Date : April 13, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21D06-PTH30
Customer identification : Hinoki Shinjo Leaf - Japan - HG2100R
Type : Essential oil
Source : *Chamaecyparis obtusa*
Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014 ISO - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Sylvain Mercier, M. Sc., Chimiste
Analysis date : April 12, 2021

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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MÉTHODE CERTIFIÉE ISO 17025:2017 CERTIFIED METHOD

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid
Refractive index: 1.4751 ± 0.0003 (20 °C; method PC-MAT-016)

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
Camphocean	0.01	Terpene derivative
Bornylene	0.04	Monoterpene
Tricyclene	0.14	Monoterpene
α-Thujene	1.15	Monoterpene
α-Pinene	2.84	Monoterpene
Camphene	0.71	Monoterpene
α-Fenchene	0.03	Monoterpene
Thuja-2,4(10)-diene	tr	Monoterpene
β-Pinene	0.49	Monoterpene
Sabinene	28.70	Monoterpene
Myrcene	6.40	Monoterpene
α-Phellandrene	0.11	Monoterpene
Δ3-Carene	0.01	Monoterpene
α-Terpinene	1.29	Monoterpene
para-Cymene	1.23	Monoterpene
Limonene	9.69	Monoterpene
1,8-Cineole	0.16	Monoterpenic ether
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.02	Monoterpene
γ-Terpinene	4.42	Monoterpene
cis-Sabinene hydrate	0.15	Monoterpenic alcohol
Terpinolene	1.48	Monoterpene
trans-Sabinene hydrate	0.13	Monoterpenic alcohol
Linalool	0.11	Monoterpenic alcohol
Unknown	0.01	Unknown
Octen-3-yl acetate	0.11	Aliphatic ester
cis-para-Menth-2-en-1-ol	0.15	Monoterpenic alcohol
Cosmene	0.01	Monoterpene
trans-para-Menth-2-en-1-ol	0.11	Monoterpenic alcohol
Camphor	0.02	Monoterpenic ketone
Camphene hydrate	0.05	Monoterpenic alcohol
Isoborneol	0.02	Monoterpenic alcohol
Borneol	0.07	Monoterpenic alcohol
Terpinen-4-ol	2.72	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	0.23	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
cis-Piperitol	0.04	Monoterpenic alcohol
trans-Piperitol	0.07	Monoterpenic alcohol
endo-Fenchyl acetate	0.06	Monoterpenic ester
trans-Chrysanthenyl acetate	0.05	Monoterpenic ester
Linalyl acetate	0.46	Monoterpenic ester
Geraniol	0.01	Monoterpenic alcohol
Isobornyl acetate	0.49	Monoterpenic ester
Bornyl acetate	7.27	Monoterpenic ester

