Date : 2025-10-17

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 25H19-PTH04
Customer Identification : Marjoram - Egypt - M20116R
Type : Essential Oil
Source : *Origanum majorana ct. Sabinene hydrate*
Customer : Plant Therapy

Checked an approved by:

Sylvain Mercier, M. Sc., Chimiste 2014-005

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

This report is an update of the version first issued on August 26, 2025 to correct a mistake in the sample identification section.

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 : Jean-Christophe Fortin, M. Sc.
Date : 2025-08-26

Physicochemical data

Refractive index : 1.4747 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Kassandra Baker
Date : 2025-08-19

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
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
2-Ethylfuran	0.01	Furan
Methyl 2-methylbutyrate	0.01	Aliphatic ester
(2*E*)-Hexenal	0.02	Aliphatic aldehyde
(3*Z*)-Hexenol	0.01	Aliphatic alcohol
Hashishene	0.01	Monoterpene
α-Thujene	0.57	Monoterpene
α-Pinene	0.55	Monoterpene
Camphene	0.03	Monoterpene
β-Pinene	0.31	Monoterpene
Sabinene	2.23	Monoterpene
3-Methyl-3-cyclohexenone	0.01	Aliphatic ketone
Octan-3-one	0.03	Aliphatic ketone
Myrcene	1.30	Monoterpene
α-Phellandrene	0.42	Monoterpene
Pseudolimonene	0.05	Monoterpene
(3*Z*)-Hexenyl acetate	0.01	Aliphatic ester
α-Terpinene	10.76	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
para-Cymene	1.51	Monoterpene
β-Phellandrene	1.41	Monoterpene
Limonene	1.34	Monoterpene
1,8-Cineole	0.16	Monoterpenic ether
(*Z*)-β-Ocimene	0.02	Monoterpene
(*E*)-β-Ocimene	0.04	Monoterpene
γ-Terpinene	12.10	Monoterpene
cis-Sabinene hydrate	3.15	Monoterpenic alcohol
Terpinolene	2.66	Monoterpene
para-Cymenene	0.01	Monoterpene
trans-Sabinene hydrate	4.40	Monoterpenic alcohol
Linalool	5.77	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Unknown	0.02	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.73	Monoterpenic alcohol
α-Campholenal	0.04	Monoterpenic aldehyde
4-Hydroxy-4-methylcyclohex-2-enone	0.01	Aliphatic alcohol
trans-Pinocarveol	0.10	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.60	Monoterpenic alcohol
Epoxyterpinolene	0.06	Monoterpenic ether

1,4-Dimethyl-4-acetylcyclohexene	0.02	Monoterpenic ketone
Unknown	0.03	Unknown
Borneol	0.05	Monoterpenic alcohol
δ-Terpineol	0.03	Monoterpenic alcohol
Terpinen-4-ol	34.50	Monoterpenic alcohol
Cryptone	0.02	Normonoterpenic ketone
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	5.05	Monoterpenic alcohol
cis-Piperitol	0.21	Monoterpenic alcohol
cis-Dihydrocarvone	0.09	Monoterpenic ketone
Methylchavicol	0.01	Phenylpropanoid
trans-Dihydrocarvone	0.05	Monoterpenic ketone
Unknown	0.01	Unknown
trans-Piperitol	0.46	Monoterpenic alcohol
trans-Carveol	0.02	Monoterpenic alcohol
cis-Sabinene hydrate acetate?	0.03	Monoterpenic ester
Nerol	0.02	Monoterpenic alcohol
Citronellol	0.03	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
Neral	0.03	Monoterpenic aldehyde
Carvenone	0.03	Monoterpenic ketone
trans-Sabinene hydrate acetate	0.37	Monoterpenic ester
Geraniol	0.04	Monoterpenic alcohol
Linalyl acetate	3.17	Monoterpenic ester
trans-Ascaridole glycol	0.09	Monoterpenic alcohol
Citronellyl formate	0.01	Monoterpenic ester
Bornyl acetate	0.10	Monoterpenic ester
Terpinen-4-yl acetate	0.14	Monoterpenic ester
Thymol	0.02	Monoterpenic alcohol
Unknown	0.04	Monoterpenic alcohol
Unknown	0.13	Monoterpenic alcohol
Bicycloelemene	0.02	Sesquiterpene
α-Cubebene	0.02	Sesquiterpene
Eugenol	0.03	Phenylpropanoid
Neryl acetate	0.03	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
Geranyl acetate	0.06	Monoterpenic ester
β-Elemene	0.01	Sesquiterpene
β-Caryophyllene	1.84	Sesquiterpene
β-Copaene	0.01	Sesquiterpene
Aromadendrene	0.07	Sesquiterpene
trans-α-Bergamotene	0.02	Sesquiterpene
α-Humulene	0.09	Sesquiterpene
allo-Aromadendrene	0.04	Sesquiterpene
trans-Cadina-1(6),4-diene	0.05	Sesquiterpene

