\alpha$ -Copaene  | 6.90                 | 1444.7 | 0.11   | 9.81               | 1372.1 | 0.11   |
| $\beta$ -Bourbonene  | 7.24*                | 1469.5 | [0.36] | 9.92               | 1379.9 | 0.30   |
| <i>cis</i> - $\beta$ -Elemene  | 8.06                 | 1532.2 | 0.09   | 9.95               | 1382.1 | 0.12   |
| $\beta$ -Cubebene  | 7.53                 | 1491.5 | 0.02   | 10.02              | 1386.7 | 0.02   |
| $\beta$ -Elemene   | 8.21*†               | 1544.0 | [3.76] | 10.07              | 1390.4 | 3.59   |
| Cyperene   | 7.24*                | 1469.5 | [0.36] | 10.10              | 1392.7 | 0.05   |
| $\alpha$ -Gurjunene  | 7.36                 | 1478.8 | 0.02   | 10.27              | 1404.3 | 0.02   |
| $\beta$ -Ylangene  | 7.90                 | 1519.5 | 0.11   | 10.39*             | 1413.0 | [0.48] |
| $\beta$ -Caryophyllene   | 8.21*†               | 1544.0 | [3.76] | 10.39*             | 1413.0 | [0.48] |
| $\alpha$ -Santalene  | 7.98                 | 1525.7 | 0.19   | 10.44              | 1417.2 | 0.15   |
| $\beta$ -Copaene   | 8.16*†               | 1539.9 | [0.35] | 10.53              | 1423.6 | 0.11   |
| $\gamma$ -Elemene  | 8.79*                | 1589.3 | [0.99] | 10.63              | 1430.8 | 0.95   |
| <i>trans</i> - $\alpha$ -Bergamotene   | 8.21*†               | 1544.0 | [3.76] | 10.66              | 1433.8 | 0.06   |
| Isogermacrene D  | 8.75                 | 1585.5 | 0.13   | 10.73              | 1438.7 | 0.08   |
| 6,9-Guaiadiene   | 8.38                 | 1556.8 | 0.03   | 10.76              | 1441.2 | 0.01   |
| Unknown EUMA XII [m/z 93, 107 (85), 105 (82), 189 (79), 91 (69), 81 (68), 79 (60), 161 (55)... 204 (31)] | 9.94                 | 1681.8 | 0.10   | 10.82              | 1445.0 | 0.07   |
| $\alpha$ -Humulene   | 9.02                 | 1607.4 | 0.23   | 10.84              | 1447.1 | 0.21   |
| Rotundene  | 8.60                 | 1573.9 | 0.06   | 10.90              | 1451.6 | 0.02   |
| allo-Aromadendrene   | 8.79*                | 1589.3 | [0.99] | 10.94              | 1454.2 | 0.05   |
| 4,5-diepi-Aristolochene  | 9.17*                | 1618.9 | [0.17] | 11.07              | 1463.7 | 0.05   |
| <i>trans</i> -Cadina-1(6),4-diene  | 8.98                 | 1604.0 | 0.05   | 11.14              | 1469.4 | 0.04   |
| Selina-4,11-diene  | 9.17*                | 1618.9 | [0.17] | 11.17              | 1471.0 | 0.16   |
| $\gamma$ -Muurolene  | 9.33                 | 1632.1 | 0.17   | 11.19              | 1472.8 | 0.10   |
| Germacrene D   | 9.52                 | 1647.9 | 0.92   | 11.22              | 1475.4 | 0.83   |
| $\beta$ -Selinene  | 9.60                 | 1654.4 | 0.60   | 11.28              | 1479.9 | 0.59   |
| $\delta$ -Selinene   | 9.40                 | 1637.6 | 0.06   | 11.37              | 1486.4 | 0.06   |
| $\alpha$ -Selinene   | 9.68                 | 1660.5 | 0.67   | 11.41              | 1489.3 | 0.64   |