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Methyl myrtenate	0.13	Monoterpenic ester
α-Terpinyl acetate	12.14	Monoterpenic ester
Neryl acetate	0.05	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
cis-β-Elemene	0.02	Sesquiterpene
β-Cubebene	0.03	Sesquiterpene
β-Elemene	0.06	Sesquiterpene
α-Chamipinene	0.01	Sesquiterpene
α-Cedrene	0.06	Sesquiterpene
β-Caryophyllene	0.02	Sesquiterpene
β-Cedrene	0.03	Sesquiterpene
cis-Thujopsene	2.28	Sesquiterpene
Isobazzanene	0.08	Sesquiterpene
Cadina-3,5-diene?	0.37	Sesquiterpene
α-Humulene	0.02	Sesquiterpene
cis-Muurola-4(15),5-diene	1.38	Sesquiterpene
β-Chamigrene	0.17*	Sesquiterpene
γ-Muurolene	[0.17]*	Sesquiterpene
Widdra-2,4(14)-diene?	0.03	Sesquiterpene
Germacrene D	0.05	Sesquiterpene
β-Selinene	0.01	Sesquiterpene
α-Selinene	0.04	Sesquiterpene
epi-Cubebol	0.01	Sesquiterpenic alcohol
Epizonarene	0.26	Sesquiterpene
α-Cuprenene	0.31*	Sesquiterpene
α-Chamigrene	[0.31]*	Sesquiterpene
β-Himachalene	0.10	Sesquiterpene
Germacrene A	0.11	Sesquiterpene
γ-Cadinene	0.11	Sesquiterpene
Cubebol	0.02	Sesquiterpenic alcohol
trans-Calamenene	0.13	Sesquiterpene
δ-Cadinene	0.44	Sesquiterpene
γ-Cuprenene	0.19	Sesquiterpene
δ-Cuprenene epimer II	0.04	Sesquiterpene
α-Elemol	2.89	Sesquiterpenic alcohol
cis-Muurol-5-en-4α-ol	0.04	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.03	Sesquiterpenic alcohol
Germacrene D-4-ol	0.06	Sesquiterpenic alcohol
Thujopsan-2α-ol	0.04	Sesquiterpenic alcohol
Widdrol	0.10	Sesquiterpenic alcohol
α-Cedrol	0.49	Sesquiterpenic alcohol
10-epi-Cubenol	0.01	Sesquiterpenic alcohol
10-epi-γ-Eudesmol	0.02	Sesquiterpenic alcohol
γ-Eudesmol	0.31	Sesquiterpenic alcohol
τ-Muurolol	0.08	Sesquiterpenic alcohol
τ-Cadinol	0.04	Sesquiterpenic alcohol
β-Eudesmol	0.33	Sesquiterpenic alcohol
α-Eudesmol	0.29	Sesquiterpenic alcohol
α-Cadinol	0.16	Sesquiterpenic alcohol
cis-14-nor-Muurol-5-en-4-one?	0.04	Norsesquiterpenic ketone
α-Bisabolol	0.05	Sesquiterpenic alcohol
Thujopsenal	0.06	Sesquiterpenic aldehyde

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Unknown	0.05	Oxygenated sesquiterpene
τ-Cadinyl acetate	0.01	Sesquiterpenic ester
Cryptomeridiol	0.03	Sesquiterpenic alcohol
Rimuene	0.21	Diterpene
Beyerene	1.88	Diterpene
Sandaracopimaradiene?	0.06	Diterpene
Pimaradiene	0.07	Diterpene
Manoyl oxide	0.03	Diterpenic ether
Kaur-15-ene?	0.03	Diterpene
Luxuriadiene?	0.18	Diterpene
para-Cymenene	0.01	Monoterpene
Consolidated total	**97.62%**	

*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of 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.

