Date : 2023-11-24

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 23K17-PTH05
Customer Identification : Juniper Berry - India - J20113R
Type : Essential Oil
Source : *Juniperus communis*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 : 2023-11-24

Physicochemical data

Refractive index : 1.4728 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2023-11-20

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
3-Methylfuran	0.01	Furan
Toluene	0.01	Simple phenolic
Santene	0.02	Normonoterpene
Bornylene	0.02	Monoterpene
Hashishene	0.11	Monoterpene
(4*E*)-2,6-Dimethyloctene	0.03	Monoterpene
Tricyclene	0.26	Monoterpene
α-Thujene	0.65	Monoterpene
α-Pinene	55.34	Monoterpene
Camphene	1.26	Monoterpene
α-Fenchene	0.10	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.04	Monoterpene
β-Pinene	2.66	Monoterpene
Sabinene	1.27	Monoterpene
Unknown	0.29	Monoterpene
Octen-3-ol	0.03	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	15.86	Monoterpene
2-Carene	0.11	Monoterpene
Menthatriene isomer I	0.03	Monoterpene
Pseudolimonene	0.74	Monoterpene
α-Phellandrene	0.49	Monoterpene
Δ3-Carene	1.40	Monoterpene
1,4-Cineole	0.01	Monoterpenic ether
α-Terpinene	0.07	Monoterpene
para-Cymene	0.17	Monoterpene
1,8-Cineole	0.04	Monoterpenic ether
Limonene	9.51	Monoterpene
β-Phellandrene	0.13	Monoterpene
ortho-Cymene	0.02	Monoterpene
γ-Terpinene	0.11	Monoterpene
Unknown	tr	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.05	Monoterpenic alcohol
γ-Campholenal	0.02	Aliphatic alcohol
Isoterpinolene	0.03	Monoterpene
Terpinolene	1.26	Monoterpene
para-Cymenene	0.05	Monoterpene
α-Pinene oxide	0.25	Monoterpenic ether
Verbenol analog?	0.22	Monoterpenic alcohol

Linalool	0.07	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
α-Campholenal	0.01	Monoterpenic aldehyde
cis-Limonene oxide	0.03	Monoterpenic ether
trans-Pinocarveol	0.08	Monoterpenic alcohol
Camphor	0.01	Monoterpenic ketone
cis-Verbenol	0.01	Monoterpenic alcohol
trans-Verbenol	0.23	Monoterpenic alcohol
Pinocamphone	0.01	Monoterpenic ketone
Pinocarvone	0.01	Monoterpenic ketone
Borneol	0.02	Monoterpenic alcohol
α-Phellandren-8-ol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.62	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
α-Terpineol	0.02	Monoterpenic alcohol
Myrtenal	0.03	Monoterpenic aldehyde
Myrtenol	0.06	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
Decanal	0.02	Aliphatic aldehyde
trans-Carveol	0.02	Monoterpenic alcohol
cis-Carveol	0.01	Monoterpenic alcohol
Citronellol	0.01	Monoterpenic alcohol
Carvone	0.02	Monoterpenic ketone
Piperitone	0.01	Monoterpenic ketone
Methyl citronellate	0.01	Monoterpenic ester
trans-Ascaridole glycol	0.02	Monoterpenic alcohol
Bornyl acetate	0.04	Monoterpenic ester
Carvacrol	0.01	Monoterpenic alcohol
δ-Elemene	0.04	Sesquiterpene
α-Terpinyl acetate	0.01	Monoterpenic ester
α-Copaene	0.02	Sesquiterpene
β-Elemene	0.05	Sesquiterpene
Longifolene	0.01	Sesquiterpene
α-Gurjunene	0.01	Sesquiterpene
β-Caryophyllene	1.36	Sesquiterpene
β-Copaene	0.01	Sesquiterpene
γ-Elemene	0.07	Sesquiterpene
α-Himachalene	0.15	Sesquiterpene
α-Humulene	0.03	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
trans-Cadina-1(6),4-diene	0.01	Sesquiterpene
γ-Muurolene	0.13	Sesquiterpene
Germacrene D	0.07	Sesquiterpene

