Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24A19-PTH02
Customer Identification : Eucalyptus Radiata - Australia - E40109R
Type : Essential Oil
Source : *Eucalyptus radiata*
Customer : Plant Therapy

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

ISO 17025:2017 CERTIFIED METHOD — MÉTHODE CERTIFIÉE

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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 : 2024-01-23

PHYSICOCHEMICAL DATA

Refractive index : 1.4643 ± 0.0003 (20 ℃)

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

Analyst : Cindy Caron B. Sc.

Date : 2024-01-22

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
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Toluene	tr	Simple phenolic
(2*E*)-Hexenal	0.01	Aliphatic aldehyde
Isoamyl acetate	0.01	Aliphatic ester
2-Methylbutyl acetate	0.01	Aliphatic ester
α-Thujene	0.29	Monoterpene
α-Pinene	2.07	Monoterpene
α-Fenchene	0.01	Monoterpene
Camphene	0.02	Monoterpene
Sabinene	1.10	Monoterpene
β-Pinene	0.63	Monoterpene
trans-para-Menthane	0.01	Monoterpene
Unknown	0.03	Unknown
Myrcene	1.05	Monoterpene
α-Phellandrene	0.45	Monoterpene
Pseudolimonene	0.02	Monoterpene
α-Terpinene	0.29	Monoterpene
Limonene	2.19	Monoterpene
1,8-Cineole	68.33	Monoterpenic ether
para-Cymene	0.58	Monoterpene
β-Phellandrene	2.99	Monoterpene
(*Z*)-β-Ocimene	0.02	Monoterpene
(*E*)-β-Ocimene	0.21	Monoterpene
γ-Terpinene	0.67	Monoterpene
cis-Sabinene hydrate	0.07	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
para-Cymenene	0.02	Monoterpene
Terpinolene	0.20	Monoterpene
α-Pinene oxide	0.01	Monoterpenic ether
trans-Sabinene hydrate	0.05	Monoterpenic alcohol
Linalool	0.38	Monoterpenic alcohol
Unknown	0.01	Unknown
cis-para-Menth-2-en-1-ol	0.11	Monoterpenic alcohol
trans-Pinocarveol	0.01	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.08	Monoterpenic alcohol
Isopulegol	0.02	Monoterpenic alcohol
Citronellal	0.04	Monoterpenic aldehyde
Borneol	tr	Monoterpenic alcohol
δ-Terpineol	0.18	Monoterpenic alcohol

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Terpinen-4-ol	1.94	Monoterpenic alcohol
Cryptone	0.02	Normonoterpenic ketone
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	9.54	Monoterpenic alcohol
cis-α-Phellandrene epoxide (iPr vs Me)	0.01	Monoterpenic ether
trans-Piperitol	0.06	Monoterpenic alcohol
Nerol	0.08	Monoterpenic alcohol
Citronellol	0.06	Monoterpenic alcohol
Neral	0.68	Monoterpenic aldehyde
Piperitone	0.22	Monoterpenic ketone
Geraniol	0.46	Monoterpenic alcohol
trans-Ascaridole glycol	0.01	Monoterpenic alcohol
Geranial	1.02	Monoterpenic aldehyde
cis-Ascaridole glycol	0.01	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
para-Menth-5-en-1,2-diol isomer III	0.03	Monoterpenic alcohol
Unknown	0.03	Monoterpenic alcohol
Unknown	0.01	Unknown
δ-Elemene	0.01	Sesquiterpene
exo-2-Hydroxycineole acetate	0.02	Monoterpenic ester
α-Terpinyl acetate	1.86	Monoterpenic ester
Unknown	0.01	Unknown
Isoledene	0.01	Sesquiterpene
Methyl (*E*)-cinnamate	0.22	Phenylpropanoid ester
β-Cubebene	tr	Sesquiterpene
Geranyl acetate	0.03	Monoterpenic ester
Unknown	0.01	Sesquiterpene
Unknown	0.02	Unknown
Unknown	tr	Unknown
α-Gurjunene	0.01	Sesquiterpene
β-Caryophyllene	0.08	Sesquiterpene
Aromadendrene	0.01	Sesquiterpene
α-Humulene	0.01	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
Viridiflorene	0.03	Sesquiterpene
Bicyclogermacrene	0.11	Sesquiterpene
δ-Cadinene	0.01	Sesquiterpene
Palustrol	0.01	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Globulol	0.03	Sesquiterpenic alcohol
Viridiflorol	0.02	Sesquiterpenic alcohol
Cubeban-11-ol	0.01	Sesquiterpenic alcohol
Ledol	0.02	Sesquiterpenic alcohol
Rosifoliol	0.01	Sesquiterpenic alcohol

