Date : August 19, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22H05-PTH05
Customer identification : Eucalyptus Yandee - EUL01001KO
Type : Essential oil
Source : *Eucalyptus loxophleba*
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 2014-005
Analysis date : August 10, 2022

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4522 ± 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
Ethanol	0.06	Aliphatic alcohol
Pentane	0.01	Alkane
Formic acid	0.02	Aliphatic acid
Isobutyral	0.05	Aliphatic aldehyde
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
Ethyl acetate	tr	Aliphatic ester
Isobutanol	0.03	Aliphatic alcohol
Isovaleral	2.41	Aliphatic aldehyde
3-Methyl-2-butanone	0.02	Aliphatic ketone
2-Methylbutyral	0.01	Aliphatic aldehyde
3-Methyl-2-butanol?	0.01	Aliphatic alcohol
Dimethylhexane isomer II?	tr	Alkane
Isoamyl alcohol	0.14	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
4-Methyl-2-pentanone	0.06	Aliphatic ketone
4-Methyl-2-pentanol	0.97	Aliphatic alcohol
Toluene	0.01	Simple phenolic
Methyl isovalerate	tr	Aliphatic ester
3-Methyl-2-butyl acetate	0.07	Aliphatic ester
2-Methylpentanol	tr	Aliphatic alcohol
4-Methylpentanol	0.01	Aliphatic alcohol
2-Pentylacetate	0.01	Aliphatic ester
Isovaleric acid	0.18	Aliphatic acid
Isoamyl acetate	0.09	Aliphatic ester
Isopropyl isovalerate	0.01	Aliphatic ester
4-Methyl-2-pentyl acetate	6.69	Aliphatic ester
Hashishene	0.03	Monoterpene
α-Thujene	0.02	Monoterpene
α-Pinene	9.36	Monoterpene
Camphene	0.21	Monoterpene
α-Fenchene	0.06	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
6-Methyl-2-heptanone	0.01	Aliphatic ketone
6-Methyl-2-heptanol?	0.01	Aliphatic alcohol
Isoamyl propionate	0.01	Aliphatic ester
β-Pinene	0.08	Monoterpene
6-Methyl-5-hepten-2-one	0.03	Aliphatic ketone
Myrcene	0.03	Monoterpene
trans-Dehydroxylinalool oxide	0.03	Monoterpenic ether
α-Phellandrene	0.01	Monoterpene
Pseudolimonene	0.01	Monoterpene
Δ3-Carene	0.02	Monoterpene
para-Methylanisole	0.01	Simple phenolic
para-Cymene	1.18	Monoterpene
Limonene	1.12	Monoterpene

1,8-Cineole	68.46	Monoterpenic ether
2-Heptyl acetate	0.01	Aliphatic ester
γ-Terpinene	0.05	Monoterpene
Unknown	0.01	Unknown
Unknown	0.03	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Methyl benzoate	0.02	Phenolic ester
γ-Campholenal	0.09	Aliphatic alcohol
α-Pinene oxide	0.19	Monoterpenic ether
Isoamyl 2-methylbutyrate	0.04	Aliphatic ester
2-Nonanol	0.04	Aliphatic alcohol
Amyl isovalerate	0.40	Aliphatic ester
endo-Fenchol	0.24	Monoterpenic alcohol
3-Methyl-3-butenyl isovalerate analog	0.03	Aliphatic ester
α-Campholenal	0.05	Monoterpenic aldehyde
3-Methylpentyl isobutyrate?	0.18	Aliphatic ester
Nopinone	0.02	Normonoterpenic ketone
trans-Pinocarveol	3.08	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
Camphor	0.02	Monoterpenic ketone
Epoxyterpinolene	0.01	Monoterpenic ether
Camphene hydrate	0.02	Monoterpenic alcohol
Nerol oxide	0.01	Aliphatic ether
Pinocamphone	0.08	Monoterpenic ketone
Pinocarvone	0.25	Monoterpenic ketone
Borneol	0.24	Monoterpenic alcohol
δ-Terpineol	0.03	Monoterpenic alcohol
Isopinocamphone	0.24	Monoterpenic ketone
Terpinen-4-ol	0.16	Monoterpenic alcohol
Unknown	0.01	Unknown
para-Cymen-8-ol	0.02	Monoterpenic alcohol
trans-Isocarveol	0.15	Monoterpenic alcohol
α-Terpineol	0.28	Monoterpenic alcohol
Myrtenol	0.07	Monoterpenic alcohol
Unknown	0.01	Unknown
3-Methylpentyl isovalerate?	0.01	Aliphatic ester
endo-Fenchyl acetate	0.04	Monoterpenic ester
trans-Carveol	0.03	Monoterpenic alcohol
exo-2-Hydroxycineole	0.02	Monoterpenic alcohol
cis-para-Mentha-1(7),8-dien-2-ol	0.08	Monoterpenic alcohol
Unknown	0.06	Oxygenated monoterpene
cis-Carveol	0.01	Monoterpenic alcohol
Myrtenyl formate?	0.02	Monoterpenic ester
Carvone	0.02	Monoterpenic ketone
Carvotanacetone	0.04	Monoterpenic ketone
Piperitone	0.02	Monoterpenic ketone
Unknown	0.01	Unknown
Unknown	0.03	Unknown
Geranial	0.01	Monoterpenic aldehyde
Bornyl acetate	0.03	Monoterpenic ester
trans-Pinocarvyl acetate	0.02	Monoterpenic ester
Carvacrol	0.01	Monoterpenic alcohol