β-Selinene	0.02	Sesquiterpene
Bicyclogermacrene	0.02	Sesquiterpene
β-Himachalene	0.37	Sesquiterpene
α-Muurolene	0.03	Sesquiterpene
β-Bisabolene	0.01	Sesquiterpene
α-Alaskene	0.03	Sesquiterpene
γ-Cadinene	0.06	Sesquiterpene
δ-Cadinene	0.12	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
Selina-4(15),7(11)-diene	0.03	Sesquiterpene
α-Cadinene	0.02	Sesquiterpene
Selina-3,7(11)-diene	0.03	Sesquiterpene
(*E*)-α-Bisabolene	0.01	Sesquiterpene
α-Elemol	0.07	Sesquiterpenic alcohol
Germacrene B	0.15	Sesquiterpene
(*E*)-Nerolidol	0.01	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.07	Sesquiterpenic ether
α-Cedrol	0.24	Sesquiterpenic alcohol
Humulene epoxide II	0.01	Sesquiterpenic ether
Torilenol	0.03	Oxygenated sesquiterpene
Alismol	0.01	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.03	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
5-Ethenyl-1,5-bis(4-methyl-3-penten-1-yl)-cyclohexene?	0.05	Diterpene
4-Ethenyl-1,4-bis(4-methyl-3-penten-1-yl)-cyclohexene?	0.03	Diterpene
meta-Camphorene	0.53	Diterpene
para-Camphorene	0.21	Diterpene
Manool	0.01	Diterpenic alcohol
7,13-Abietadiene	0.08	Diterpene
Abieta-7,13-dien-3-one?	0.01	Diterpenic ketone
Consolidated total	**98.54**	

