Date : 2024-03-12

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24B27-PTH14
Customer Identification : Organic Oregano - Spain - O50114R
Type : Essential Oil
Source : *Origanum vulgare ct. Carvacrol*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 : 2024-03-12

Physicochemical data

Refractive index : 1.5096 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-02-28

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
Isobutyral	0.01	Aliphatic aldehyde
Isovaleral	0.02	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Methyl 2-methylbutyrate	0.06	Aliphatic ester
(2*E*)-Hexenal	0.01	Aliphatic aldehyde
Heptan-3-one	0.01	Aliphatic ketone
Hashishene	0.01	Monoterpene
Tricyclene	0.01	Monoterpene
α-Thujene	1.18	Monoterpene
α-Pinene	0.94	Monoterpene
Unknown	0.01	Monoterpene
Camphene	0.12	Monoterpene
Thuja-2,4(10)-diene	tr	Monoterpene
Sabinene	tr	Monoterpene
β-Pinene	0.13	Monoterpene
Octen-3-ol	0.38	Aliphatic alcohol
Octan-3-one	0.18	Aliphatic ketone
Myrcene	1.50	Monoterpene
Octan-3-ol	0.05	Aliphatic alcohol
α-Phellandrene	0.16	Monoterpene
Pseudolimonene	0.01	Monoterpene
Δ3-Carene	0.07	Monoterpene
α-Terpinene	1.14	Monoterpene
para-Cymene	7.10	Monoterpene
β-Phellandrene	0.19	Monoterpene
Limonene	0.22	Monoterpene
1,8-Cineole	0.05	Monoterpenic ether
(*Z*)-β-Ocimene	0.03	Monoterpene
(*E*)-β-Ocimene	0.10	Monoterpene
γ-Terpinene	5.01	Monoterpene
cis-Sabinene hydrate	0.28	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
para-Cymenene	0.03	Monoterpene
Terpinolene	0.09	Monoterpene
trans-Sabinene hydrate	0.08	Monoterpenic alcohol
Linalool	0.87	Monoterpenic alcohol
endo-Fenchol	0.02	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol

trans-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
Camphor	0.03	Monoterpenic ketone
Isoborneol	0.01	Monoterpenic alcohol
Unknown	0.01	Unknown
Borneol	0.30	Monoterpenic alcohol
Terpinen-4-ol	0.76	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
α-Terpineol	0.13	Monoterpenic alcohol
cis-Dihydrocarvone	0.04	Monoterpenic ketone
cis-Piperitol	0.04	Monoterpenic alcohol
trans-Dihydrocarvone	0.06	Monoterpenic ketone
trans-Piperitol	0.04	Monoterpenic alcohol
trans-Carveol	0.01	Monoterpenic alcohol
cis-Carveol	0.01	Monoterpenic alcohol
Thymol methyl ether	0.02	Monoterpenic ether
Carvacrol methyl ether	0.12	Monoterpenic ether
Piperitone	0.01	Monoterpenic ketone
Carvenone	0.04	Monoterpenic ketone
Geraniol	0.02	Monoterpenic alcohol
Geranial	0.01	Monoterpenic aldehyde
Bornyl acetate	0.01	Monoterpenic ester
Thymol analogue I (isothymol?)	0.03	Monoterpenic alcohol
Thymol	3.37	Monoterpenic alcohol
Carvacrol	70.34	Monoterpenic alcohol
2-Methyl-6-propylphenol?	0.01	Miscellaneous
Carvacryl acetate	0.02	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
β-Bourbonene	0.02	Sesquiterpene
β-Elemene	0.03	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
β-Caryophyllene	2.30	Sesquiterpene
α-Humulene	0.14	Sesquiterpene
(*E*)-β-Farnesene	0.11	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
β-Bisabolene	0.45	Sesquiterpene
δ-Cadinene	0.05	Sesquiterpene
β-Sesquiphellandrene	0.02	Sesquiterpene
(*E*)-α-Bisabolene	0.01	Sesquiterpene
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.26	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Unknown	0.01	Oxygenated sesquiterpene
1,10-diepi-Cubenol	0.01	Sesquiterpenic alcohol