Germacrene D	0.01	Sesquiterpene
Bicyclogermacrene	0.55	Sesquiterpene
Viridiflorene	0.27	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.05	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
δ-Cadinene	0.02	Sesquiterpene
Isocaryophyllene epoxide B	0.01	Sesquiterpenic ether
Spathulenol	0.05	Sesquiterpenic alcohol
Caryophyllene oxide	0.07	Sesquiterpenic ether
Globulol	0.02	Sesquiterpenic alcohol
Viridiflorol	0.03	Sesquiterpenic alcohol
10-epi-γ-Eudesmol	0.01	Sesquiterpenic alcohol
Isospathulenol	0.08	Sesquiterpenic alcohol
τ-Cadinol	0.01	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Phytone	0.01	Terpenic ketone
Unknown	0.03	Diterpene
Consolidated total	**98.92**	

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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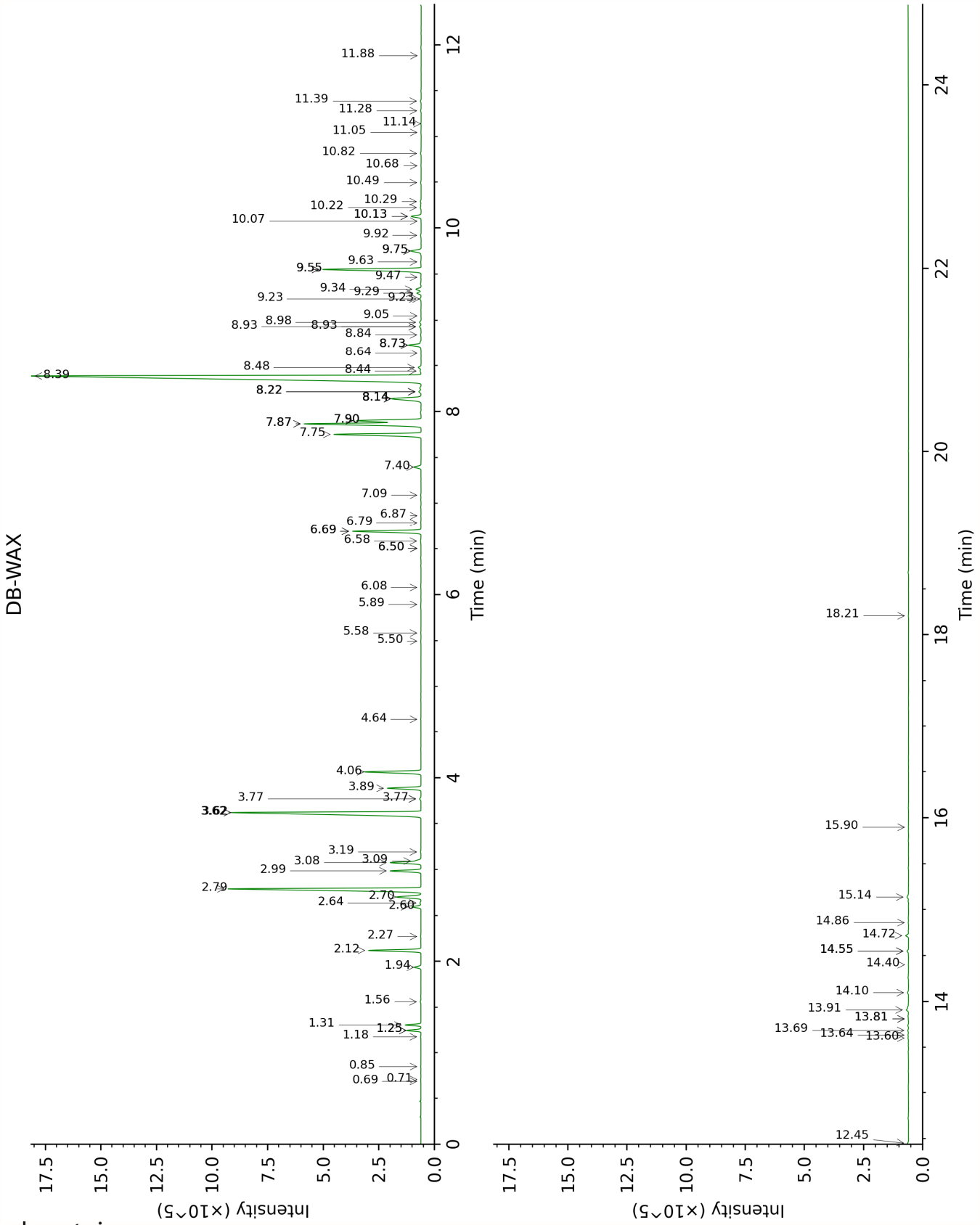
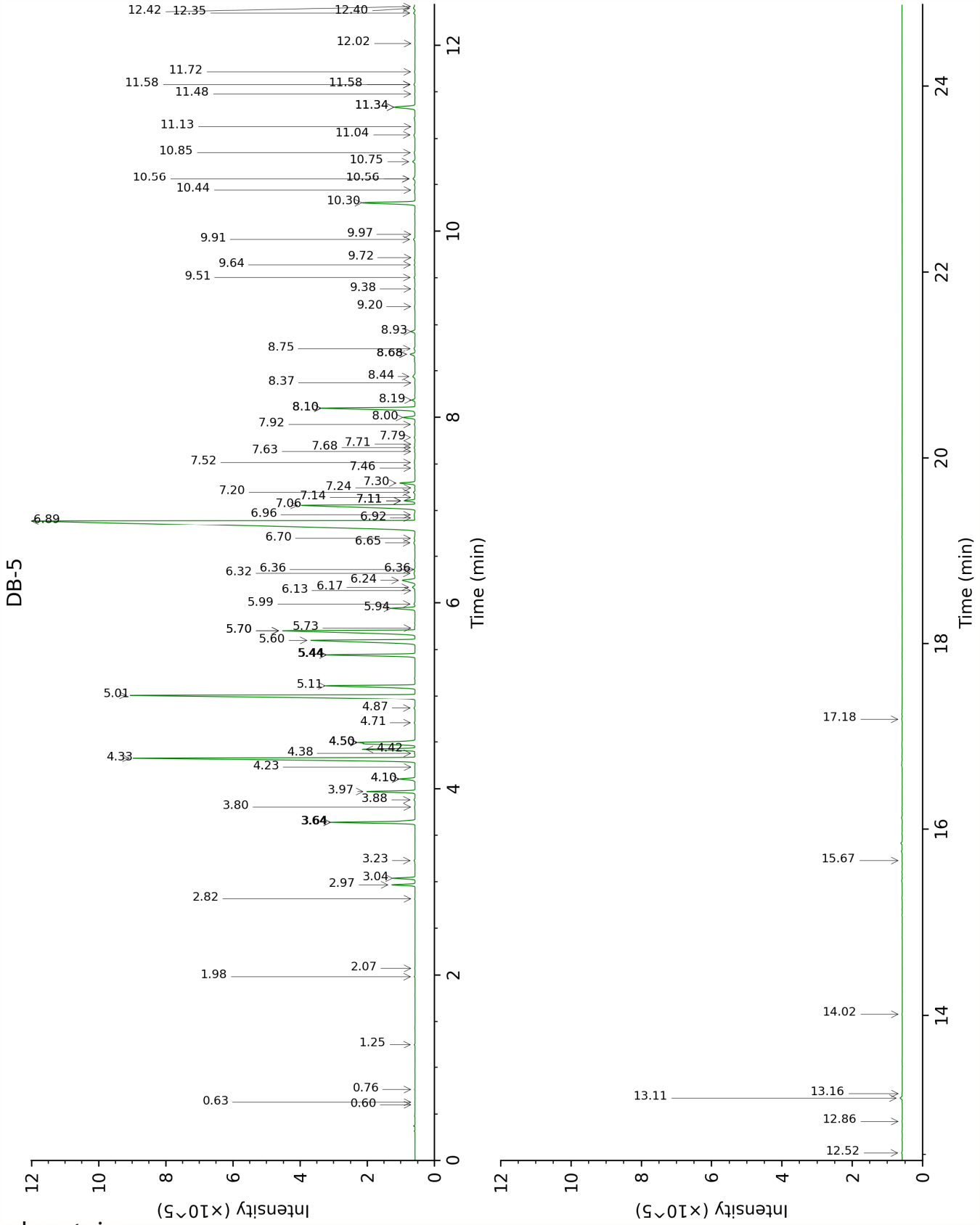