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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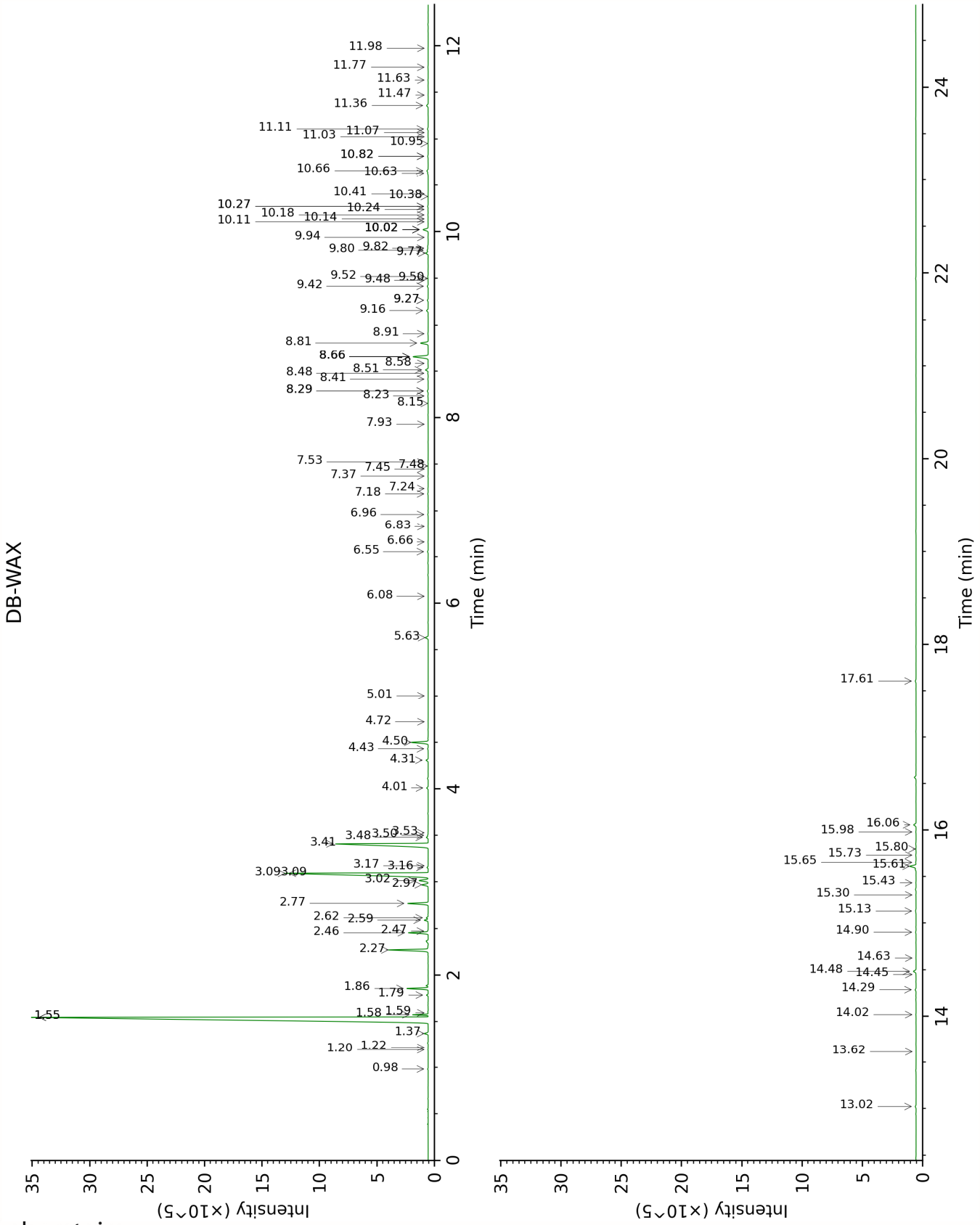
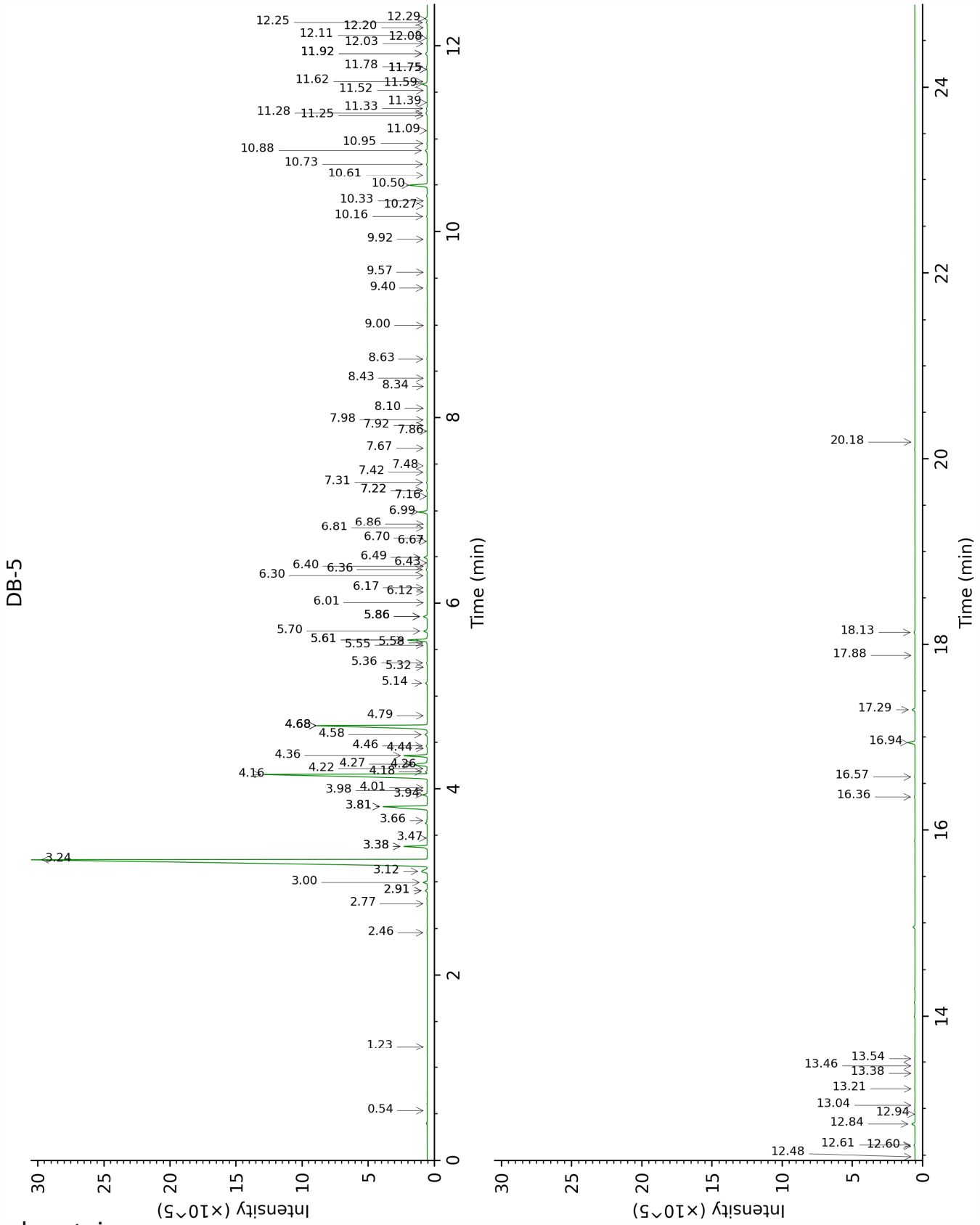

