Date : 2026-01-29

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 26A06-PTH02
Customer Identification : Spearmint ORGANIC - India - S40111R
Type : Essential Oil
Source : *Mentha spicata*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2026-01-06 to make a correction 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 : Alexis St-Gelais, Ph. D., Chimiste 2013-174
Date : 2026-01-06

Physicochemical data

Refractive index : 1.491 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2026-01-06

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
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Methyl 2-methylbutyrate	0.01	Aliphatic ester
Ethyl 2-methylbutyrate	0.01	Aliphatic ester
(3*Z*)-Hexenol	0.01	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
trans-2,5-Diethyltetrahydrofuran	0.05	Furan
Hashishene	0.07	Monoterpene
α-Thujene	0.03	Monoterpene
α-Pinene	0.57	Monoterpene
trans-3-Methylcyclohexanol	0.01	Aliphatic alcohol
α-Fenchene	tr	Monoterpene
Camphene	0.01	Monoterpene
3-Methylcyclohexanone	0.03	Aliphatic ketone
Thuja-2,4(10)-diene	0.01	Monoterpene
β-Pinene	0.75	Monoterpene
Sabinene	0.41	Monoterpene
Octen-3-ol	0.02	Aliphatic alcohol
Octan-3-one	0.03	Aliphatic ketone
Myrcene	1.27	Monoterpene
Octan-3-ol	0.39	Aliphatic alcohol
α-Phellandrene	0.02	Monoterpene
Pseudolimonene	0.04	Monoterpene
Δ3-Carene	0.01	Monoterpene
α-Terpinene	0.08	Monoterpene
meta-Cymene	0.02	Monoterpene
para-Cymene	0.25	Monoterpene
Limonene	15.43	Monoterpene
1,8-Cineole	1.30	Monoterpenic ether
2-Ethylhexanol	0.01	Aliphatic alcohol
ortho-Cymene	0.01	Monoterpene
(*Z*)-β-Ocimene	0.06	Monoterpene
Butyl 2-methylbutyrate	tr	Aliphatic ester
(*E*)-β-Ocimene	0.04	Monoterpene
γ-Terpinene	0.16	Monoterpene
cis-Sabinene hydrate	0.24	Monoterpenic alcohol
cis-Linalool oxide (fur.)	tr	Monoterpenic alcohol
Octanol	0.04	Aliphatic alcohol

para-Cymenene	0.03	Monoterpene
trans-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.07	Monoterpene
trans-Sabinene hydrate	0.03	Monoterpenic alcohol
Isoamyl 2-methylbutyrate	0.01	Aliphatic ester
Linalool	0.07	Monoterpenic alcohol
2-Methylbutyl 2-methylbutyrate	0.02	Aliphatic ester
Nonanal	0.01	Aliphatic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.04	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
Octan-3-yl acetate	0.09	Aliphatic ester
cis-Limonene oxide	0.03	Monoterpenic ether
cis-para-Mentha-2,8-dien-1-ol	0.05	Monoterpenic alcohol
trans-Limonene oxide	0.04	Monoterpenic ether
Camphor	0.01	Monoterpenic ketone
Isopulegol	0.02	Monoterpenic alcohol
Menthone	0.18	Monoterpenic ketone
Isomenthone	0.08	Monoterpenic ketone
δ-Terpineol	0.11	Monoterpenic alcohol
neo-Menthol	0.04	Monoterpenic alcohol
Menthol	0.73	Monoterpenic alcohol
Terpinen-4-ol	0.47	Monoterpenic alcohol
Isomenthol	0.02	Monoterpenic alcohol
α-Terpineol	0.22	Monoterpenic alcohol
neo-Dihydrocarveol	0.24	Monoterpenic alcohol
cis-Dihydrocarvone	1.21	Monoterpenic ketone
Methylchavicol	0.14	Phenylpropanoid
Dihydrocarveol	0.15	Monoterpenic alcohol
trans-Dihydrocarvone	0.21	Monoterpenic ketone
trans-Piperitol	0.01	Monoterpenic alcohol
iso-Dihydrocarveol ?	0.02	Monoterpenic alcohol
trans-Carveol	0.30	Monoterpenic alcohol
Pulegone	0.03	Monoterpenic ketone
Carvone	68.13	Monoterpenic ketone
cis-Carveol	0.17	Monoterpenic alcohol
Piperitone	0.68	Monoterpenic ketone
cis-Carvone oxide	0.01	Monoterpenic ketone
Isopiperitenone	0.05	Monoterpenic ketone
trans-Carvone oxide	0.07	Monoterpenic ketone
Decanol	0.03	Aliphatic alcohol
Dihydroedulan I	0.01	Terpenic ether
Menthyl acetate	0.05	Monoterpenic ester
Dihydroedulan II	0.10	Terpenic ether
Thymol	0.01	Monoterpenic alcohol
Isomenthyl acetate	0.01	Monoterpenic alcohol