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γ-Eudesmol	0.02	Sesquiterpenic alcohol
Isospathulenol	0.04	Sesquiterpenic alcohol
β-Eudesmol	0.02	Sesquiterpenic alcohol
α-Eudesmol	0.02	Sesquiterpenic alcohol
Consolidated total	**99.14**	

tr: The compound has been detected below 0.005% of the total signal
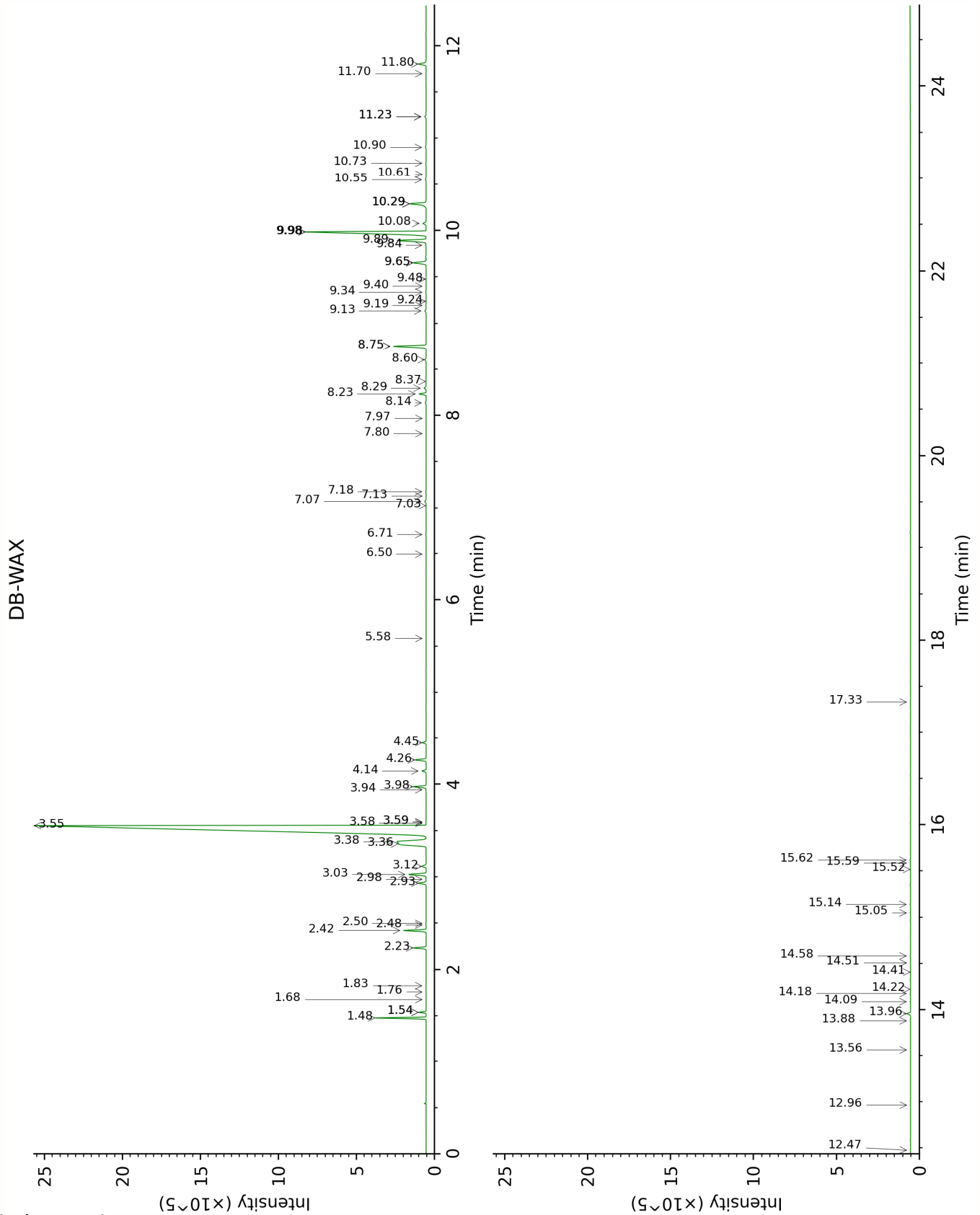
Note: no correction factor was applied