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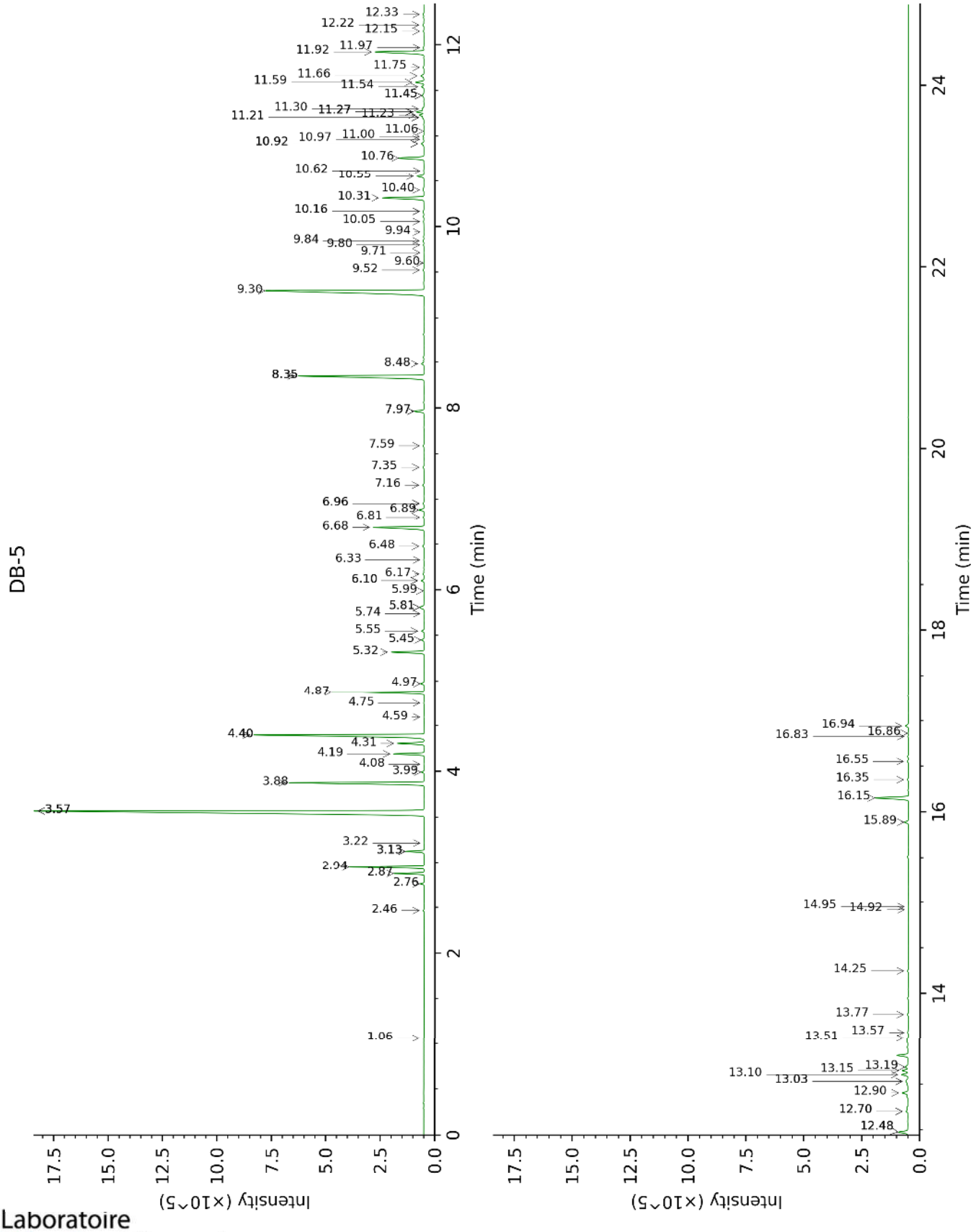
DB-5
Intensity (×10^5)
Time (min)
12.33
12.22
12.15
11.92
11.97
11.75
11.59
11.66
11.54
11.45
11.21
11.30
11.27
11.23
11.06
10.92
10.97
11.00
10.76
10.62
10.55
10.40
10.31
10.16
10.05
9.94
9.84
9.80
9.71
9.60
9.52
9.30
8.48
8.35
7.97
7.59
7.35
7.16