DB-WAX
Time (min)
Intensity (×10^5)
11.98
11.77
11.63
11.47
11.36
11.11
11.03
11.07
10.95
10.82
10.66
10.63
10.41
10.38
10.27
10.18
10.14
10.24
10.11
10.02
9.94
9.80
9.82
9.77
9.52
9.48
9.50
9.42
9.27
9.16
8.91
8.81
8.66
8.58
8.48
8.51
8.41
8.29
8.23
8.15
7.93
7.53
7.45
7.48
7.37
7.18
7.24
6.96
6.83
6.66
6.55
6.08
5.63
5.01
4.72
4.43
4.50
4.31
4.01
3.48
3.50
3.53
3.41
3.17
3.16
3.09
3.09
3.02
2.97
2.77
2.62
2.59
2.46
2.47
2.27
1.86
1.79
1.58
1.59
1.55
1.37
1.20
1.22
0.98
17.61
15.98
16.06
15.73
15.80
15.65
15.61
15.43
15.30
15.13
14.90
14.63
14.48
14.45
14.29
14.02
13.62
13.02


DB-5
Time (min)
Intensity (×10^5)
12.25
12.29
12.20
12.11
12.08
12.03
11.92
11.78
11.75
11.62
11.59
11.52
11.39
11.33
11.28
11.25
11.09
10.95
10.88
10.73
10.61
10.50
10.33
10.27
10.16
9.92
9.57
9.40
9.00
8.63
8.43
8.34
8.10
7.98
7.92
7.86
7.67
7.48
7.42
7.31
7.22
7.16
6.99
6.86
6.81
6.70
6.67
6.49
6.43
6.40
6.36
6.30
6.17
6.12
6.01
5.86
5.70
5.61
5.58
5.55
5.36
5.32
5.14
4.79
4.68
4.58
4.46
4.44
4.36
4.27
4.26
4.22
4.18
4.16
3.98
4.01
3.94
3.81
3.66
3.47
3.38
3.24
3.12
3.00
2.91
2.77
2.46
1.23
0.54
20.18
18.13
17.88
17.29
16.94
16.57
16.36
13.54
13.46
13.38
13.21
13.04
12.94
12.84
12.61
12.60
12.48

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
3-Methylfuran				0.54	606.7	0.01
Toluene	1.60	1003.9	0.01	1.23	760.3	0.01
Santene	1.22	950.8	0.01	2.46	879.0	0.02
Bornylene	1.20	946.9	0.01	2.77	904.5	0.02
Hashishene	1.55*	999.4	[55.16]	2.91*	913.8	[0.14]
(4*E*)-2,6-Dimethyloctene	0.98	915.3	0.03	2.91*	913.8	[0.14]
Tricyclene	1.37	973.8	0.27	3.00	919.7	0.26
α-Thujene	1.58	1002.1	0.65	3.12	927.5	0.65
α-Pinene	1.55*	999.4	[55.16]	3.24	935.7	55.34
Camphene	1.86	1028.6	1.26	3.38*	945.1	[1.37]
α-Fenchene	1.79	1021.9	0.10	3.38*	945.1	[1.37]
Thuja-2,4(10)-diene	2.47	1086.6	0.02	3.47	951.0	0.03
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.09*	1135.7	[15.88]	3.66	963.2	0.04
β-Pinene	2.27	1067.6	2.66	3.81*	973.1	[3.99]
Sabinene	2.46	1085.0	1.27	3.81*	973.1	[3.99]
Unknown ORVU I [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	2.59	1097.6	0.25	3.94	981.4	0.29
Octen-3-ol	6.96	1417.0	0.03	3.98	984.3	0.03
6-Methyl-5-hepten-2-one				4.01	986.4	0.02
Myrcene	3.09*	1135.7	[15.88]	4.16	995.8	15.86
2-Carene	2.62	1099.6	0.12	4.18	997.6	0.11
Menthatriene isomer I	3.53	1168.5	0.01	4.22	999.9	0.03
Pseudolimonene	3.02	1129.8	0.74	4.26*†	1002.5	[0.82]
α-Phellandrene	2.97	1126.4	0.49	4.27*†	1003.0	[0.43]
Δ3-Carene	2.77	1111.2	1.40	4.36	1008.9	1.40
1,4-Cineole	3.18	1141.8	tr	4.44	1013.8	0.01
α-Terpinene	3.16	1140.4	0.06	4.46	1015.4	0.07
para-Cymene	4.31	1225.4	0.16	4.58	1023.0	0.17
1,8-Cineole	3.50	1166.5	0.04	4.68*	1028.9	[9.71]
Limonene	3.41	1159.5	9.51	4.68*	1028.9	[9.71]
β-Phellandrene	3.48	1164.8	0.13	4.68*	1028.9	[9.71]
ortho-Cymene	4.72	1254.5	tr	4.79	1035.6	0.02
γ-Terpinene	4.01	1204.3	0.11	5.14	1057.9	0.11
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33),	5.01	1274.7	tr	5.32	1068.6	tr