Caryophylladienol I	0.01	Sesquiterpenic alcohol
Caryophylladienol II	0.01	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.02	Sesquiterpenic alcohol
Phytone	0.01	Terpenic ketone
Unknown	0.03	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.07	Unknown
Unknown	0.07	Unknown
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.04	Unknown
Unknown	0.04	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Consolidated total	**99.46**	

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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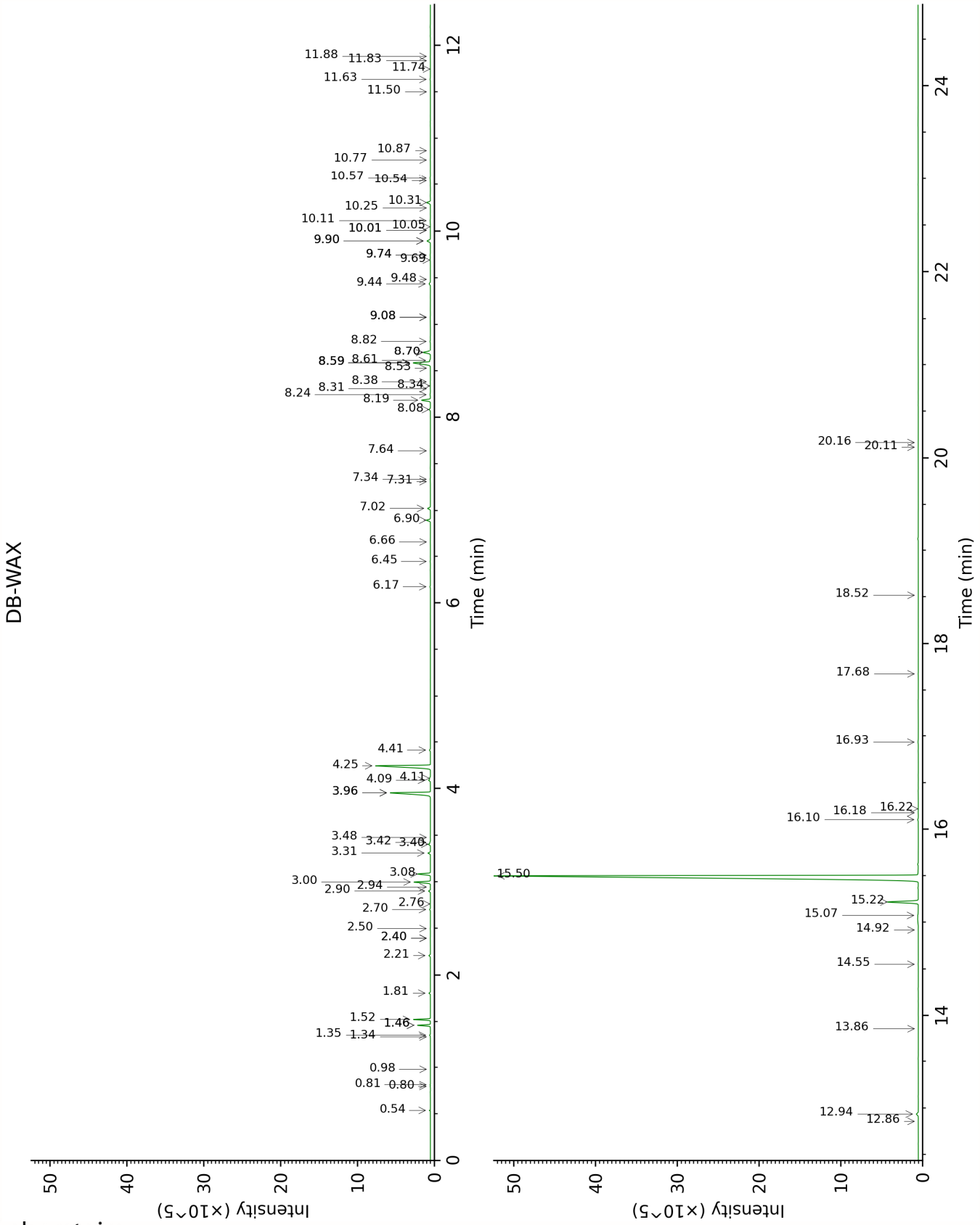
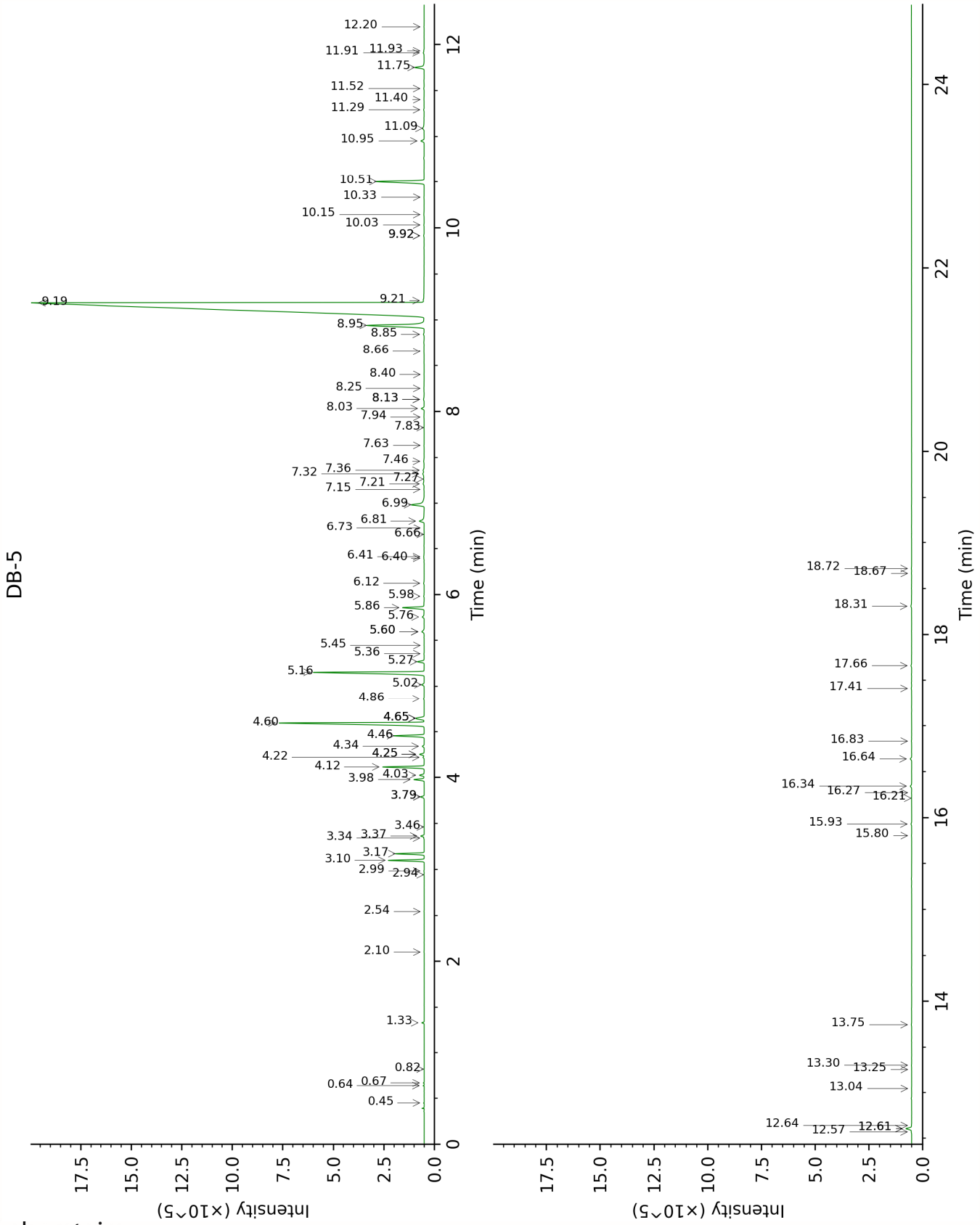