neo-Dihydrocarvyl acetate	tr	Monoterpenic ester
Dihydrocarvyl acetate	0.23	Monoterpenic ester
Bicycloelemene	0.02	Sesquiterpene
trans-Carvyl acetate	0.01	Monoterpenic ester
α-Cubebene	0.01	Sesquiterpene
iso-Dihydrocarvyl acetate	0.02	Monoterpenic ester
Piperitenone oxide	0.06	Monoterpenic ketone
cis-Carvyl acetate	0.16	Monoterpenic ester
α-Copaene	0.04	Sesquiterpene
β-Bourbonene	1.02	Sesquiterpene
1,5-diepi-β-Bourbonene	0.09	Sesquiterpene
β-Elemene	0.02	Sesquiterpene
(*Z*)-Jasmone	0.12	Jasmonate
Isocaryophyllene	0.04	Sesquiterpene
β-Caryophyllene	0.73	Sesquiterpene
β-Ylangene	0.08	Sesquiterpene
β-Copaene	0.10	Sesquiterpene
Aromadendrene	0.02	Sesquiterpene
Isogermacrene D	0.09	Sesquiterpene
α-Humulene	0.05	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
Unknown	0.04	Sesquiterpene
(*E*)-β-Farnesene	0.34	Sesquiterpene
Germacrene D	0.34	Sesquiterpene
Bicyclogermacrene	0.03	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
δ-Cadinene	0.04	Sesquiterpene
1,5-Epoxysalvial-4(14)-ene	0.01	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.05	Sesquiterpenic ether
Viridiflorol	0.05	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
Consolidated total	**99.34**	