77 (26), 91 (20), 152 (18)]						
cis-Linalool oxide (fur.)	6.83	1407.1	0.01	5.36	1071.4	0.05
γ-Campholenal				5.55	1083.2	0.02
Isoterpinolene	4.43	1234.0	0.04	5.58	1084.9	0.03
Terpinolene	4.50	1238.9	1.26	5.61*	1086.8	[1.33]
para-Cymenene	6.56	1387.5	0.05	5.61*	1086.8	[1.33]
α-Pinene oxide	5.63	1322.2	0.23	5.70	1092.8	0.25
Verbenol analog?	8.51	1532.3	0.22	5.86*	1102.5	[0.28]
Linalool	8.29*	1515.0	[0.08]	5.86*	1102.5	[0.28]
Nonanal	6.08	1353.6	0.01	5.86*	1102.5	[0.28]
endo-Fenchol	8.58	1537.7	0.02	6.01	1111.9	0.01
cis-para-Menth-2-en-1-ol	8.29*	1515.0	[0.08]	6.12	1119.2	0.01
α-Campholenal	7.24	1437.4	0.02	6.17	1122.1	0.01
cis-Limonene oxide	6.66	1395.0	0.01	6.30	1130.4	0.03
trans-Pinocarveol	9.42	1601.8	0.07	6.36	1134.5	0.08
Camphor	7.45	1452.8	0.01	6.40	1136.8	0.01
cis-Verbenol	9.48	1606.9	0.01	6.43	1139.1	0.01
trans-Verbenol	9.77	1630.3	0.21	6.49	1142.9	0.23
Pinocamphone	7.48	1455.2	0.01	6.67	1153.8	0.01
Pinocarvone	8.16	1504.9	0.01	6.70	1155.9	0.01
Borneol	10.02*	1650.5	[0.46]	6.81	1163.0	0.02
α-Phellandren-8-ol	10.41	1681.1	0.01	6.86	1166.1	0.01
Terpinen-4-ol	8.81	1555.0	0.62	6.99	1174.4	0.62
para-Cymen-8-ol	11.77	1795.4	0.02	7.16	1185.1	0.01
α-Terpineol	10.02*	1650.5	[0.46]	7.22*	1189.0	[0.05]
Myrtenal	8.91	1562.6	0.03	7.22*	1189.0	[0.05]
Myrtenol	11.11	1739.6	0.06	7.31	1194.5	0.06
Verbenone	9.82	1634.5	0.03	7.42	1201.5	0.03
Decanal	7.52	1458.3	0.02	7.48	1206.0	0.02
trans-Carveol	11.63	1783.7	0.02	7.67	1218.6	0.02
cis-Carveol	11.98	1813.3	0.01	7.86	1230.7	0.01
Citronellol	11.02	1732.6	0.01	7.92	1234.8	0.01
Carvone	10.24	1667.7	0.03	7.98	1238.9	0.02
Piperitone	10.14	1659.6	0.02	8.10	1247.3	0.01
Methyl citronellate	8.42	1524.8	0.03	8.34	1262.8	0.01
trans-Ascaridole glycol	14.45	2038.9	0.01	8.42	1268.7	0.02
Bornyl acetate	8.48	1529.6	0.04	8.63	1282.4	0.04
Carvacrol	15.65	2156.7	0.04	9.00	1307.0	0.01
δ-Elemene	7.18	1433.2	0.04	9.40	1335.2	0.04
α-Terpinyl acetate	9.94	1643.8	0.01	9.57	1347.1	0.01
α-Copaene	7.37	1447.2	0.02	9.92	1371.9	0.02