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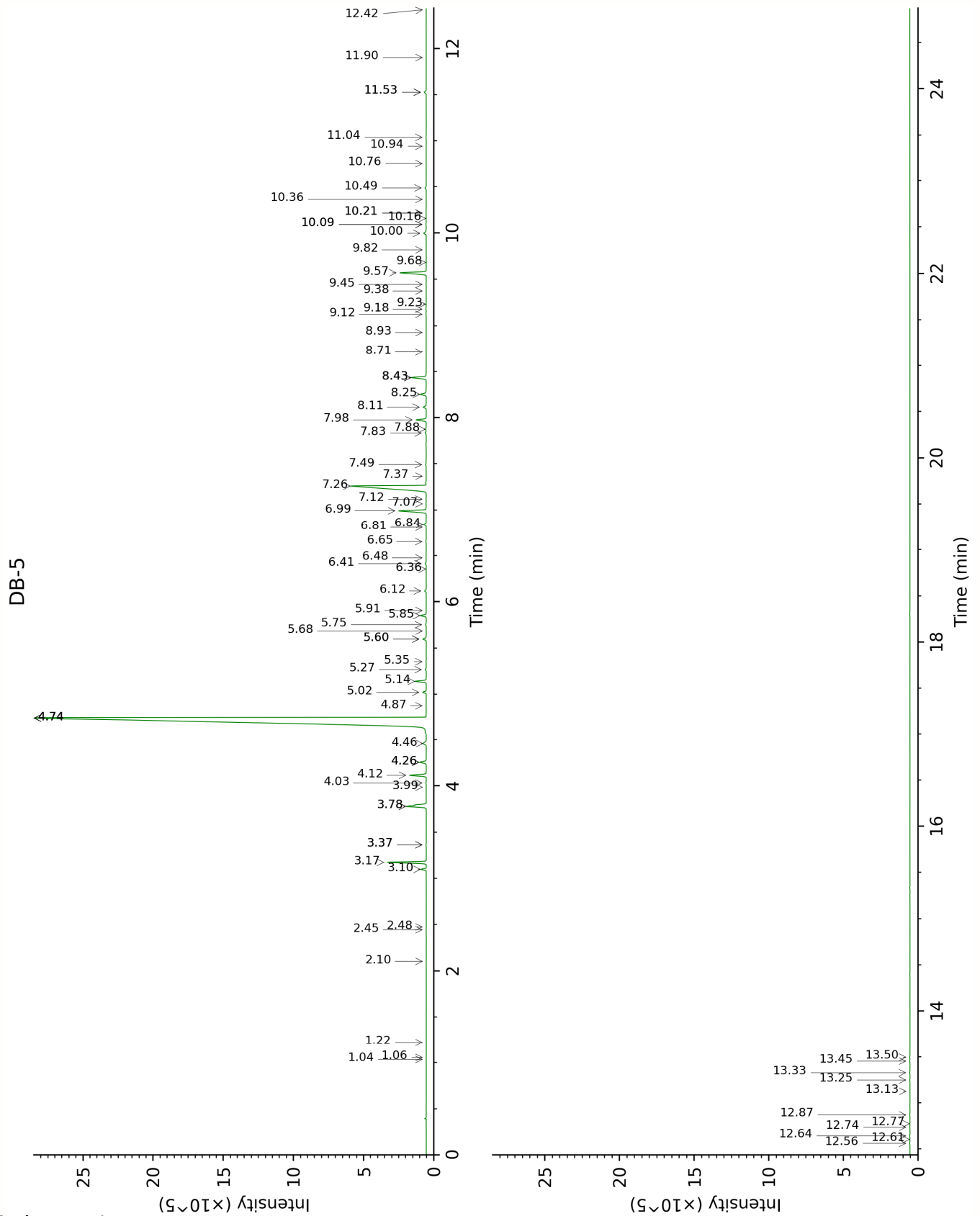
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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)

Time (min)

Intensity (×10^5)