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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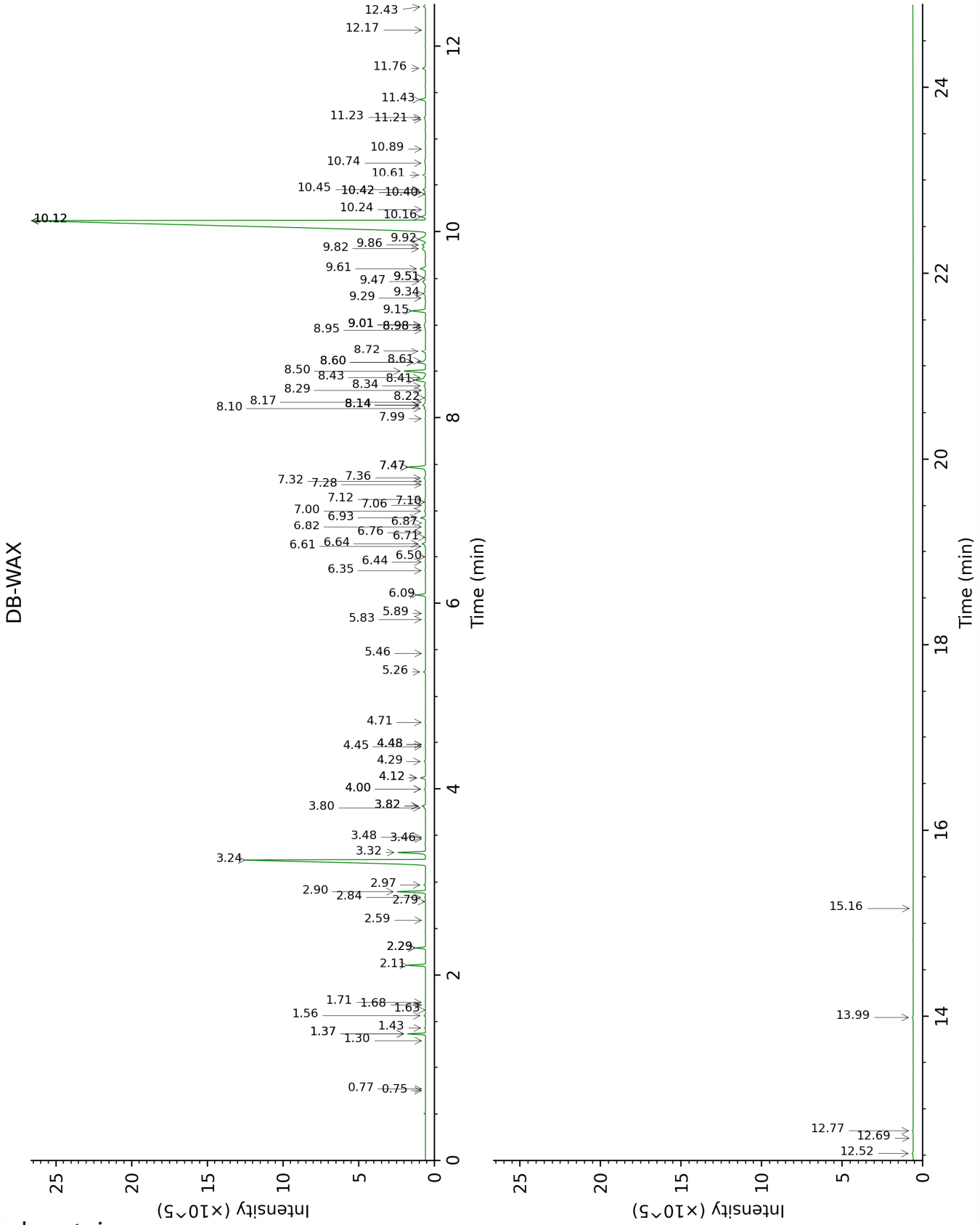
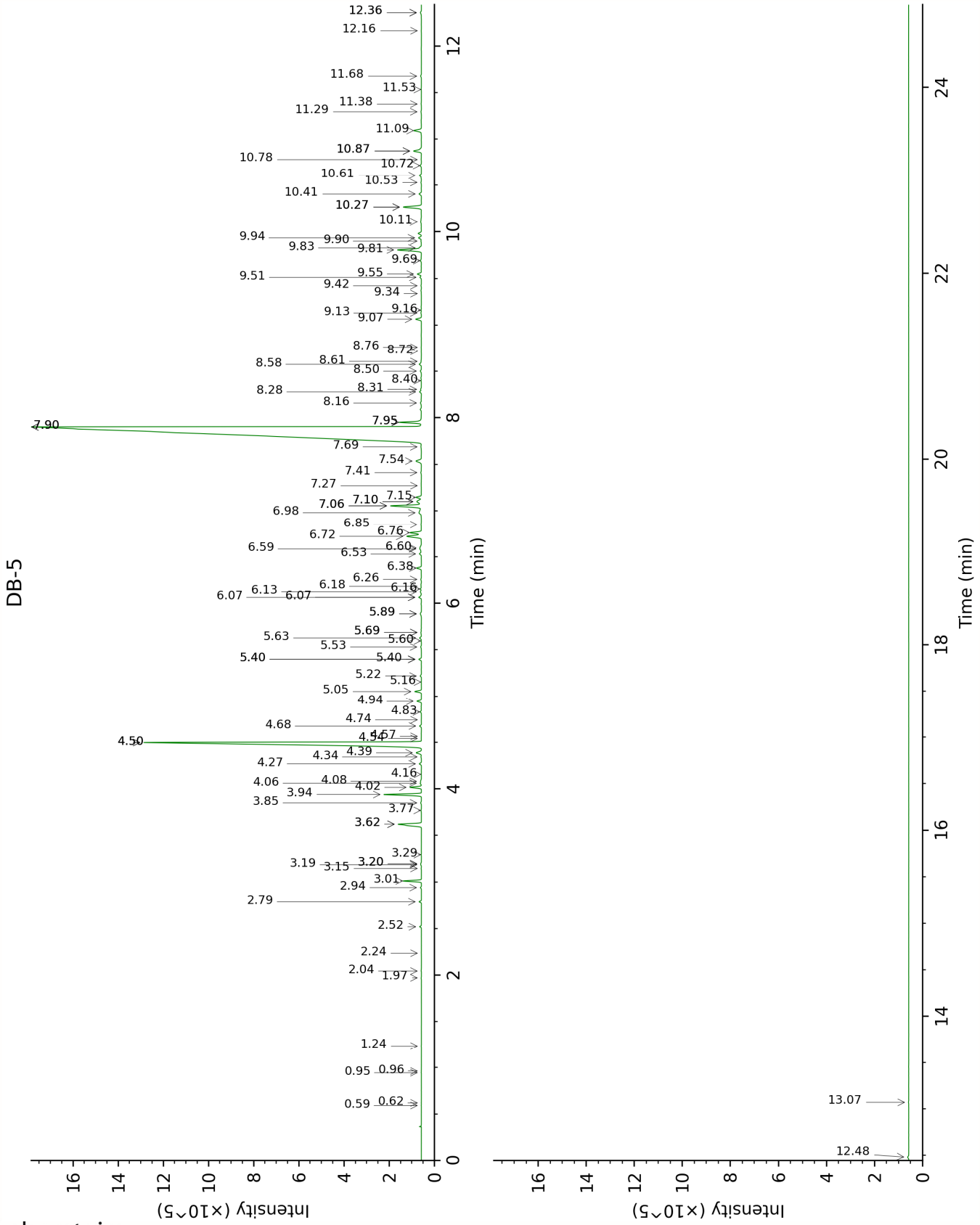

