Date : 2025-05-12

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 25D28-HZA01
Customer Identification : Petitgrain Bigarade - Lot: CITAUL1 - Paraguay
Type : Essential Oil
Source : *Citrus aurantium subsp. amara*
Customer : Hunzaroma Inc.

Checked an approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia

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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 : 2025-05-08

Physicochemical data

Refractive index : 1.4611 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2025-04-28

Conclusion

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

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Analysis Summary - Consolidated Contents

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

Identification	%	Class
Ethanol	0.07	Aliphatic alcohol
2-Methyl-3-buten-2-ol	0.01	Aliphatic alcohol
(3*Z*)-Hexenol	0.02	Aliphatic alcohol
Hexanol	0.01	Aliphatic alcohol
α-Thujene	0.01	Monoterpene
α-Pinene	0.07	Monoterpene
α-Fenchene	tr	Monoterpene
Camphene	tr	Monoterpene
β-Pinene	0.52	Monoterpene
Sabinene	0.09	Monoterpene
6-Methyl-5-hepten-2-one	0.03	Aliphatic ketone
Myrcene	0.99	Monoterpene
Pseudolimonene	0.04	Monoterpene
α-Phellandrene	0.01	Monoterpene
cis-Dehydroxylinalool oxide	0.01	Monoterpenic ether
Δ3-Carene	0.22	Monoterpene
α-Terpinene	0.01	Monoterpene
meta-Cymene	0.01	Monoterpene
para-Cymene	0.05	Monoterpene
Limonene	1.72	Monoterpene
β-Phellandrene	0.06	Monoterpene
(*Z*)-β-Ocimene	0.67	Monoterpene
(*E*)-β-Ocimene	1.72	Monoterpene
γ-Terpinene	0.02	Monoterpene
cis-Sabinene hydrate	0.02	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.09	Monoterpenic alcohol
Terpinolene	0.13	Monoterpene
trans-Linalool oxide (fur.)	0.11	Monoterpenic alcohol
α-Pinene oxide	0.01	Monoterpenic ether
Rosefuran	0.02	Monoterpenic ether
Linalool	37.56	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
allo-Ocimene	0.02	Monoterpene
Camphor	0.01	Monoterpenic ketone
neo-allo-Ocimene	0.01	Monoterpene
trans-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
(*E*)-Myroxide	0.01	Monoterpenic ether
δ-Terpineol	0.03	Monoterpenic alcohol
Rosefuran oxide	0.01	Monoterpenic ether
Terpinen-4-ol	0.05	Monoterpenic alcohol

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para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	5.81	Monoterpenic alcohol
Hodiendiol (2,6-dimethylocta-3,7-diene-2,6-diol)	0.03	Monoterpenic alcohol
(3*E*,5*E*)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.02	Monoterpenic alcohol
Nerol	0.56	Monoterpenic alcohol
Citronellol	0.02	Monoterpenic alcohol
Neral	0.03	Monoterpenic aldehyde
Geraniol	1.39	Monoterpenic alcohol
Linalyl acetate	41.97	Monoterpenic ester
(*trans*?)-Linalool oxide acetate (fur.)?	0.04	Monoterpenic ester
Geranial	0.04	Monoterpenic aldehyde
2,6-Dimethyl-1,7-octadiene-3,6-diol	0.04	Monoterpenic alcohol
Bornyl acetate	0.01	Monoterpenic ester
Geranyl formate	0.03	Monoterpenic ester
Methyl anthranilate	0.59	Phenolic ester
Linalyl propionate	0.03	Monoterpenic ester
Hodiendiol derivative	0.06	Oxygenated monoterpene
α-Terpinyl acetate	0.07	Monoterpenic ester
Unknown	0.06	Sesquiterpene
Neryl acetate	1.15	Monoterpenic ester
α-Copaene	0.02	Sesquiterpene
Geranyl acetate	1.99	Monoterpenic ester
β-Elemene	0.02	Sesquiterpene
Dimethyl anthranilate	0.03	Phenolic ester
β-Caryophyllene	0.34	Sesquiterpene
Aromadendrene	0.02	Sesquiterpene
α-Humulene	0.04	Sesquiterpene
(*E*)-β-Farnesene	0.01	Sesquiterpene
γ-Muurolene	0.01	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
Bicyclogermacrene	0.05	Sesquiterpene
(3*Z*,6*E*)-α-Farnesene	0.05	Sesquiterpene
γ-Cadinene	tr	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.01	Sesquiterpene
δ-Cadinene	0.01	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
Methyl N-formylanthranilate	0.05	Phenolic ester
(*E*)-Nerolidol	0.03	Sesquiterpenic alcohol
Spathulenol	0.03	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.03	Sesquiterpenic ether
Alismol isomer?	0.02	Sesquiterpenic alcohol
τ-Cadinol	0.01	Sesquiterpenic alcohol
meta-Camphorene	0.01	Diterpene

Phytol	0.01	Diterpenic alcohol
Consolidated total	**99.27**	

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.