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DB-5

FULL ANALYSIS DATA

Isoamyl alcohol	Column DB-WAX			Column DB-5		
	3.59*	1175.4	[0.01]	1.04	733.0	0.01
2-Methylbutanol	3.59*	1175.4	[0.01]	1.06	736.0	tr
Toluene	1.54*	1000.0	[0.29]	1.22	758.8	tr
(2*E*)-Hexenal	3.58	1174.3	0.01	2.10	849.7	0.01
Isoamyl acetate	2.50	1090.7	0.01	2.45	877.7	0.01
2-Methylbutyl acetate	2.48	1089.0	0.01	2.48	880.2	0.01
α-Thujene	1.54*	1000.0	[0.29]	3.10	926.1	0.29
α-Pinene	1.48	991.1	2.06	3.18	931.1	2.07
α-Fenchene	1.76	1020.8	0.01	3.36*	943.6	[0.03]
Camphene	1.83	1027.1	0.02	3.36*	943.6	[0.03]
Sabinene	2.42	1083.4	1.10	3.78*	970.9	[1.73]
β-Pinene	2.23	1065.7	0.63	3.78*	970.9	[1.73]
trans-para-Menthane	1.68	1013.1	0.01	3.99	984.5	0.01
Unknown CASA XI [m/z 67, 68 (95), 43 (73), 94 (65), 79 (54), 41 (50)...]				4.03	987.6	0.03
Myrcene	3.03	1132.4	1.06	4.12	993.0	1.05
α-Phellandrene	2.93	1125.2	0.45	4.26*	1002.3	[0.46]
Pseudolimonene	2.98	1128.5	0.02	4.26*	1002.3	[0.46]
α-Terpinene	3.12	1139.0	0.30	4.46	1015.1	0.29
Limonene	3.36	1157.4	2.19	4.74*	1032.3	[74.42]
1,8-Cineole	3.55	1172.3	68.33	4.74*	1032.3	[74.42]
para-Cymene	4.26	1224.5	0.58	4.74*	1032.3	[74.42]
β-Phellandrene	3.38	1159.1	2.99	4.74*	1032.3	[74.42]
(*Z*)-β-Ocimene	3.94	1201.6	0.01	4.87	1040.6	0.02
(*E*)-β-Ocimene	4.14	1216.0	0.22	5.02	1050.2	0.21
γ-Terpinene	3.98	1203.9	0.68	5.14	1057.6	0.67
cis-Sabinene hydrate	7.07	1427.1	0.09	5.27	1065.6	0.07
cis-Linalool oxide (fur.)	6.71	1400.2	0.02	5.35	1070.9	0.02
para-Cymenene	6.50	1385.0	0.02	5.60*	1086.2	[0.23]
Terpinolene	4.45	1237.8	0.20	5.60*	1086.2	[0.23]
α-Pinene oxide	5.58	1320.0	0.01	5.68	1091.6	0.01
trans-Sabinene hydrate	8.14	1506.1	0.05	5.75	1095.9	0.05
Linalool	8.23	1513.6	0.38	5.85	1102.1	0.38
Unknown CASA I [m/z 43, 59 (37), 79 (33), 91 (32), 119	9.24	1591.1	0.01	5.91	1105.5	0.01