β-Elemene	8.66*	1543.3	[1.39]	10.16	1389.1	0.05
Longifolene	8.23	1510.9	0.04	10.27	1396.9	0.01
α-Gurjunene	7.93	1488.0	0.01	10.33	1400.8	0.01
β-Caryophyllene	8.66*	1543.3	[1.39]	10.50	1413.1	1.36
β-Copaene	8.66*	1543.3	[1.39]	10.61	1421.2	0.01
γ-Elemene	9.27*	1590.0	[0.07]	10.73	1430.3	0.07
α-Himachalene	9.16	1581.6	0.15	10.88	1441.3	0.15
α-Humulene	9.52	1610.2	0.04	10.95	1446.9	0.03
allo-Aromadendrene	9.27*	1590.0	[0.07]	11.09	1457.1	0.01
trans-Cadina-1(6),4-diene	9.50	1608.5	0.01	11.25	1468.9	0.01
γ-Muurolene	9.80	1632.7	0.09	11.28	1471.1	0.13
Germacrene D	10.02*	1650.5	[0.46]	11.33	1474.8	0.07
β-Selinene	10.11	1657.1	0.02	11.39	1479.5	0.02
Bicyclogermacrene	10.27*	1670.3	[0.05]	11.52	1489.1	0.02
β-Himachalene	10.02*	1650.5	[0.46]	11.59	1494.3	0.37
α-Muurolene	10.27*	1670.3	[0.05]	11.62	1496.3	0.03
β-Bisabolene	10.38	1678.9	0.01	11.75*	1506.1	[0.04]
α-Alaskene	10.18	1663.0	0.03	11.75*	1506.1	[0.04]
γ-Cadinene	10.63	1699.6	0.06	11.78	1508.3	0.06
δ-Cadinene	10.66	1701.9	0.12	11.92*	1519.2	[0.15]
trans-Calamenene	11.47	1770.1	0.01	11.92*	1519.2	[0.15]
Selina-4(15),7(11)-diene	10.82*	1715.0	[0.05]	12.03	1527.8	0.03
α-Cadinene	11.07	1736.4	0.01	12.08	1532.4	0.02
Selina-3,7(11)-diene	10.82*	1715.0	[0.05]	12.11	1534.6	0.03
(*E*)-α-Bisabolene	10.95	1726.5	0.02	12.20	1541.1	0.01
α-Elemol	14.29	2023.2	0.07	12.25	1545.5	0.07
Germacrene B	11.36	1760.8	0.15	12.30	1548.9	0.15
(*E*)-Nerolidol	14.02	1997.7	0.02	12.48	1563.5	0.01
Spathulenol	14.63	2055.7	0.01	12.60	1572.4	0.02
Caryophyllene oxide	13.02	1906.1	0.07	12.61	1573.5	0.07
α-Cedrol	14.48	2042.1	0.23	12.84	1591.2	0.24
Humulene epoxide II	13.62	1960.3	0.01	12.94	1599.5	0.01
Torilenol	15.73	2164.5	0.03	13.04	1607.1	0.03
Alismol	15.98	2189.5	0.02	13.21	1621.7	0.01
τ-Muurolol	15.30	2121.9	0.02	13.38	1635.4	0.02
α-Muurolol	15.43	2134.9	0.02	13.46	1642.1	0.03
α-Cadinol	15.80	2171.1	0.02	13.54	1648.4	0.02
5-Ethenyl-1,5-bis(4-methyl-3-penten-1-yl)-cyclohexene?	14.90	2082.3	0.04	16.36	1893.9	0.05
4-Ethenyl-1,4-bis(4-methyl-3-penten-1-yl)-cyclohexene?	15.13	2104.7	0.07	16.57	1913.8	0.03

meta-Camphorene	15.61	2152.7	0.56	16.94	1949.0	0.53
para-Camphorene	16.06	2197.4	0.21	17.29	1982.4	0.21
Manool				17.88	2040.1	0.01
7,13-Abietadiene	17.61	2361.0	0.08	18.13	2064.6	0.08
Abieta-7,13-dien-3-one?				20.18	2278.3	0.01
Total reported		98.04%			98.67%	

*: 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