6.96
6.89
6.81
6.68
6.48
6.33
6.17
6.10
5.99
5.81
5.74
5.55
5.45
5.32
4.97
4.87
4.75
4.59
4.40
4.31
4.19
4.08
3.99
3.88
3.57
3.22
3.13
2.94
2.87
2.76
2.46
1.06
16.94
16.83
16.86
16.55
16.35
16.15
15.89
14.95
14.92
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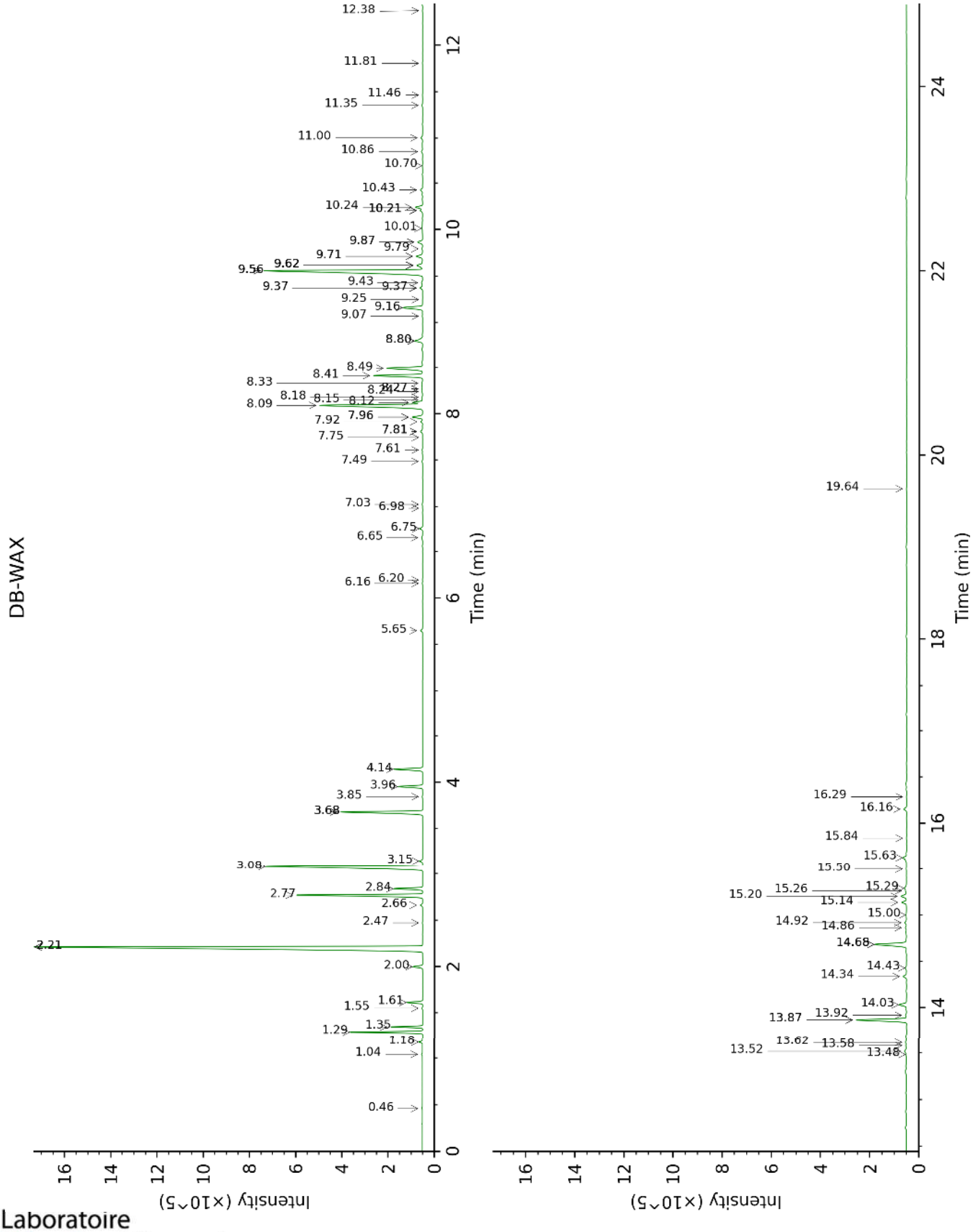
13.19
13.10
13.03
12.90
12.70
12.48