DB-WAX
Time (min)
Intensity (×10^5)
11.88
11.39
11.28
11.14
11.05
10.82
10.68
10.49
10.29
10.22
10.13
10.07
9.92
9.75
9.63
9.55
9.47
9.34
9.29
9.23
9.23
9.05
8.98
8.93
8.93
8.84
8.73
8.64
8.48
8.44
8.39
8.22
8.14
7.90
7.87
7.75
7.40
7.09
6.87
6.79
6.69
6.58
6.50
6.08
5.89
5.58
5.50
4.64
4.06
3.89
3.77
3.77
3.62
3.19
3.09
3.08
2.99
2.79
2.70
2.64
2.60
2.27
2.12
1.94
1.56
1.31
1.25
1.18
0.85
0.71
0.69
18.21
15.90
15.14
14.86
14.72
14.55
14.40
14.10
13.91
13.81
13.69
13.64
13.60
12.45


DB-5
Time (min)
Intensity (×10^5)
12.42
12.35
12.40
12.02
11.72
11.58
11.58
11.48
11.34
11.13
11.04
10.85
10.75
10.56
10.56
10.44
10.30
9.91
9.97
9.72
9.64
9.51
9.38
9.20
8.93
8.75
8.68
8.37
8.44
8.19
8.10
8.00
7.92
7.79
7.71
7.68
7.63
7.52
7.46
7.30
7.24
7.20
7.14
7.11
7.06
6.96
6.92
6.89
6.70
6.65
6.36
6.36
6.32
6.24
6.17
6.13
5.99
5.94
5.73
5.70
5.60
5.44
5.11
5.01
4.87
4.71
4.50
4.42
4.38
4.33
4.23
4.10
3.97
3.88
3.80
3.64
3.23
3.04
2.97
2.82
2.07
1.98
1.25
0.76
0.63
0.60
17.18
15.67
14.02
13.16
13.11
12.86
12.52

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Isovaleral	0.71	885.7	tr	0.60	639.7	tr
2-Methylbutyral	0.69	877.5	0.01	0.63	649.7	tr
2-Ethylfuran	0.85	917.3	tr	0.76	699.7	0.01
Methyl 2-methylbutyrate	1.18	977.2	0.01	1.25	773.2	0.01
(2*E*)-Hexenal	3.19	1173.7	0.02	1.98	847.7	0.02
(3*Z*)-Hexenol	5.58	1350.9	0.01	2.07	855.3	0.01
Hashishene	1.25*	989.6	[0.55]	2.82	915.5	0.01
α-Thujene	1.31	999.3	0.56	2.97	925.5	0.57
α-Pinene	1.25*	989.6	[0.55]	3.04	930.3	0.55
Camphene	1.56	1025.8	0.03	3.23	943.0	0.03
β-Pinene	1.94	1065.1	0.31	3.64*	970.6	[2.55]
Sabinene	2.12	1084.3	2.23	3.64*	970.6	[2.55]
3-Methyl-3-cyclohexenone	5.89	1373.4	0.01	3.80	981.6	0.01
Octan-3-one	3.77*	1218.1	[0.07]	3.88	986.8	0.03
Myrcene	2.70	1134.4	1.29	3.97	992.8	1.30
α-Phellandrene	2.60	1125.7	0.42	4.10*	1001.8	[0.46]
Pseudolimonene	2.64	1129.2	0.05	4.10*	1001.8	[0.46]
(3*Z*)-Hexenyl acetate	4.64	1281.4	0.01	4.23	1010.0	0.01
α-Terpinene	2.79	1141.5	10.69	4.33	1016.1	10.76
Carvomenthene	2.27	1099.8	0.02	4.38	1019.4	0.02
para-Cymene	3.89	1226.6	1.51	4.42	1022.1	1.51
β-Phellandrene	3.08	1164.4	1.41	4.50*	1026.8	[2.93]
Limonene	2.99	1157.2	1.34	4.50*	1026.8	[2.93]
1,8-Cineole	3.09	1165.8	0.16	4.50*	1026.8	[2.93]
(*Z*)-β-Ocimene	3.62*	1207.2	[12.03]	4.71	1040.2	0.02
(*E*)-β-Ocimene	3.77*	1218.1	[0.07]	4.87	1050.2	0.04
γ-Terpinene	3.62*	1207.2	[12.03]	5.01	1059.3	12.10
cis-Sabinene hydrate	6.69*	1432.0	[3.22]	5.11	1065.8	3.15
Terpinolene	4.06	1239.6	2.66	5.44*	1086.9	[2.71]
para-Cymenene	6.08	1386.8	0.01	5.44*	1086.9	[2.71]
trans-Sabinene hydrate	7.75	1511.8	4.46	5.60	1096.8	4.40
Linalool	7.87*	1520.7	[6.21]	5.70*	1103.3	[5.78]
Unknown CEDE I [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.50	1344.5	0.01	5.70*	1103.3	[5.78]
Unknown ORMA I [m/z 119, 109 (94),	8.22*	1547.9	[0.12]	5.73	1105.2	0.02