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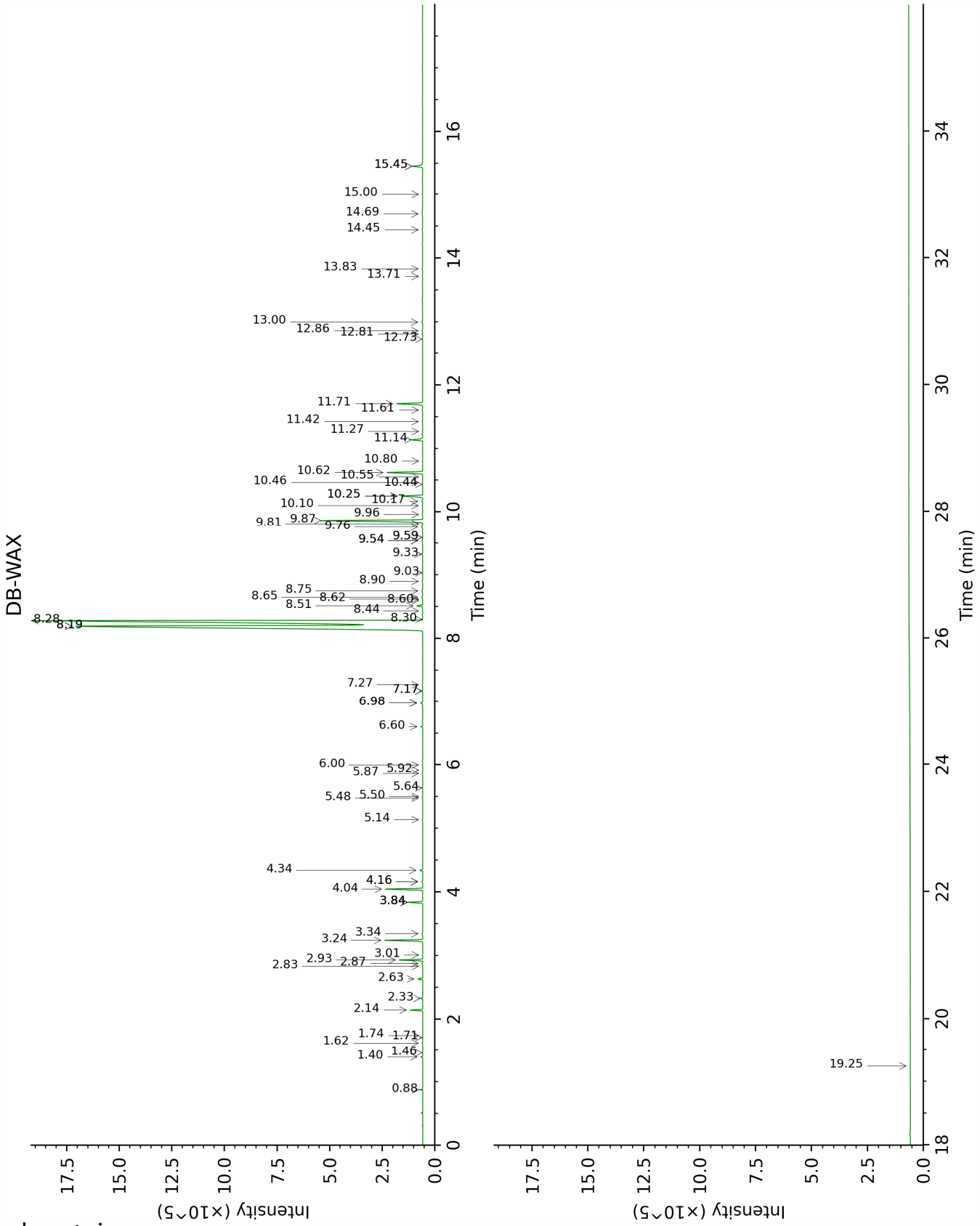
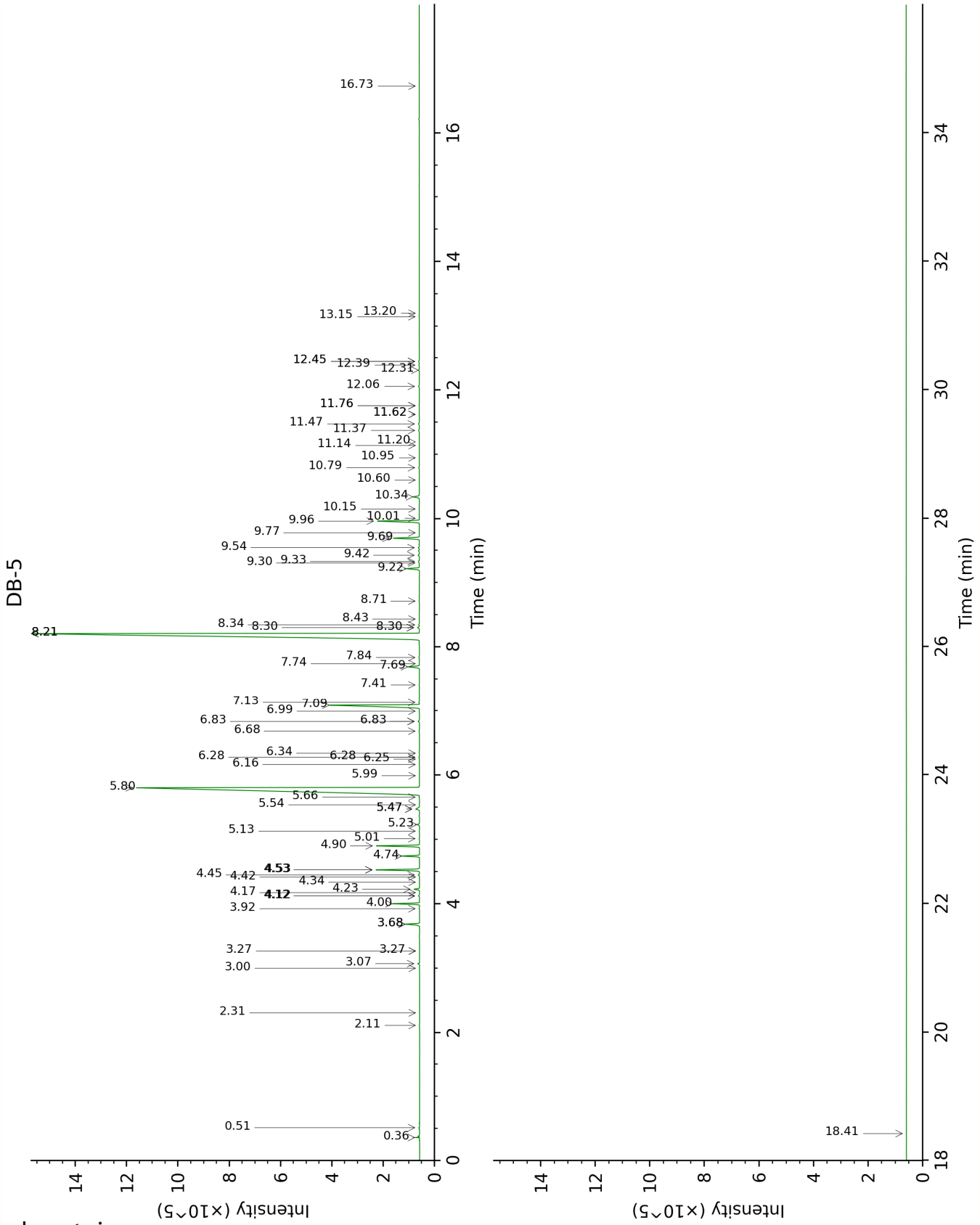