DB-WAX
Time (min)
Intensity (×10^5)
12.43
12.17
11.76
11.43
11.23
11.21
10.89
10.74
10.61
10.45
10.42
10.40
10.24
10.16
10.12
9.92
9.86
9.82
9.61
9.51
9.47
9.34
9.29
9.15
9.01
8.98
8.95
8.72
8.61
8.60
8.50
8.43
8.41
8.34
8.29
8.22
8.17
8.14
8.10
7.99
7.47
7.36
7.32
7.28
7.12
7.10
7.06
7.00
6.93
6.87
6.82
6.76
6.71
6.64
6.61
6.50
6.44
6.35
6.09
5.89
5.83
5.46
5.26
4.71
4.48
4.45
4.29
4.12
4.00
3.82
3.80
3.48
3.46
3.32
3.24
2.97
2.90
2.84
2.79
2.59
2.29
2.11
1.71
1.68
1.63
1.56
1.43
1.37
1.30
0.77
0.75
15.16
13.99
12.77
12.69
12.52


DB-5
Time (min)
Intensity (×10^5)
12.36
12.16
11.68
11.53
11.38
11.29
11.09
10.87
10.78
10.72
10.61
10.53
10.41
10.27
10.11
9.94
9.90
9.83
9.81
9.69
9.55
9.51
9.42
9.34
9.16
9.13
9.07
8.76
8.72
8.61
8.58
8.50
8.40
8.31
8.28
8.16
7.95
7.90
7.69
7.54
7.41
7.27
7.15
7.10
7.06
6.98
6.85
6.76
6.72
6.60
6.59
6.53
6.38
6.26
6.18
6.16
6.13
6.07
6.07
5.89
5.69
5.63
5.60
5.53
5.40
5.40
5.22
5.16
5.05
4.94
4.83
4.74
4.68
4.67
4.54
4.50
4.39
4.34
4.27
4.16
4.08
4.06
4.02
3.94
3.85
3.77
3.62
3.29
3.20
3.19
3.15
3.01
2.94
2.79
2.52
2.24
2.04
1.97
1.24
0.96
0.95
0.62
0.59
13.07
12.48

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Isovaleral	0.77	888.4	tr	0.59	643.5	tr
2-Methylbutyral	0.75	881.4	tr	0.62	653.9	tr
Isoamyl alcohol	3.48	1180.5	tr	0.95	732.8	tr
2-Methylbutanol	3.46	1179.0	tr	0.96	735.5	tr
Methyl 2-methylbutyrate	1.30	978.4	tr	1.24	775.3	0.01
Ethyl 2-methylbutyrate	1.71	1026.2	0.02	1.97	849.9	0.01
(3*Z*)-Hexenol	5.83	1350.5	0.02	2.04	856.1	0.01
Hexanol	5.46	1324.6	0.01	2.24	872.4	tr
trans-2,5-Diethyltetrahydrofuran	1.56	1011.9	0.05	2.52	896.5	0.05
Hashishene	1.37*	990.5	[0.64]	2.79	916.2	0.07
α-Thujene	1.43	998.9	0.03	2.94	926.3	0.03
α-Pinene	1.37*	990.5	[0.64]	3.01	931.1	0.57
trans-3-Methylcyclohexanol	6.76	1417.7	0.01	3.15	940.1	0.01
α-Fenchene	1.63	1018.0	tr	3.19*†	942.8	[0.02]
Camphene	1.68	1023.3	0.01	3.20*†	943.5	[0.02]
3-Methylcyclohexanone	4.72	1272.5	0.03	3.20*†	943.5	[0.02]
Thuja-2,4(10)-diene	2.29*	1084.4	[0.41]	3.30	950.1	0.01
β-Pinene	2.11	1065.8	0.75	3.62*	972.0	[1.17]
Sabinene	2.29*	1084.4	[0.41]	3.62*	972.0	[1.17]
Octen-3-ol	6.82	1422.3	0.02	3.77	982.0	0.02
Octan-3-one	4.00*	1219.7	[0.06]	3.85	987.4	0.03
Myrcene	2.90	1134.4	1.27	3.94	993.5	1.27
Octan-3-ol	6.09	1369.4	0.40	4.02	998.7	0.39
α-Phellandrene	2.79	1126.0	0.02	4.06*†	1001.6	[0.05]
Pseudolimonene	2.84	1129.6	0.04	4.08*†	1003.0	[0.04]
Δ3-Carene	2.59	1110.3	0.01	4.16	1007.9	0.01
α-Terpinene	2.97	1140.1	0.08	4.27	1015.0	0.08
meta-Cymene	4.12*	1228.6	[0.24]	4.34	1019.8	0.02
para-Cymene	4.12*	1228.6	[0.24]	4.39	1022.6	0.25
Limonene	3.24	1161.2	15.43	4.50*	1029.5	[16.80]
1,8-Cineole	3.32	1167.6	1.30	4.50*	1029.5	[16.80]
2-Ethylhexanol	7.32	1458.8	0.01	4.54	1032.3	0.01
ortho-Cymene	4.48*	1255.0	[0.01]	4.57	1033.8	0.01
(*Z*)-β-Ocimene	3.80	1205.0	0.06	4.68	1040.8	0.06
Butyl 2-methylbutyrate	3.82*	1206.4	[0.17]	4.74	1045.1	tr
(*E*)-β-Ocimene	4.00*	1219.7	[0.06]	4.83	1050.5	0.04
γ-Terpinene	3.82*	1206.4	[0.17]	4.94	1057.8	0.16
cis-Sabinene hydrate	6.93	1430.0	0.25	5.05	1064.8	0.24