43 (61), 95 (56), 91 (48), 77 (32), 152 (32), 137 (31), 134 (24)]						
cis-para-Menth-2-en-1-ol	7.87*	1520.7	[6.21]	5.94	1118.9	0.73
α-Campholenal	6.69*	1432.0	[3.22]	5.99	1121.8	0.04
4-Hydroxy-4-methylcyclohex-2-enone	13.81*	2032.4	[0.02]	6.13	1131.2	0.01
trans-Pinocarveol	8.93*	1603.9	[0.08]	6.17	1133.5	0.10
trans-para-Menth-2-en-1-ol	8.73*	1588.0	[0.63]	6.24	1138.3	0.60
Epoxyterpinolene	6.50*	1418.1	[0.01]	6.32	1143.2	0.06
1,4-Dimethyl-4-acetylcyclohexene	7.09	1461.9	0.02	6.36*	1145.8	[0.03]
Unknown MEAL II [m/z 109, 124 (45), 119 (41), 43 (35), 91 (28), 95 (25)...]	6.58	1424.1	0.03	6.36*	1145.8	[0.03]
Borneol	9.55*	1654.4	[5.06]	6.65	1164.4	0.05
δ-Terpineol	9.23*	1628.4	[0.06]	6.70	1167.4	0.03
Terpinen-4-ol	8.39	1561.3	34.58	6.89	1180.0	34.50
Cryptone	8.84	1596.7	0.03	6.92	1182.1	0.02
para-Cymen-8-ol	11.28	1800.0	0.04	6.96	1184.3	0.03
α-Terpineol	9.55*	1654.4	[5.06]	7.06	1190.9	5.05
cis-Piperitol	9.30	1633.4	0.21	7.10*	1194.0	[0.30]
cis-Dihydrocarvone	8.22*	1547.9	[0.12]	7.10*	1194.0	[0.30]
Methylchavicol	9.05	1613.4	0.01	7.14	1196.4	0.01
trans-Dihydrocarvone	8.44	1565.5	0.06	7.20	1199.9	0.05
Unknown PIMA 7 [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	10.68	1748.9	0.01	7.24	1203.0	0.01
trans-Piperitol	10.13*	1701.4	[0.49]	7.30	1206.4	0.46
trans-Carveol	11.14	1787.8	0.02	7.46	1217.3	0.02
cis-Sabinene hydrate acetate?				7.52	1221.3	0.03
Nerol	10.82	1760.3	0.03	7.64	1229.4	0.02
Citronellol	10.49	1732.6	0.03	7.68	1232.2	0.03
Unknown CIAU II [m/z 137, 152 (28),	11.05	1779.7	0.01	7.71	1234.7	0.02

