Date : 2024-12-13

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24K29-PTH04
Customer Identification : Rosemary - Hungary - R40113R
Type : Essential Oil
Source : *Rosmarinus officinalis ct. 1,8-Cineole*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

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 : Alexis St-Gelais, Ph. D., Chimiste 2013-174
Date : 2024-12-13

Physicochemical data

Refractive index : 1.4655 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-12-03

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	0.06	Aliphatic alcohol
Isobutyral	tr	Aliphatic aldehyde
Isovaleral	0.11	Aliphatic aldehyde
Isoamyl alcohol	0.02	Aliphatic alcohol
Isovaleric acid	0.02	Aliphatic acid
Cyclofenchene	0.02	Monoterpene
Unknown	0.02	Monoterpene
Hashishene	0.03	Monoterpene
Tricyclene	0.28	Monoterpene
α-Thujene	0.07	Monoterpene
α-Pinene	13.33	Monoterpene
β-Fenchene ?	0.06	Monoterpene
α-Fenchene	0.12	Monoterpene
Camphene	4.51	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
β-Pinene	6.26	Monoterpene
Sabinene	0.02	Monoterpene
Unknown	0.03	Monoterpene
Unknown UNKN CCCXC [m/z 91, 92 (50), 119 (20), 41 (18), 93 (14)...]	0.05	Unknown
Octan-3-one	0.03	Aliphatic ketone
Myrcene	1.09	Monoterpene
Pseudolimonene	0.07	Monoterpene
α-Phellandrene	0.23	Monoterpene
Δ3-Carene	0.02	Monoterpene
α-Terpinene	0.13	Monoterpene
para-Cymene	1.99	Monoterpene
1,8-Cineole	47.03	Monoterpenic ether
Limonene	3.82	Monoterpene
(*Z*)-β-Ocimene	0.05	Monoterpene
(*E*)-β-Ocimene	0.03	Monoterpene
γ-Terpinene	1.31	Monoterpene
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
para-Cymenene	0.06	Monoterpene
Terpinolene	0.07	Monoterpene
trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Unknown	0.03	Unknown
Linalool	0.45	Monoterpenic alcohol
Unknown	0.01	Unknown
endo-Fenchol	0.04	Monoterpenic alcohol

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Camphor	9.55	Monoterpenic ketone
trans-Pinocarveol	0.09	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Camphene hydrate	0.02	Monoterpenic alcohol
Isoborneol	0.16	Monoterpenic alcohol
Borneol	3.05	Monoterpenic alcohol
δ-Terpineol	0.11	Monoterpenic alcohol
Isopinocamphone	0.03	Monoterpenic ketone
Terpinen-4-ol	0.32	Monoterpenic alcohol
para-Cymen-8-ol	0.04	Monoterpenic alcohol
Myrtenal	0.02	Monoterpenic aldehyde
α-Terpineol	1.99	Monoterpenic alcohol
cis-α-Phellandrene epoxide (iPr vs Me)	0.02	Monoterpenic ether
Myrtenol	0.03	Monoterpenic alcohol
Verbenone	0.05	Monoterpenic ketone
Bornyl formate	0.02	Monoterpenic ester
Linalyl acetate	0.03	Monoterpenic ester
Bornyl acetate	1.00	Monoterpenic ester
Unknown	tr	Oxygenated monoterpene
α-Cubebene	0.02	Sesquiterpene
α-Ylangene	0.01	Sesquiterpene
α-Copaene	0.04	Sesquiterpene
Methyleugenol	0.04	Phenylpropanoid
β-Caryophyllene	0.43	Sesquiterpene
β-Copaene	0.02	Sesquiterpene
Aromadendrene	0.20	Sesquiterpene
α-Humulene	0.06	Sesquiterpene
allo-Aromadendrene	0.06	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
Unknown	0.02	Unknown
β-Bisabolene	0.03	Sesquiterpene
δ-Cadinene	0.02	Sesquiterpene
Isocaryophyllene epoxide B	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.07	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Globulol	0.05	Sesquiterpenic alcohol
Humulene epoxide II	0.02	Sesquiterpenic ether
γ-Eudesmol	0.03	Sesquiterpenic alcohol
β-Eudesmol	0.06	Sesquiterpenic alcohol
α-Eudesmol	0.04	Sesquiterpenic alcohol
meta-Camphorene	0.06	Diterpene
para-Camphorene	0.03	Diterpene
Consolidated total	**99.50**	