|  |         |        |         |        |        |         |
|--|---------|--------|---------|--------|--------|---------|
| Curzerene  | 11.48   | 1813.1 | 23.51   | 11.52  | 1497.2 | 22.91   |
| ε-Amorphene  | 9.77    | 1668.4 | 0.13    | 11.54  | 1498.6 | 0.11    |
| δ-Amorphene  | 9.72    | 1664.1 | 0.04    | 11.58* | 1502.1 | [0.13]  |
| δ-Guaiene  | 9.64    | 1657.6 | 0.05    | 11.58* | 1502.1 | [0.13]  |
| γ-Cadinene   | 10.13   | 1697.1 | 0.37    | 11.68  | 1509.5 | 0.33    |
| δ-Cadinene   | 10.16   | 1699.7 | 0.22    | 11.81* | 1519.8 | [0.28]  |
| trans-Calamenene   | 10.97   | 1768.4 | 0.02    | 11.81* | 1519.8 | [0.28]  |
| Selina-4(15),7(11)-diene   | 10.30*  | 1711.7 | [0.19]  | 11.92  | 1528.4 | 0.12    |
| Selina-4,7(11)-diene   | 10.26   | 1708.5 | 0.04    | 11.98  | 1532.9 | 0.08    |
| Selina-3,7(11)-diene   | 10.30*  | 1711.7 | [0.19]  | 12.00  | 1535.1 | 0.13    |
| α-Elemol   | 13.83   | 2028.1 | 0.36    | 12.14  | 1545.9 | 0.16    |
| Germacrene B   | 10.85   | 1758.7 | 2.15    | 12.19  | 1549.9 | 2.09    |
| 1,5-Epoxyvalial-4(14)-ene  | 11.85   | 1845.9 | 0.05    | 12.30  | 1558.2 | 0.07    |
| Furanoeudesma-1,4-diene  | 13.27   | 1975.6 | 0.60    | 12.47  | 1571.6 | 0.59    |
| Caryophyllene oxide  | 12.50   | 1904.1 | 0.08    | 12.50  | 1573.7 | 0.05    |
| Viridiflorol   | 13.73   | 2018.7 | 0.19    | 12.64  | 1584.8 | 0.05    |
| β-Elemenone  |         |        |         | 12.82  | 1598.8 | 0.53    |
| Furanoeudesma-1,3-diene  | 14.05*† | 2049.8 | [33.45] | 13.13* | 1624.5 | [30.96] |
| γ-Eudesmol   | 14.66   | 2109.2 | 0.11    | 13.13* | 1624.5 | [30.96] |
| Alismol  | 15.48   | 2191.5 | 0.31    | 13.13* | 1624.5 | [30.96] |
| Lindestrene  | 14.08*† | 2052.9 | [8.36]  | 13.19  | 1629.6 | 9.97    |
| τ-Muurolol   | 14.76*  | 2119.1 | [0.58]  | 13.28* | 1636.3 | [0.81]  |
| τ-Cadinol  | 14.63*  | 2105.9 | [3.03]  | 13.28* | 1636.3 | [0.81]  |
| β-Eudesmol   | 15.14   | 2157.0 | 0.08    | 13.36  | 1643.1 | 0.11    |
| α-Eudesmol   | 15.07   | 2150.4 | 0.07    | 13.42* | 1648.0 | [0.68]  |
| Furanodiene  | 13.94   | 2039.1 | 0.70    | 13.42* | 1648.0 | [0.68]  |
| Atractylone?   |         |        |         | 13.48  | 1653.0 | 0.71    |
| α-Elemyl acetate   | 13.30   | 1978.4 | 1.28    | 13.74  | 1674.7 | 1.35    |
| Unknown COMY IV [m/z 108, 216 (29), 93 (26), 109 (21), 91 (21)]                                | 14.63*  | 2105.9 | [3.03]  | 13.86* | 1684.7 | [3.75]  |
| 2-Methoxyisofuranogermacrene?  | 14.58   | 2100.6 | 0.07    | 13.86* | 1684.7 | [3.75]  |
| Germacrone   | 14.98   | 2141.6 | 0.99    | 13.86* | 1684.7 | [3.75]  |
| Unknown AGAR XXIV [m/z 93, 81 (90), 95 (86), 91 (83), 41 (83), 107 (81)... 220 (29), 238? (4)] | 16.98   | 2350.7 | 0.13    | 14.15  | 1709.0 | 0.04    |
| Aromadendrane-4,10-diol  | 16.55   | 2303.6 | 0.16    | 14.18  | 1711.7 | 0.18    |
| 2-Methoxyfuranodiene   | 15.26   | 2169.0 | 4.51    | 14.24  | 1716.9 | 4.46    |
| Benzyl benzoate  | 18.56   | 2528.1 | 0.12    | 14.70  | 1756.3 | 0.06    |
| γ-Eudesmyl acetate   | 14.37   | 2081.0 | 0.15    | 14.87  | 1770.9 | 0.10    |
| α-Eudesmyl acetate   | 14.76*  | 2119.1 | [0.58]  | 14.96  | 1778.8 | 0.15    |
| β-Eudesmyl acetate   | 14.71   | 2114.6 | 0.09    | 14.99  | 1781.4 | 0.18    |
| Isofuranodienone   |         |        |         | 15.10  | 1791.3 | 0.11    |
| Unknown COMY II [m/z 108,  |         |        |         | 15.53  | 1829.6 | 0.56    |

|  |        |        |        |       |        |      |
|--|--------|--------|--------|-------|--------|------|
| 109 (74), 106 (58), 148 (48), 43 (42), 91 (40), 105 (29), 230 (26)...<br>274 (13)]                     |        |        |        |       |        |      |
| 2-Acetoxyfuranodiene?  | 18.12  | 2477.9 | 0.72   | 16.12 | 1883.6 | 0.78 |
| Myrrhanolide C?  |        |        |        | 16.15 | 1886.3 | 0.13 |
| Unknown COMY I [m/z 197, 108 (83), 212 (50), 43 (42), 169 (38), 183 (31), 155 (30), 79 (26), 105 (26)] | 19.79* | 2673.9 | [0.14] | 17.00 | 1965.8 | 0.16 |
| Unknown COMY XII [m/z 43, 108 (85), 197 (58), 79 (36), 212 (34)...]                                    |        |        |        | 17.31 | 1995.6 | 0.66 |
| Cembrenol  | 19.79* | 2673.9 | [0.14] | 18.61 | 2125.4 | 0.01 |
| Total reported   |        | 93.23% |        |       | 93.35% |      |

\*: 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