43 (25), 91 (24), 109 (23), 119 (19)]						
Neral	9.23*	1628.4	[0.06]	7.78	1239.5	0.03
Carvenone	9.63	1661.1	0.02	7.92	1249.0	0.03
trans-Sabinene hydrate acetate	7.40	1484.7	0.36	8.00	1254.1	0.37
Geraniol	11.39	1809.4	0.04	8.10*	1260.8	[3.21]
Linalyl acetate	7.90*	1523.5	[3.48]	8.10*	1260.8	[3.21]
trans-Ascaridole glycol	13.91	2041.8	0.11	8.19	1266.7	0.09
Citronellyl formate	8.64	1580.7	0.01	8.37	1279.2	0.01
Bornyl acetate	7.90*	1523.5	[3.48]	8.44	1283.9	0.10
Terpinen-4-yl acetate	8.48	1568.5	0.14	8.68*	1300.1	[0.18]
Thymol	14.86	2135.4	0.02	8.68*	1300.1	[0.18]
Unknown MEAL I analog	13.69	2020.2	0.04	8.75	1304.7	0.04
Unknown MEAL I [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	14.72	2121.1	0.13	8.93	1314.4	0.13
Bicycloelemene	6.79	1439.4	0.02	9.20	1333.4	0.02
α-Cubebene	6.50*	1418.1	[0.01]	9.38	1346.9	0.02
Eugenol	14.55*	2104.1	[0.08]	9.51	1355.5	0.03
Neryl acetate	9.92	1684.5	0.03	9.64	1365.1	0.03
α-Copaene	6.87	1445.1	0.01	9.72	1370.7	0.01
Geranyl acetate	10.29	1715.1	0.04	9.91	1384.5	0.06
β-Elemene	8.14*	1542.1	[1.88]	9.97	1388.4	0.01
β-Caryophyllene	8.14*	1542.1	[1.88]	10.30	1412.8	1.84
β-Copaene	8.14*	1542.1	[1.88]	10.44	1423.0	0.01
Aromadendrene	8.22*	1547.9	[0.12]	10.56*	1432.1	[0.09]
trans-α-Bergamotene	8.14*	1542.1	[1.88]	10.56*	1432.1	[0.09]
α-Humulene	8.98	1607.7	0.08	10.75	1446.4	0.09
allo-Aromadendrene	8.73*	1588.0	[0.63]	10.85	1453.7	0.04
trans-Cadina-1(6),4-diene	8.93*	1603.9	[0.08]	11.04	1468.0	0.05
Germacrene D	9.47	1647.5	0.02	11.13	1474.6	0.01
Bicyclogermacrene	9.75*	1670.7	[0.57]	11.34*	1490.3	[0.82]
Viridiflorene	9.34	1636.9	0.27	11.34*	1490.3	[0.82]
α-Muurolene	9.75*	1670.7	[0.57]	11.48	1500.9	0.02
(3*E*,6*E*)-α-Farnesene	10.22	1709.6	0.05	11.58*	1508.8	[0.04]
γ-Cadinene	10.08	1697.0	0.01	11.58*	1508.8	[0.04]

δ-Cadinene	10.13*	1701.4	[0.49]	11.72	1519.5	0.02
Isocaryophyllene epoxide B	11.88	1853.4	0.01	12.02	1543.6	0.01
Spathulenol	14.10	2060.0	0.06	12.35	1569.4	0.05
Caryophyllene oxide	12.45	1904.0	0.06	12.40	1573.7	0.07
Globulol	13.60	2012.2	0.03	12.42	1575.1	0.02
Viridiflorol	13.64	2015.3	0.03	12.52	1583.0	0.03
10-epi-γ-Eudesmol	13.81*	2032.4	[0.02]	12.86	1609.9	0.01
Isospathulenol	15.14	2163.5	0.10	13.11	1630.8	0.08
τ-Cadinol	14.55*	2104.1	[0.08]	13.16	1634.8	0.01
Unknown KUER IX [m/z 43, 93 (44), 162 (39), 107 (39), 121 (34), 95 (32)...220 (7)]	18.21	2493.4	0.02	14.02	1706.3	0.02
Phytone	14.40	2089.4	0.01	15.67	1852.0	0.01
Unknown PISI IV [m/z 257, 258 (20), 91 (19), 272 (18)]	15.90	2241.6	0.01	17.18	1994.2	0.03
Total reported		98.58%			98.97%	

*: 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