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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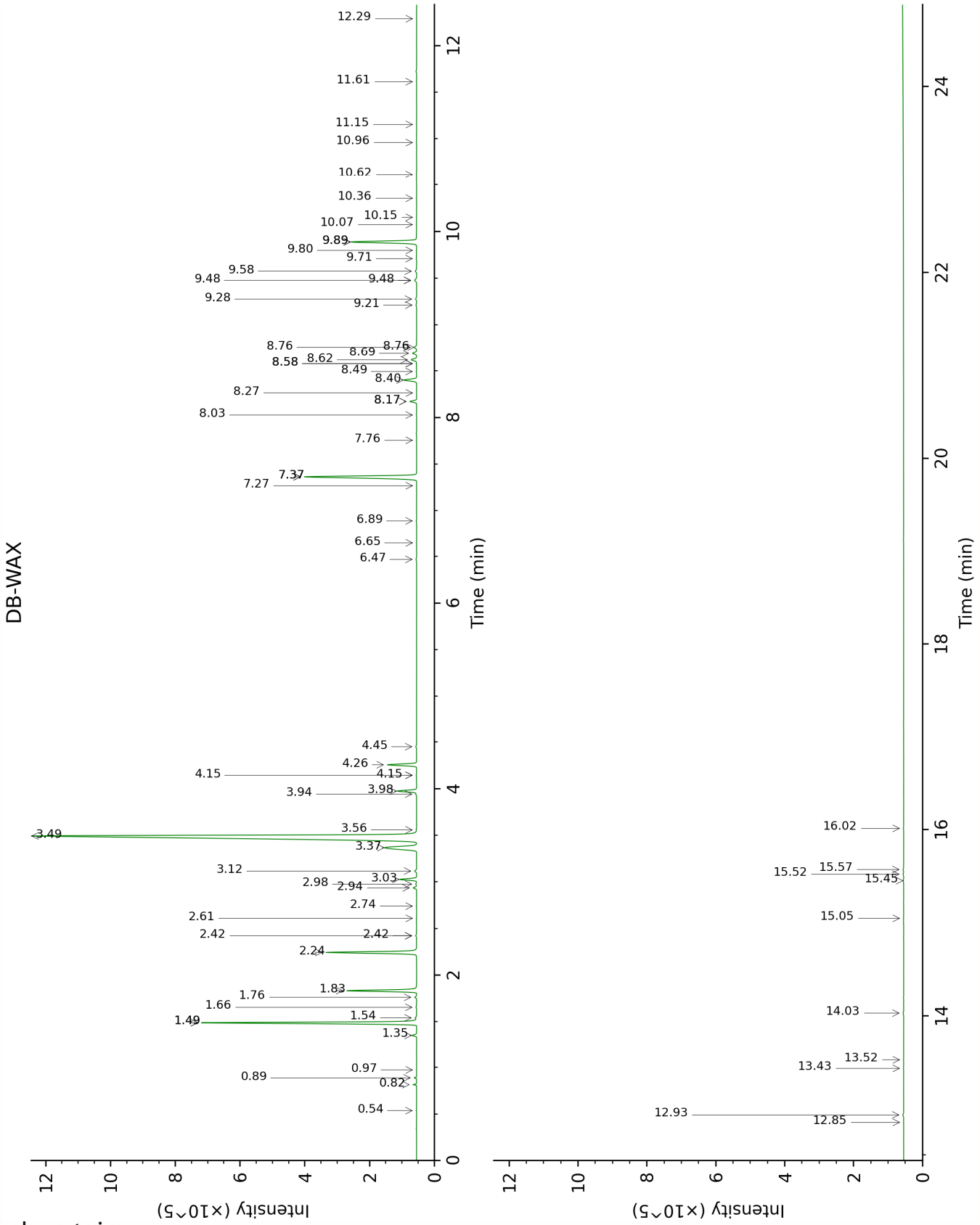
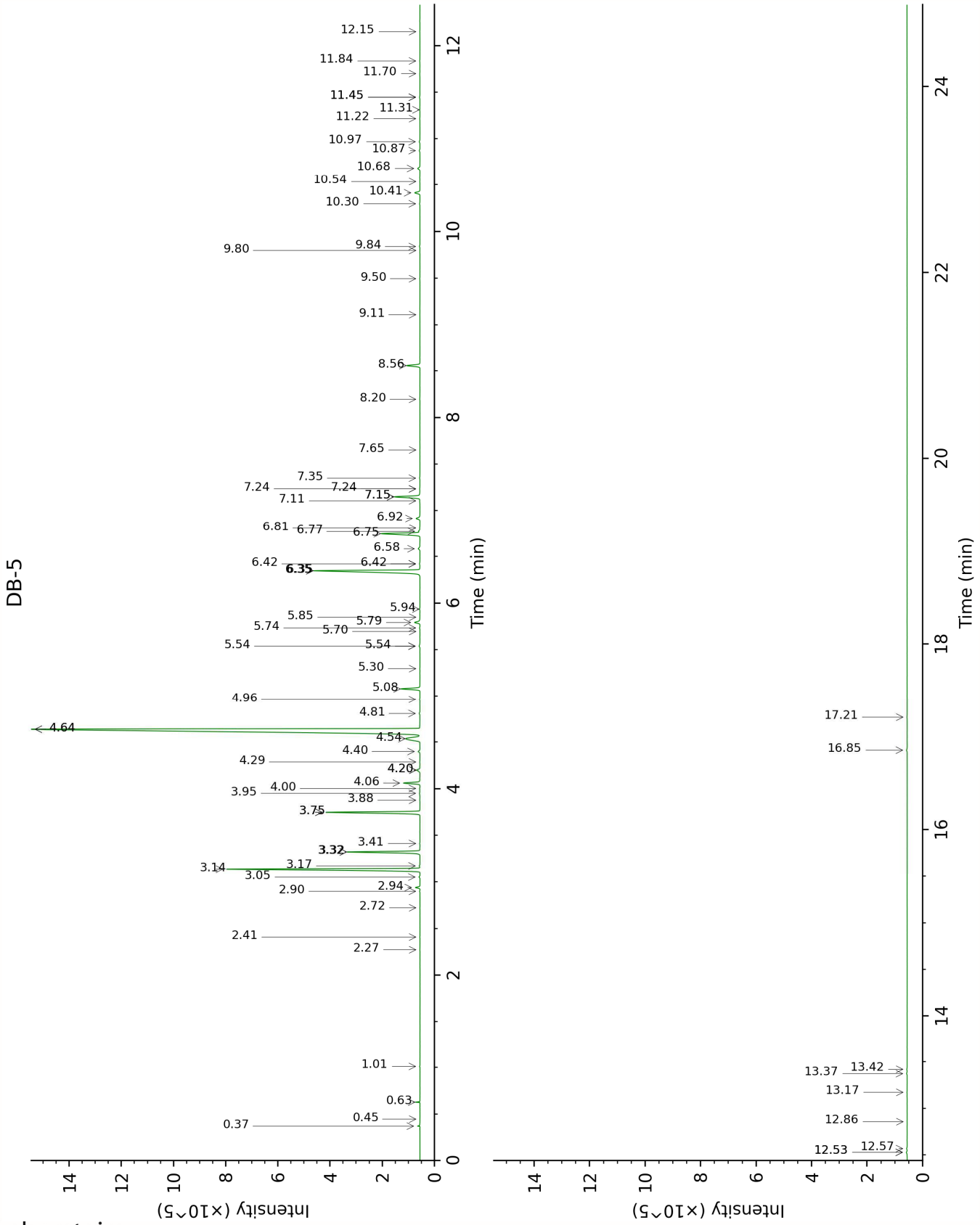