cis-Linalool oxide (fur.)	6.50	1398.7	0.01	5.16	1071.3	tr
Octanol	8.22	1526.4	0.05	5.22	1075.4	0.04
para-Cymenene	6.35	1388.0	0.03	5.40*	1086.9	[0.10]
trans-Linalool oxide (fur.)	6.87	1426.0	0.01	5.40*	1086.9	[0.10]
Terpinolene	4.30	1241.6	0.07	5.40*	1086.9	[0.10]
trans-Sabinene hydrate	7.99	1509.1	0.03	5.53	1095.3	0.03
Isoamyl 2-methylbutyrate	4.48*	1255.0	[0.01]	5.60	1099.5	0.01
Linalool	8.10	1517.5	0.07	5.63	1101.5	0.07
2-Methylbutyl 2-methylbutyrate	4.45	1253.2	0.02	5.69*	1105.2	[0.03]
Nonanal	5.89	1355.3	0.01	5.69*	1105.2	[0.03]
trans-para-Mentha-2,8-dien-1-ol	8.98*	1585.0	[0.04]	5.89*	1118.2	[0.06]
cis-para-Menth-2-en-1-ol	8.17	1522.7	0.03	5.89*	1118.2	[0.06]
Octan-3-yl acetate	5.26	1310.5	0.09	6.07*	1129.7	[0.11]
cis-Limonene oxide	6.44	1394.6	0.03	6.07*	1129.7	[0.11]
cis-para-Mentha-2,8-dien-1-ol	9.51*	1627.1	[0.08]	6.13	1133.6	0.05
trans-Limonene oxide	6.61	1406.9	0.03	6.16	1135.6	0.04
Camphor	7.28	1456.3	0.03	6.18	1137.4	0.01
Isopulegol	8.14*	1520.2	[0.23]	6.26	1142.3	0.02
Menthone	6.64	1409.0	0.19	6.38	1150.2	0.18
Isomenthone	7.00	1435.3	0.07	6.53	1160.1	0.08
δ-Terpineol	9.51*	1627.1	[0.08]	6.59*†	1163.6	[0.09]
neo-Menthol	8.61	1556.8	0.04	6.60*†	1164.3	[0.06]
Menthol	9.16	1598.8	0.77	6.72	1172.4	0.73
Terpinen-4-ol	8.60*	1555.6	[0.46]	6.76	1175.0	0.47
Isomenthol	8.95	1582.5	0.01	6.85	1180.8	0.02
α-Terpineol	9.86	1655.7	0.23	6.98	1189.3	0.22
neo-Dihydrocarveol	10.16	1680.0	0.24	7.06*	1194.2	[1.35]
cis-Dihydrocarvone	8.50	1548.4	1.21	7.06*	1194.2	[1.35]
Methylchavicol	9.34	1613.7	0.14	7.10*	1197.1	[0.30]
Dihydrocarveol	10.45	1703.7	0.15	7.10*	1197.1	[0.30]
trans-Dihydrocarvone	8.72	1565.0	0.22	7.15	1200.1	0.21
trans-Piperitol	10.42*	1701.1	[0.05]	7.27	1208.4	0.01
iso-Dihydrocarveol ?				7.41	1218.0	0.02
trans-Carveol	11.43	1785.9	0.31	7.54	1226.5	0.30
Pulegone	8.98*	1585.0	[0.04]	7.69	1236.9	0.03
Carvone	10.12*	1676.5	[67.82]	7.90*	1251.5	[68.30]
cis-Carveol	11.76	1815.2	0.17	7.90*	1251.5	[68.30]
Piperitone	9.92	1660.4	0.68	7.95*	1254.9	[0.78]