DB-WAX
Time (min)
Intensity (×10^5)
15.45
15.00
14.69
14.45
13.83
13.71
13.00
12.86
12.81
12.73
11.71
11.61
11.42
11.27
11.14
10.80
10.62
10.55
10.46
10.44
10.25
10.17
10.10
9.96
9.81
9.87
9.76
9.54
9.59
9.33
9.03
8.90
8.65
8.75
8.62
8.60
8.51
8.44
8.30
8.28
8.19
7.27
7.17
6.98
6.60
6.00
5.87
5.92
5.64
5.48
5.50
5.14
4.34
4.16
4.04
3.84
3.24
3.34
3.01
2.83
2.93
2.87
2.63
2.33
2.14
1.62
1.74
1.71
1.40
1.46
0.88
19.25


DB-5
16.73
13.15
13.20
12.45
12.39
12.31
12.06
11.76
11.62
11.47
11.37
11.14
11.20
10.95
10.79
10.60
10.34
10.15
10.01
9.96
9.77
9.69
9.54
9.42
9.30
9.33
9.22
8.71
8.43
8.34
8.30
8.30
8.21
7.84
7.74
7.69
7.41
7.13
7.09
6.99
6.83
6.83
6.68
6.34
6.28
6.28
6.25
6.16
5.99
5.80
5.66
5.54
5.47
5.23
5.13
5.01
4.90
4.74
4.53
4.45
4.42
4.34
4.23
4.17
4.12
4.00
3.92
3.68
3.27
3.27
3.07
3.00
2.31
2.11
0.51
0.36
Intensity (×10^5)
Time (min)
18.41
Intensity (×10^5)
Time (min)

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Ethanol	0.88	906.9	0.08	0.36	502.4	0.07
2-Methyl-3-buten-2-ol	1.62	1014.4	0.02	0.51	608.0	0.01
(3*Z*)-Hexenol	5.87	1351.6	0.01	2.11	857.2	0.02
Hexanol	5.48	1324.0	0.02	2.31	873.5	0.01
α-Thujene	1.46	998.4	0.01	3.00	926.0	0.01
α-Pinene	1.40	991.1	0.06	3.07	930.8	0.07
α-Fenchene	1.71	1023.2	tr	3.27*	944.0	[0.01]
Camphene	1.74	1026.2	tr	3.27*	944.0	[0.01]
β-Pinene	2.14	1066.1	0.52	3.68*	971.8	[0.60]
Sabinene	2.33	1084.4	0.09	3.68*	971.8	[0.60]
6-Methyl-5-hepten-2-one	5.14	1300.0	0.02	3.92	988.0	0.03
Myrcene	2.93	1133.8	0.99	4.00	993.2	0.99
Pseudolimonene	2.87	1129.4	0.04	4.12*	1001.3	[0.05]
α-Phellandrene	2.83	1126.0	0.01	4.12*	1001.3	[0.05]
cis-Dehydroxylinalool oxide	3.84*	1204.5	[0.69]	4.18	1004.7	0.01
Δ3-Carene	2.63	1110.5	0.22	4.23	1008.0	0.22
α-Terpinene	3.01	1140.0	0.01	4.34	1015.0	0.01
meta-Cymene	4.16*	1228.3	[0.05]	4.42	1020.0	0.01
para-Cymene	4.16*	1228.3	[0.05]	4.45	1022.1	0.05
Limonene	3.24	1158.2	1.72	4.53*	1027.1	[1.77]
β-Phellandrene	3.34	1166.3	0.06	4.53*	1027.1	[1.77]
(*Z*)-β-Ocimene	3.84*	1204.5	[0.69]	4.74	1040.7	0.67
(*E*)-β-Ocimene	4.04	1219.7	1.73	4.90	1050.7	1.72
γ-Terpinene	3.84*	1204.5	[0.69]	5.01	1057.9	0.02
cis-Sabinene hydrate	6.98*	1431.5	[0.12]	5.13	1065.3	0.02
cis-Linalool oxide (fur.)	6.60	1404.1	0.10	5.23	1071.7	0.09
Terpinolene	4.34	1241.3	0.13	5.47*	1087.0	[0.24]
trans-Linalool oxide (fur.)	6.98*	1431.5	[0.12]	5.47*	1087.0	[0.24]
α-Pinene oxide	5.50	1325.9	0.01	5.54	1091.2	0.01
Rosefuran	6.00	1361.0	0.02	5.66	1098.8	0.02
Linalool	8.19*†	1522.0	[41.72]	5.80	1108.1	37.56
cis-para-Menth-2-en-1-ol	8.19*†	1522.0	[41.72]	5.99	1120.3	0.01
allo-Ocimene	5.64	1335.4	0.01	6.16	1131.5	0.02
Camphor	7.27	1453.4	0.02	6.25	1136.9	0.01
neo-allo-Ocimene	5.92	1355.2	0.01	6.28*	1138.8	[0.03]