DB-WAX
Time (min)
Intensity (×10^5)
12.29
11.61
11.15
10.96
10.62
10.36
10.15
10.07
9.89
9.80
9.71
9.58
9.48
9.48
9.28
9.21
8.76
8.76
8.69
8.62
8.58
8.49
8.40
8.27
8.17
8.03
7.76
7.37
7.27
6.89
6.65
6.47
4.45
4.26
4.15
4.15
3.98
3.94
3.56
3.49
3.37
3.12
3.03
2.98
2.94
2.74
2.61
2.42
2.42
2.24
1.83
1.76
1.66
1.54
1.49
1.35
0.97
0.89
0.82
0.54
16.02
15.57
15.52
15.45
15.05
14.03
13.52
13.43
12.93
12.85


DB-5
12.15
11.84
11.70
11.45
11.31
11.22
10.97
10.87
10.68
10.54
10.41
10.30
9.80
9.84
9.50
9.11
8.56
8.20
7.65
7.35
7.24
7.24
7.11
7.15
6.92
6.81
6.77
6.75
6.58
6.42
6.42
6.35
5.94
5.85
5.79
5.74
5.70
5.54
5.54
5.30
5.08
4.96
4.81
4.64
4.54
4.40
4.29
4.20
4.06
4.00
3.95
3.88
3.75
3.41
3.32
3.17
3.14
3.05
2.94
2.90
2.72
2.41
2.27
1.01
0.63
0.45
0.37
17.21
16.85
13.42
13.37
13.17
12.86
12.57
12.53
Time (min)
Intensity (×10^5)

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Ethanol	0.89	905.6	0.08	0.37	499.9	0.06
Isobutyral	0.54	782.8	0.01	0.45	538.2	tr
Isovaleral	0.82	885.8	0.12	0.63	641.0	0.11
Isoamyl alcohol	3.56	1176.7	0.03	1.01	732.9	0.02
Isovaleric acid				2.27	867.0	0.02
Cyclofenchene	0.98	918.1	0.01	2.41	878.3	0.02
Unknown THPL XII [m/z 80, 79 (45), 93 (25), 136 (13), 121 (13), 77 (11)...]				2.72	904.4	0.02
Hashishene	1.49*	994.8	[13.27]	2.90	916.2	0.03
Tricyclene	1.35	974.4	0.28	2.94	918.9	0.28
α-Thujene	1.54	1001.5	0.09	3.05	926.4	0.07
α-Pinene	1.49*	994.8	[13.27]	3.14	931.9	13.33
β-Fenchene ?	1.66	1012.2	0.05	3.17	934.3	0.06
α-Fenchene	1.76	1022.3	0.12	3.32*	944.2	[4.64]
Camphene	1.83	1029.0	4.51	3.32*	944.2	[4.64]
Thuja-2,4(10)-diene	2.42*	1085.2	[0.07]	3.41	950.2	0.03
β-Pinene	2.24	1068.1	6.26	3.75*	972.4	[6.28]
Sabinene	2.42*	1085.2	[0.07]	3.75*	972.4	[6.28]
Unknown ORVU I [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	2.61	1102.5	0.02	3.88	981.0	0.03
Unknown UNKN CCCXC [m/z 91, 92 (50), 119 (20), 41 (18), 93 (14)...]				3.95	985.9	0.05
Octan-3-one	4.15*	1221.8	[0.04]	4.00	989.3	0.03
Myrcene	3.03	1134.9	1.12	4.06	993.2	1.09
Pseudolimonene	2.98	1131.0	0.07	4.20*	1002.4	[0.29]
α-Phellandrene	2.94	1127.9	0.23	4.20*	1002.4	[0.29]
Δ3-Carene	2.74	1112.6	0.02	4.29	1008.0	0.02
α-Terpinene	3.12	1142.0	0.14	4.40	1015.0	0.13
para-Cymene	4.26	1230.2	2.02	4.54	1023.7	1.99
1,8-Cineole	3.49	1171.5	47.03	4.64*	1030.1	[51.07]
Limonene	3.37	1161.6	3.82	4.64*	1030.1	[51.07]
(*Z*)-β-Ocimene	3.94	1206.7	0.05	4.81	1040.7	0.05
(*E*)-β-Ocimene	4.15*	1221.8	[0.04]	4.96	1050.4	0.03
γ-Terpinene	3.98	1209.2	1.35	5.08	1057.7	1.31
cis-Linalool oxide	6.65	1397.6	0.02	5.30	1071.3	0.02