cis-Carvone oxide	10.89	1741.0	0.01	7.95*	1254.9	[0.78]
Isopiperitenone	11.21	1767.7	0.03	8.16	1269.2	0.05
trans-Carvone oxide	11.23	1769.6	0.08	8.28	1277.4	0.07
Decanol	10.74	1728.3	0.04	8.31	1279.2	0.03
Dihydroedulan I	7.10	1442.5	0.03	8.40	1285.6	0.01
Menthyl acetate	8.14*	1520.2	[0.23]	8.50	1292.7	0.05
Dihydroedulan II	7.47*	1470.2	[1.04]	8.58	1297.7	0.10
Thymol	15.16	2132.2	0.01	8.61	1299.8	0.01
Isomenthyl acetate	8.30	1532.4	0.02	8.76	1307.3	0.01
neo-Dihydrocarvyl acetate	9.00*	1587.0	[0.12]	8.72	1307.4	tr
Dihydrocarvyl acetate	9.47	1624.0	0.25	9.07	1328.8	0.23
Bicycloelemene	7.06	1439.9	0.03	9.13	1333.6	0.02
trans-Carvyl acetate	10.24	1686.1	0.01	9.16	1335.7	0.01
α-Cubebene	6.71	1414.1	0.01	9.34	1348.3	0.01
iso-Dihydrocarvyl acetate				9.42	1354.3	0.02
Piperitenone oxide	12.52	1882.0	0.06	9.51	1360.7	0.06
cis-Carvyl acetate	10.61	1717.4	0.16	9.55	1363.2	0.16
α-Copaene	7.12	1444.6	0.04	9.69	1373.4	0.04
β-Bourbonene	7.47*	1470.2	[1.04]	9.81†	1381.5	1.05
1,5-diepi-β-Bourbonene	7.36	1461.6	0.09	9.83†	1383.0	0.06
β-Elemene	8.43	1543.0	0.08	9.90	1388.2	0.02
(*Z*)-Jasmone	12.43	1873.8	0.12	9.94	1390.7	0.12
Isocaryophyllene	8.14*	1520.2	[0.23]	10.11	1402.9	0.04
β-Caryophyllene	8.41	1541.0	0.73	10.26*	1414.5	[0.81]
β-Ylangene	8.14*	1520.2	[0.23]	10.26*	1414.5	[0.81]
β-Copaene	8.34	1536.1	0.10	10.41	1425.1	0.10
Aromadendrene	8.60*	1555.6	[0.46]	10.53	1434.4	0.02
Isogermacrene D	9.00*	1587.0	[0.12]	10.61	1440.2	0.09
α-Humulene	9.29	1609.8	0.05	10.72	1448.4	0.05
allo-Aromadendrene	9.00*	1587.0	[0.12]	10.78	1453.2	0.01
Unknown MISC XLIX [m/z 161, 105 (56), 91 (50), 93 (36), 119 (33), 79 (31)...204 (5)]				10.87*	1460.2	[0.39]
(*E*)-β-Farnesene	9.61	1635.1	0.34	10.87*	1460.2	[0.39]
Germacrene D	9.82	1652.4	0.33	11.09	1476.7	0.34
Bicyclogermacrene	10.12*	1676.5	[67.82]	11.30	1491.8	0.03
α-Muurolene	10.12*	1676.5	[67.82]	11.38	1498.0	0.02
γ-Cadinene	10.40	1699.7	0.01	11.53	1509.9	0.01
δ-Cadinene	10.42*	1701.1	[0.05]	11.68	1521.2	0.04
1,5-Epoxysalvial-4(14)-ene	12.17	1851.3	0.01	12.16	1559.7	0.01

Caryophyllene oxide isomer	12.69	1896.8	0.01	12.36*	1575.0	[0.06]
Caryophyllene oxide	12.77	1904.2	0.05	12.36*	1575.0	[0.06]
Viridiflorol	13.99	2018.1	0.05	12.48	1584.6	0.05
Isospathulenol				13.07	1632.5	0.01
Total reported		98.90%			99.43%	

*: 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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