DB-WAX
Intensity (×10^5)
Time (min)
12.38
11.81
11.46
11.35
11.00
10.86
10.70
10.43
10.24
10.21
10.01
9.87
9.79
9.71
9.62
9.56
9.43
9.37
9.37
9.25
9.16
9.07
8.80
8.49
8.41
8.33
8.27
8.24
8.18
8.15
8.12
8.09
7.96
7.92
7.81
7.75
7.61
7.49
7.03
6.98
6.75
6.65
6.20
6.16
5.65
4.14
3.96
3.85
3.68
3.15
3.08
2.84
2.77
2.66
2.47
2.21
2.00
1.61
1.55
1.35
1.29
1.18
1.04
0.46
19.64
16.29
16.16
15.84
15.63
15.50
15.29
15.26
15.20
15.14
15.00
14.92
14.86
14.68
14.43
14.34
14.03
13.92
13.87
13.62
13.58
13.52
13.48

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Camphocean	1.06	756	0.01	0.46	778	0.01
Bornylene	2.46	898	0.04	1.04	951	0.03
Tricyclene	2.76	920	0.14	1.18	973	0.14
α-Thujene	2.87	927	1.15	1.35	1002	1.16
α-Pinene	2.94	932	2.84	1.29	994	2.88
Camphene	3.13*	944	0.74	1.61	1028	0.71
α-Fenchene	3.13*	944	[0.74]	1.55	1022	0.03
Thuja-2,4(10)-diene	3.22	951	tr	2.21*	1089	28.96
β-Pinene	3.57*	974	29.19	2.00	1067	0.49
Sabinene	3.57*	974	[29.19]	2.21*	1089	[28.96]
Myrcene	3.88	995	6.40	2.77	1136	6.48
α-Phellandrene	3.99	1003	0.11	2.66	1127	0.11
Δ3-Carene	4.08	1009	0.01	2.47	1112	0.02
α-Terpinene	4.19	1016	1.29	2.84	1141	1.30
para-Cymene	4.31	1023	1.23	3.96	1228	1.25
Limonene	4.40*	1029	9.74	3.08	1161	9.69
1,8-Cineole	4.40*	1029	[9.74]	3.15	1166	0.16
(*Z*)-β-Ocimene	4.60	1041	0.01	3.68*	1208	4.47
(*E*)-β-Ocimene	4.75	1051	0.02	3.85	1220	0.02
γ-Terpinene	4.87	1059	4.42	3.68*	1208	[4.47]
cis-Sabinene hydrate	4.97	1065	0.15	6.75	1431	0.15
Terpinolene	5.32	1087	1.48	4.14	1242	1.48
trans-Sabinene hydrate	5.45	1096	0.13	7.81*	1511	0.14
Linalool	5.55	1102	0.11	7.92	1519	0.10
Unknown [m/z 43, 99 (17), 79 (17), 41 (8), 108 (6)...]	5.74	1114	0.01	6.16	1387	0.02
Octen-3-yl acetate	5.81*	1118	0.29	5.65	1350	0.11
cis-para-Menth-2-en-1-ol	5.81*	1118	[0.29]	7.96*	1523	0.61
Cosmene	5.99	1130	0.01			
trans-para-Menth-2-en-1-ol	6.10*	1137	0.13	8.80*	1588	0.59
Camphor	6.10*	1137	[0.13]	7.02	1452	0.02
Camphene hydrate	6.17	1142	0.05	8.27*†	1547	[0.13]
Isoborneol	6.33	1152	0.02	9.25	1624	0.01
Borneol	6.48	1161	0.07	9.62*	1654	0.45
Terpinen-4-ol	6.68	1174	2.72	8.41	1558	2.76
para-Cymen-8-ol	6.81	1182	0.03	11.35	1801	0.04
α-Terpineol	6.89	1188	0.23	9.62*	1654	[0.45]
Myrtenol	6.96*	1192	0.05	10.70	1745	0.02
cis-Piperitol	6.96*	1192	[0.05]	9.37*†	1634	0.25
trans-Piperitol	7.16	1205	0.07	10.21*	1703	0.15
endo-Fenchyl acetate	7.35	1218	0.06	6.65	1424	0.08
trans-Chrysanthenyl acetate	7.59	1234	0.05	7.49	1486	0.03
Linalyl acetate	7.97*	1259	0.47	7.96*	1523	[0.61]
Geraniol	7.97*	1259	[0.47]	11.46	1811	0.01