DB-WAX
Intensity (×10^5)
Time (min)
11.88
11.83
11.74
11.63
11.50
10.87
10.77
10.57
10.54
10.31
10.25
10.11
10.05
10.01
9.90
9.74
9.69
9.48
9.44
9.08
8.82
8.70
8.61
8.59
8.53
8.38
8.34
8.31
8.24
8.19
8.08
7.64
7.34
7.31
7.02
6.90
6.66
6.45
6.17
4.41
4.25
4.11
4.09
3.96
3.48
3.42
3.40
3.31
3.08
3.00
2.94
2.90
2.76
2.70
2.50
2.40
2.21
1.81
1.52
1.46
1.35
1.34
0.98
0.81
0.80
0.54
20.16
20.11
18.52
17.68
16.93
16.22
16.18
16.10
15.50
15.22
15.07
14.92
14.55
13.86
12.94
12.86


DB-5
Time (min)
Intensity (×10^5)
12.20
11.91
11.93
11.75
11.52
11.40
11.29
11.09
10.95
10.51
10.33
10.15
10.03
9.92
9.19
9.21
8.95
8.85
8.66
8.40
8.25
8.13
8.03
7.94
7.83
7.63
7.46
7.32
7.36
7.27
7.15
7.21
6.99
6.81
6.73
6.66
6.41
6.40
6.12
5.98
5.86
5.76
5.60
5.45
5.36
5.27
5.16
5.02
4.86
4.65
4.60
4.46
4.34
4.25
4.22
4.12
4.03
3.98
3.79
3.46
3.34
3.37
3.17
3.10
2.99
2.94
2.54
2.10
1.33
0.82
0.64
0.67
0.45
18.72
18.67
18.31
17.66
17.41
16.83
16.64
16.34
16.27
16.21
15.93
15.80
13.75
13.30
13.25
13.04
12.64
12.57
12.61

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Isobutyral	0.54	775.7	0.04	0.45	536.7	0.01
Isovaleral	0.82	883.7	0.02	0.64	640.9	0.02
2-Methylbutyral	0.80	877.6	0.01	0.67	651.0	0.01
2-Ethylfuran	0.98	919.9	tr	0.82	701.4	tr
Methyl 2-methylbutyrate	1.36	976.0	0.05	1.33	774.4	0.06
(2*E*)-Hexenal	3.48	1170.2	0.01	2.10	850.1	0.01
Heptan-3-one	2.76	1115.8	0.01	2.54	886.2	0.01
Hashishene	1.46*	992.0	[0.94]	2.94	916.4	0.01
Tricyclene	1.34	973.2	0.01	2.99	919.2	0.01
α-Thujene	1.52	1001.4	1.17	3.10	926.8	1.18
α-Pinene	1.46*	992.0	[0.94]	3.17	931.5	0.94
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.50	1094.1	0.02	3.34	942.7	0.01
Camphene	1.81	1028.6	0.11	3.37	944.2	0.12
Thuja-2,4(10)-diene	2.40*	1084.2	[0.01]	3.46	950.7	tr
Sabinene	2.40*	1084.2	[0.01]	3.79*	972.3	[0.13]
β-Pinene	2.21	1066.6	0.13	3.79*	972.3	[0.13]
Octen-3-ol	6.90	1417.3	0.39	3.98	984.6	0.38
Octan-3-one	4.09	1216.2	0.18	4.03	987.7	0.18
Myrcene	3.00	1133.7	1.49	4.12	993.7	1.50
Octan-3-ol	6.18	1364.7	0.05	4.22	1000.5	0.05
α-Phellandrene	2.90	1126.3	0.16	4.26*	1002.7	[0.17]
Pseudolimonene	2.94	1129.6	0.01	4.26*	1002.7	[0.17]
Δ3-Carene	2.70	1111.3	0.07	4.34	1008.3	0.07
α-Terpinene	3.08	1140.3	1.13	4.46	1015.5	1.14
para-Cymene	4.25	1227.4	7.03	4.60	1024.2	7.10
β-Phellandrene	3.40	1164.7	0.19	4.65*	1027.4	[0.47]
Limonene	3.31	1157.4	0.22	4.65*	1027.4	[0.47]
1,8-Cineole	3.42	1166.1	0.05	4.65*	1027.4	[0.47]
(*Z*)-β-Ocimene	3.96*	1206.6	[5.00]	4.86	1040.9	0.03
(*E*)-β-Ocimene	4.11	1217.8	0.09	5.02	1050.7	0.10
γ-Terpinene	3.96*	1206.6	[5.00]	5.16	1059.1	5.01
cis-Sabinene hydrate	7.02	1426.7	0.29	5.27	1066.4	0.28
cis-Linalool oxide (fur.)	6.66	1399.3	0.01	5.36	1071.8	0.01
Octanol	8.34	1525.7	0.01	5.45	1077.4	0.01
para-Cymenene	6.45	1384.2	0.03	5.60*	1086.7	[0.13]
Terpinolene	4.41	1239.4	0.09	5.60*	1086.7	[0.13]
trans-Sabinene hydrate	8.08	1506.0	0.12	5.76	1096.8	0.08