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(31)...]						
cis-para-Menth-2-en-1-ol	8.30	1518.4	0.12	6.12	1119.0	0.11
trans-Pinocarveol	9.40	1603.9	0.01	6.36	1134.1	0.01
trans-para-Menth-2-en-1-ol	9.14	1583.2	0.09	6.41	1137.8	0.08
Isopulegol	8.37	1524.0	0.02	6.48	1141.9	0.02
Citronellal	7.18	1434.9	0.03	6.65	1153.1	0.04
Borneol	9.98*	1651.1	[9.52]	6.81	1163.1	tr
δ-Terpineol	9.65*	1624.2	[0.85]	6.84	1165.1	0.18
Terpinen-4-ol	8.75*	1553.7	[1.94]	6.99	1174.7	1.94
Cryptone	9.34	1598.7	0.03	7.07	1179.6	0.02
para-Cymen-8-ol	11.70	1793.7	0.02	7.12	1182.8	0.02
α-Terpineol	9.98*	1651.1	[9.52]	7.26	1191.9	9.54
cis-α-Phellandrene epoxide (iPr vs Me)	11.23*	1754.4	[0.09]	7.37	1198.7	0.01
trans-Piperitol	10.55	1696.5	0.06	7.49	1206.7	0.06
Nerol	11.23*	1754.4	[0.09]	7.83	1229.5	0.08
Citronellol	10.90	1726.4	0.05	7.88	1232.3	0.06
Neral	9.65*	1624.2	[0.85]	7.98	1239.1	0.68
Piperitone	10.08	1658.4	0.21	8.11	1248.3	0.22
Geraniol	11.80	1802.7	0.49	8.25	1257.6	0.46
trans-Ascaridole glycol	14.41	2040.2	0.01	8.43*	1269.6	[1.03]
Geranial	10.29*	1675.5	[1.14]	8.43*	1269.6	[1.03]
cis-Ascaridole glycol	15.05	2101.8	0.03	8.71	1288.3	0.01
Unknown RODA I [m/z 59, 94 (99), 79 (68), 43 (32), 97 (17)... 137 (8)...]				8.93	1302.7	0.02
para-Menth-5-en-1,2-diol isomer III				9.12	1316.4	0.03
Unknown MEAL I [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]				9.18	1320.3	0.03
Unknown PRME VII [m/z 69, 41 (58), 114 (29), 43 (25), 83 (24), 123 (20)...]				9.23	1324.0	0.01
δ-Elemene	7.13	1431.4	0.01	9.38	1334.1	0.01
exo-2-Hydroxycineole acetate	10.29*	1675.5	[1.14]	9.45	1339.1	0.02

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Compound						
α-Terpinyl acetate	9.89	1643.6	1.86	9.57	1347.9	1.86
Unknown EUGL I [m/z 43, 95 (62), 107 (45), 110 (41), 55 (28), 67 (25)...]	14.22	2022.5	0.02	9.68	1355.7	0.01
Isoledene	7.03	1423.8	0.01	9.82	1365.3	0.01
Methyl (*E*)-cinnamate	13.96	1997.3	0.22	10.00	1377.9	0.22
β-Cubebene	7.97	1493.4	tr	10.09*	1384.6	[0.03]
Geranyl acetate	10.73	1712.0	0.03	10.09*	1384.6	[0.03]
Unknown EUGL IV [m/z 93, 122 (98), 161 (98), 107 (86), 95 (46), 105 (72)... 204 (34)]				10.16	1389.2	0.01
Unknown CALU VIII [m/z 71, 100 (92), 111 (79), 69 (46), 109 (45)...]	17.33	2336.2	0.02	10.22*	1393.2	[0.03]
Unknown RHGR XXXVIII [m/z 79, 59 (80), 94 (49), 43 (41), 109 (30), 93 (25)...]				10.22*	1393.2	[0.03]
α-Gurjunene	7.80	1481.3	0.01	10.36	1403.6	0.01
β-Caryophyllene	8.60	1542.1	0.09	10.49	1412.7	0.08
Aromadendrene	8.75*	1553.7	[1.94]	10.76	1432.8	0.01
α-Humulene	9.48	1610.1	0.01	10.94	1446.8	0.01
allo-Aromadendrene	9.19	1587.6	0.03	11.04	1453.9	0.02
Viridiflorene	9.84	1639.5	0.03	11.53*	1490.2	[0.14]
Bicyclogermacrene	10.29*	1675.5	[1.14]	11.53*	1490.2	[0.14]
δ-Cadinene	10.61	1701.7	0.01	11.90	1518.8	0.01
Palustrol	12.47	1861.8	0.01	12.42	1559.7	0.01
Spathulenol	14.58	2057.0	0.03	12.56	1570.5	0.02
Caryophyllene oxide	12.96	1905.4	0.01	12.60	1573.8	0.01
Globulol	14.09	2009.6	0.03	12.64	1576.8	0.03
Viridiflorol	14.18	2018.1	0.02	12.74	1584.2	0.02
Cubeban-11-ol	13.88	1990.0	0.02	12.77	1587.1	0.01
Ledol	13.56	1960.3	0.01	12.87	1594.6	0.02
Rosifoliol	14.51	2049.8	0.01	13.13	1615.2	0.01
γ-Eudesmol	15.14	2111.0	0.03	13.25	1625.3	0.02
Isospathulenol	15.62	2158.8	0.03	13.33	1631.8	0.04
β-Eudesmol	15.59	2155.5	0.02	13.45	1642.2	0.02

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α-Eudesmol	15.52	2148.8	0.02	13.50	1645.7	0.02
Total reported		99.05%			99.47%	

*: 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

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