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Isobornyl acetate	8.35*	1285	7.79	8.12	1535	0.49
Bornyl acetate	8.35*	1285	[7.79]	8.09	1533	7.27
Methyl myrtenate	8.48	1294	0.13	9.37*†	1634	[0.25]
α-Terpinyl acetate	9.30	1351	12.14	9.56*	1650	12.26
Neryl acetate	9.52	1367	0.05	10.01	1687	0.07
α-Copaene	9.60	1373	0.01	6.98	1449	0.01
cis-β-Elemene	9.71	1381	0.02	8.15	1538	0.03
β-Cubebene	9.80	1387	0.03	7.61	1496	0.03
β-Elemene	9.84	1390	0.06	8.24†	1545	0.13
α-Chamipinene	9.94	1397	0.01	7.75	1506	0.01
α-Cedrene	10.05	1405	0.06	7.81*	1511	[0.14]
β-Caryophyllene	10.16*	1413	0.06	8.27*†	1547	[0.13]
β-Cedrene	10.16*	1413	[0.06]	8.18	1540	0.03
cis-Thujopsene	10.31	1424	2.28	8.49	1564	2.28
Isobazzanene	10.40	1430	0.08	8.33	1552	0.05
Cadina-3,5-diene?	10.55	1442	0.37	8.80*	1588	[0.59]
α-Humulene	10.62	1447	0.02	9.07	1610	0.02
cis-Muurola-4(15),5-diene	10.76	1458	1.38	9.16	1617	1.26
β-Chamigrene	10.92*	1469	0.17	9.43†	1639	[0.25]
γ-Muurolene	10.92*	1469	[0.17]	9.37*†	1634	[0.25]
Widdra-2,4(14)-diene?	10.97	1473	0.03	9.56*	1650	[12.26]
Germacrene D	11.00	1475	0.05	9.62*	1654	[0.45]
β-Selinene	11.06	1480	0.01	9.71*	1662	0.43
α-Selinene	11.21*	1491	0.08	9.79	1669	0.04
epi-Cubebol	11.21*	1491	[0.08]	11.81	1841	0.01
Epizonarene	11.23	1493	0.26	9.71*	1662	[0.43]
α-Cuprenene	11.27*	1495	0.41	9.87*	1675	0.34
α-Chamigrene	11.27*	1495	[0.41]	9.87*	1675	[0.34]
β-Himachalene	11.27*	1495	[0.41]	9.62*	1654	[0.45]
Germacrene A	11.30	1498	0.11	10.21*	1703	[0.15]
γ-Cadinene	11.45*	1509	0.13	10.21*	1703	[0.15]
Cubebol	11.45*	1509	[0.13]	12.38	1892	0.02
trans-Calamenene	11.54	1516	0.13	11.00	1771	0.11
δ-Cadinene	11.59	1520	0.44	10.24	1706	0.44
γ-Cuprenene	11.66	1526	0.19	10.43	1722	0.14
δ-Cuprenene epimer II	11.75	1533	0.04	10.86	1758	0.07
α-Elemol	11.92	1546	2.89	13.87*	2032	2.91
cis-Muurol-5-en-4α-ol	11.97	1550	0.04	13.62	2007	0.02
(*E*)-Nerolidol	12.15	1564	0.03	13.58	2004	0.02
Germacrene D-4-ol	12.22	1570	0.06	13.52	1998	0.09
Thujopsan-2α-ol	12.33	1579	0.04	13.92	2036	0.08
Widdrol	12.48*	1590	0.56	14.43	2086	0.10
α-Cedrol	12.48*	1590	[0.56]	14.03	2048	0.49
10-epi-Cubenol	12.70*	1608	0.09	13.48	1995	0.01
10-epi-γ-Eudesmol	12.70*	1608	[0.09]	13.87*	2032	[2.91]
γ-Eudesmol	12.90	1625	0.31	14.68*	2111	2.22
τ-Muurolol	13.03*	1635	0.17	14.86	2129	0.08
τ-Cadinol	13.03*	1635	[0.17]	14.68*	2111	[2.22]
β-Eudesmol	13.10	1641	0.33	15.20	2163	0.38
α-Eudesmol	13.15	1645	0.29	15.14	2157	0.28
α-Cadinol	13.18	1648	0.16	15.29	2172	0.16

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cis-14-nor-Muurol-5-en-4-one?	13.51	1674	0.04	15.50	2193	0.02
α-Bisabolol	13.57	1680	0.05	15.26	2169	0.05
Thujopsenal	13.77	1696	0.06	15.63	2207	0.30
Unknown [m/z 43, 194 (68), 136 (63), 81 (63), 177 (56), 223 (51)... 238 (3)]	14.25	1738	0.05			
τ-Cadinyl acetate	14.92	1796	0.01	15.00	2143	0.05
Cryptomeridiol	14.95	1799	0.03	19.64	2653	0.01
Rimuene	15.89	1884	0.21	14.34	2077	0.23
Beyerene	16.15	1908	1.88	14.68*	2111	[2.22]
Sandaracopimaradiene?	16.35	1927	0.06	14.92	2134	0.11
Pimaradiene	16.55	1946	0.07			
Manoyl oxide	16.83	1972	0.03	16.29	2276	0.02
Kaur-15-ene?	16.86	1975	0.03	15.84	2229	0.01
Luxuriadiene?	16.94	1983	0.18	16.16	2262	0.18
para-Cymenene				6.20	1390	0.01
Total identified		**97.63%**			**98.27%**	
Total reported		**97.69%**			**98.29%**	

*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not 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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