Linalool	8.18	1513.8	0.88	5.86	1103.1	0.87
endo-Fenchol	8.53	1540.5	0.01	5.98	1111.0	0.02
cis-para-Menth-2-en-1-ol	8.24	1518.4	0.05	6.12	1120.0	0.03
trans-para-Menth-2-en-1-ol	9.08*	1583.4	[0.02]	6.40	1137.3	0.01
Camphor	7.34	1450.0	0.03	6.41	1138.4	0.03
Isoborneol	9.48	1615.5	0.01	6.66	1153.9	0.01
Unknown RHGR XVIII [m/z 123, 81 (46), 43 (45), 95 (34), 166 (30)]	9.08*	1583.4	[0.02]	6.73	1158.4	0.01
Borneol	9.90*	1648.9	[0.39]	6.81	1163.6	0.30
Terpinen-4-ol	8.70*	1553.7	[0.89]	6.99	1175.0	0.76
para-Cymen-8-ol	11.63	1794.2	0.05	7.15	1185.6	0.01
α-Terpineol	9.90*	1648.9	[0.39]	7.21*†	1189.5	[0.07]
cis-Dihydrocarvone	8.61	1546.9	0.08	7.27	1192.8	0.04
cis-Piperitol	9.69	1632.3	0.04	7.32*†	1196.4	[0.10]
trans-Dihydrocarvone	8.82	1563.3	0.04	7.36	1198.9	0.06
trans-Piperitol	10.54	1701.4	0.03	7.46	1205.1	0.04
trans-Carveol	11.50	1782.9	0.01	7.63	1216.7	0.01
cis-Carveol	11.83	1811.6	0.01	7.83	1229.6	0.01
Thymol methyl ether	8.58*	1544.9	[2.31]	7.94	1237.3	0.02
Carvacrol methyl ether	8.70*	1553.7	[0.89]	8.03	1243.6	0.12
Piperitone	10.05	1661.2	0.01	8.13*	1250.1	[0.05]
Carvenone	10.01*	1658.2	[0.02]	8.13*	1250.1	[0.05]
Geraniol	11.74	1803.7	0.01	8.25	1258.2	0.02
Geranial	10.25	1677.6	0.02	8.40	1268.3	0.01
Bornyl acetate	8.38	1529.1	0.02	8.66	1285.3	0.01
Thymol analogue I (isothymol?)	15.08	2112.2	0.10	8.85	1297.9	0.03
Thymol	15.22	2126.7	3.32	8.94	1304.4	3.37
Carvacrol	15.50	2154.8	69.95	9.19	1321.7	70.34
2-Methyl-6-propylphenol?				9.21	1323.3	0.01
Carvacryl acetate	11.88	1815.7	0.02	9.92*	1372.9	[0.03]
α-Copaene	7.31	1448.1	0.01	9.92*	1372.9	[0.03]
β-Bourbonene	7.64	1472.8	0.01	10.03	1381.1	0.02
β-Elemene	8.58*	1544.9	[2.31]	10.15	1389.0	0.03
Isocaryophyllene	8.31	1523.4	0.01	10.33	1402.3	0.01
β-Caryophyllene	8.58*	1544.9	[2.31]	10.50	1414.8	2.30
α-Humulene	9.44	1611.6	0.15	10.95	1448.2	0.14