trans-para-Menth-2-en-1-ol	9.03	1586.3	0.01	6.28*	1138.8	[0.03]
(*E*)-Myroxide	7.18*	1446.1	[0.01]	6.34	1142.9	0.01
δ-Terpineol	9.54*	1626.9	[0.06]	6.68	1165.1	0.03
Rosefuran oxide	8.60	1552.9	0.01	6.83*	1175.0	[0.07]
Terpinen-4-ol	8.65	1556.9	0.05	6.83*	1175.0	[0.07]
para-Cymen-8-ol	11.61	1798.0	0.02	6.99	1185.4	0.02
α-Terpineol	9.87	1653.0	5.82	7.09	1191.4	5.81
Hodiendiol (2,6-dimethylocta-3,7-diene-2,6-diol)	12.86	1909.5	0.04	7.13	1194.2	0.03
(3*E*,5*E*)-2,6-Dimethylocta-3,5,7-trien-2-ol	11.42	1782.2	0.02	7.41	1212.8	0.02
Nerol	11.14	1758.0	0.63	7.69	1232.0	0.56
Citronellol	10.80	1729.9	0.01	7.74	1235.4	0.02
Neral	9.54*	1626.9	[0.06]	7.84	1241.9	0.03
Geraniol	11.70	1806.6	1.39	8.21*	1267.2	[43.37]
Linalyl acetate	8.28*†	1528.7	[37.89]	8.21*	1267.2	[43.37]
(*trans*?)-Linalool oxide acetate (fur.)?	8.75	1564.5	0.04	8.30*	1273.6	[0.09]
Geranial	10.17	1677.3	0.04	8.30*	1273.6	[0.09]
2,6-Dimethyl-1,7-octadiene-3,6-diol	14.69	2081.7	0.06	8.34	1276.5	0.04
Bornyl acetate	8.30	1530.3	tr	8.43	1282.7	0.01
Geranyl formate	9.96	1660.7	0.02	8.71	1301.8	0.03
Methyl anthranilate	15.45*	2157.3	[0.62]	9.22	1333.6	0.59
Linalyl propionate	8.90	1576.2	0.03	9.30	1339.9	0.03
Hodiendiol derivative	13.00	1921.9	0.05	9.33	1341.6	0.06
α-Terpinyl acetate	9.76	1644.5	0.06	9.42	1348.5	0.07
Unknown PIMA XXVI [m/z 43, 81 (96), 95 (85), 67 (74), 69 (68), 41 (66)...204 (1)]				9.54	1356.9	0.06
Neryl acetate	10.25*	1683.9	[1.15]	9.69	1367.4	1.15
α-Copaene	7.18*	1446.1	[0.01]	9.77	1373.3	0.02
Geranyl acetate	10.62	1714.8	1.97	9.96	1387.0	1.99
β-Elemene	8.44	1540.5	0.01	10.01	1390.2	0.02
Dimethyl anthranilate	13.72	1987.7	0.02	10.16	1400.5	0.03
β-Caryophyllene	8.51	1546.6	0.29	10.34	1414.3	0.34

Aromadendrene	8.62	1554.7	tr	10.60	1434.0	0.02
α-Humulene	9.33	1609.8	0.03	10.80	1448.4	0.04
(*E*)-β-Farnesene	9.59*	1630.9	[0.01]	10.95	1459.8	0.01
γ-Muurolene	9.59*	1630.9	[0.01]	11.14	1474.3	0.01
Germacrene D	9.81	1648.7	0.01	11.20	1478.4	0.01
Bicyclogermacrene	10.10	1672.0	0.03	11.37	1491.8	0.05
(3*Z*,6*E*)-α-Farnesene	10.25*	1683.9	[1.15]	11.47	1499.3	0.05
γ-Cadinene	10.44	1699.2	tr	11.62*	1510.7	[0.02]
(3*E*,6*E*)-α-Farnesene	10.55	1708.9	0.01	11.62*	1510.7	[0.02]
δ-Cadinene	10.46	1701.6	0.01	11.76*	1521.4	[0.03]
trans-Calamenene	11.27	1769.2	0.01	11.76*	1521.4	[0.03]
Methyl N-formylanthranilate				12.06	1545.1	0.05
(*E*)-Nerolidol	13.83	1999.1	0.04	12.31	1565.0	0.03
Spathulenol	14.44	2057.7	0.03	12.39	1571.2	0.03
Caryophyllene oxide isomer	12.73	1897.4	0.01	12.44*	1575.8	[0.05]
Caryophyllene oxide	12.81	1904.6	0.03	12.44*	1575.8	[0.05]
Alismol isomer?				13.15	1632.7	0.02
τ-Cadinol	15.00	2112.3	0.01	13.20	1637.1	0.01
meta-Camphorene	15.45*	2157.3	[0.62]	16.73	1949.2	0.01
Phytol	19.25	2571.0	0.03	18.41	2114.4	0.01
Total reported		99.10%			99.31%	

*: 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