(fur.)						
para-Cymenene	6.47	1384.8	0.06	5.54*	1086.5	[0.09]
Terpinolene	4.45	1244.8	0.07	5.54*	1086.5	[0.09]
trans-Sabinene hydrate	8.03	1500.6	0.02	5.70	1096.4	0.01
Unknown UNKN XVIII [m/z 108, 109 (58), 95 (52), 69 (48), 152 (42), 41 (37)...]				5.74	1098.8	0.03
Linalool	8.17*	1511.9	[0.46]	5.79	1102.4	0.45
Unknown UNKN LX [m/z 139, 95 (95), 109 (64), 121 (40), 41 (23), 136 (22)...]				5.85	1106.0	0.01
endo-Fenchol	8.50	1537.0	0.03	5.94	1111.6	0.04
Camphor	7.36*	1451.1	[9.54]	6.35*	1137.9	[9.64]
trans-Pinocarveol	9.28	1597.9	0.09	6.35*	1137.9	[9.64]
Unknown MEER II [m/z 83, 55 (69), 41 (60), 71 (59), 81 (57), 95 (56), 69 (56)...154 (3)]				6.42*	1142.7	[0.05]
Camphene hydrate	8.58*	1543.6	[0.04]	6.42*	1142.7	[0.05]
Isoborneol	9.48*	1614.1	[0.19]	6.58	1153.0	0.16
Borneol	9.89*	1647.5	[5.04]	6.75	1163.4	3.05
δ-Terpineol	9.58	1622.1	0.11	6.77	1165.0	0.11
Isopinocamphone	7.76	1480.3	0.02	6.81	1167.3	0.03
Terpinen-4-ol	8.69	1552.2	0.30	6.92	1174.3	0.32
para-Cymen-8-ol	11.61	1791.9	0.02	7.11	1186.4	0.04
Myrtenal	8.76*	1557.8	[0.20]	7.15*	1189.2	[2.01]
α-Terpineol	9.89*	1647.5	[5.04]	7.15*	1189.2	[2.01]
cis-α-Phellandrene epoxide (iPr vs Me)	11.15	1752.8	0.02	7.24*	1194.6	[0.04]
Myrtenol	10.96	1736.3	0.03	7.24*	1194.6	[0.04]
Verbenone	9.71	1633.0	0.04	7.35	1202.0	0.05
Bornyl formate	8.17*	1511.9	[0.46]	7.65	1222.1	0.02
Linalyl acetate	8.26	1519.1	0.02	8.20	1258.6	0.03
Bornyl acetate	8.40	1529.9	1.01	8.56	1282.8	1.00
Unknown MISC XI [m/z 91, 79 (94),				9.11	1320.6	tr

77 (72), 41 (37), 93 (31)... 152 (1)]						
α-Cubebene	6.89	1415.8	0.03	9.50	1347.8	0.02
α-Ylangene	7.27	1443.9	0.02	9.80	1369.1	0.01
α-Copaene	7.36*	1451.1	[9.54]	9.84	1372.1	0.04
Methyleugenol	13.43	1955.2	0.03	10.30	1404.4	0.04
β-Caryophyllene	8.62	1546.8	0.43	10.41	1413.1	0.43
β-Copaene	8.58*	1543.6	[0.04]	10.54	1422.1	0.02
Aromadendrene	8.76*	1557.8	[0.20]	10.68	1433.1	0.20
α-Humulene	9.48*	1614.1	[0.19]	10.87	1447.4	0.06
allo-Aromadendrene	9.21	1592.9	0.06	10.97	1454.5	0.06
γ-Muurolene	9.80	1640.2	0.03	11.22	1473.0	0.02
β-Selinene	10.07	1662.7	0.03	11.31	1480.0	0.02
α-Selinene	10.15	1669.0	0.02	11.45*	1490.1	[0.04]
Unknown MISC CCII [m/z 59, 94 (67), 95 (50), 79 (44), 43 (41), 73 (16)...]				11.45*	1490.1	[0.04]
β-Bisabolene	10.36	1685.6	0.02	11.70	1509.2	0.03
δ-Cadinene	10.62	1707.0	0.04	11.84	1519.9	0.02
Isocaryophyllene epoxide B	12.29	1851.6	0.02	12.15	1544.6	0.02
Caryophyllene oxide	12.93	1908.9	0.07	12.53*	1574.3	[0.09]
Caryophyllene oxide isomer	12.85	1901.5	0.02	12.53*	1574.3	[0.09]
Globulol	14.03	2011.2	0.06	12.57	1577.4	0.05
Humulene epoxide II	13.52	1963.6	0.02	12.86	1600.2	0.02
γ-Eudesmol	15.05	2109.7	0.02	13.17	1626.0	0.03
β-Eudesmol	15.52	2157.1	0.05	13.37	1642.7	0.06
α-Eudesmol	15.45	2150.1	0.05	13.42	1646.5	0.04
meta-Camphorene	15.57	2162.1	0.05	16.85	1950.2	0.06
para-Camphorene	16.02	2206.6	0.03	17.21	1984.0	0.03
Total reported		99.23%			99.68%	

*: 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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