(*E*)-β-Farnesene	9.74*	1636.5	[0.04]	11.09	1458.4	0.11
γ-Muurolene	9.74*	1636.5	[0.04]	11.29	1473.4	0.02
β-Selinene	10.01*	1658.2	[0.02]	11.40	1481.6	0.02
α-Selinene	10.11	1666.5	0.04	11.52	1490.6	0.02
β-Bisabolene	10.31	1682.3	0.41	11.75	1507.8	0.45
δ-Cadinene	10.57	1703.7	0.04	11.91	1520.3	0.05
β-Sesquiphellandrene	10.77	1720.6	0.02	11.93	1522.0	0.02
(*E*)-α-Bisabolene	10.87	1729.2	0.02	12.20	1542.4	0.01
Spathulenol	14.55	2061.3	0.03	12.57	1572.0	0.02
Caryophyllene oxide	12.94	1909.5	0.26	12.61*	1574.8	[0.26]
Caryophyllene oxide isomer	12.86	1902.3	0.01	12.61*	1574.8	[0.26]
Unknown HEBR VI [m/z 109, 43 (95), 81 (81), 93 (76), 69 (75), 95 (74), 107 (71)... 204 (22), 220 (6)]				12.64	1577.5	0.01
1,10-diepi-Cubenol	13.86	1995.0	0.01	13.04	1609.2	0.01
Caryophylladienol I	16.22	2227.8	0.01	13.25	1626.3	0.01
Caryophylladienol II	16.18	2223.4	0.02	13.30	1630.2	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	16.94	2302.3	0.05	13.75	1667.3	0.02
Phytone	14.92	2096.8	0.01	15.80	1845.5	0.01
Unknown ORVU II [m/z 81, 150 (90), 136 (88), 135 (74), 93 (54), 121 (41)...]				15.93	1857.0	0.03
Unknown ORVU XIII [m/z 93, 135 (57), 43 (41), 91 (39), 150 (22)...]				16.21	1882.6	0.01
Unknown ORVU XII [m/z 133, 150 (34), 105 (22), 135 (16), 134 (12)...]				16.27	1888.0	0.01
Unknown ORVU III [m/z 81, 150 (83), 136 (81), 135 (67), 93 (48), 121 (36)...]				16.34	1894.6	0.07
Unknown ORVU X [m/z 136, 81 (81), 150 (74), 135 (52),	16.10	2215.8	0.07	16.64	1922.2	0.07

93 (46), 121 (42)...]						
Unknown ORVU XV [m/z 81, 136 (71), 150 (57), 93 (47), 135 (42)...]				16.83	1940.6	0.01
Unknown MOFI III [m/z 99, 43 (43), 69 (37), 71 (37), 41 (28)...]	17.68	2382.2	0.02	17.41	1995.8	0.02
Unknown ORVU VI [m/z 135, 150 (66), 43 (38), 109 (27), 93 (25), 137 (20)...]	18.52	2475.9	0.01	17.66	2020.0	0.04
Unknown ORVU XVIII [m/z 135, 150 (71), 43 (55), 93 (36), 109 (36), 91 (28)...]				18.31	2084.1	0.04
Unknown MOFI V [m/z 69, 41 (81), 91 (37), 166 (35), 105 (33), 43 (30)...]	20.12	2661.7	0.01	18.67	2120.2	0.01
Unknown MOFI VI [m/z 69, 41 (74), 166 (36), 91 (32), 105 (28), 43 (25)...]	20.16	2667.7	0.01	18.72	2125.7	0.01
Total reported		98.69%			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