exo-2-Hydroxycineole acetate	0.05	Monoterpenic ester
α-Terpinyl acetate	0.04	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
cis-para-Menth-6-ene-2,8-diol?	0.01	Monoterpenic alcohol
Unknown	0.07	Unknown
β-Caryophyllene	0.03	Sesquiterpene
β-Gurjunene	0.01	Sesquiterpene
Aromadendrene	0.28	Sesquiterpene
Selina-5,11-diene	0.01	Sesquiterpene
allo-Aromadendrene	0.09	Sesquiterpene
γ-Gurjunene	0.01	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
allo-Aromadendr-9-ene	0.01	Sesquiterpene
epi-Cubebol	0.01	Sesquiterpenic alcohol
Viridiflorene	0.02	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Epiglobulol	0.02	Sesquiterpenic alcohol
Spathulenol	0.03	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Globulol	0.06	Sesquiterpenic alcohol
Viridiflorol	0.01	Sesquiterpenic alcohol
Cubeban-11-ol	0.01	Sesquiterpenic alcohol
Eudesm-5-en-11-ol	0.01	Sesquiterpenic alcohol
β-Eudesmol	0.02	Sesquiterpenic alcohol
Benzyl benzoate	0.02	Phenolic ester
Consolidated total	**99.01%**	

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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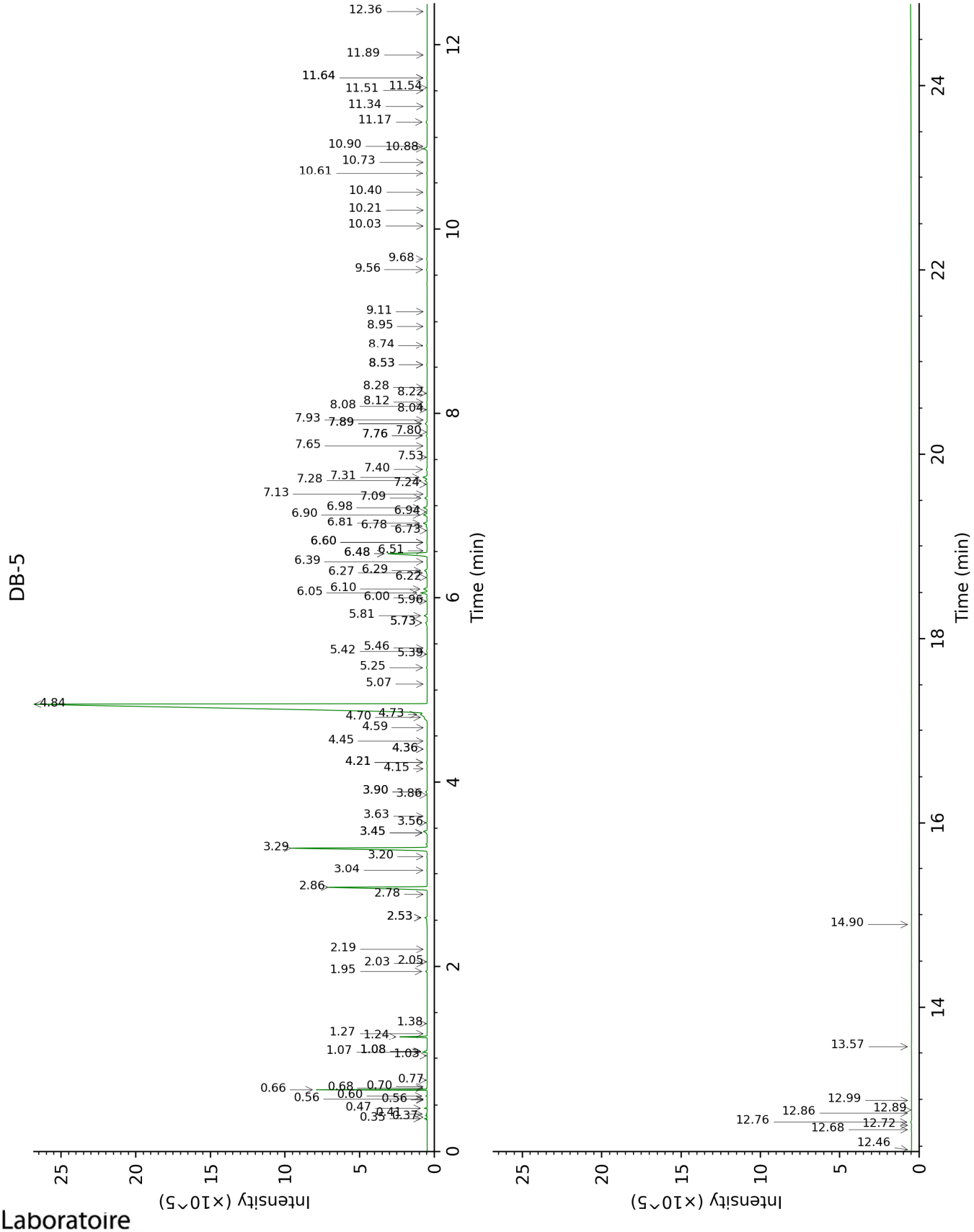
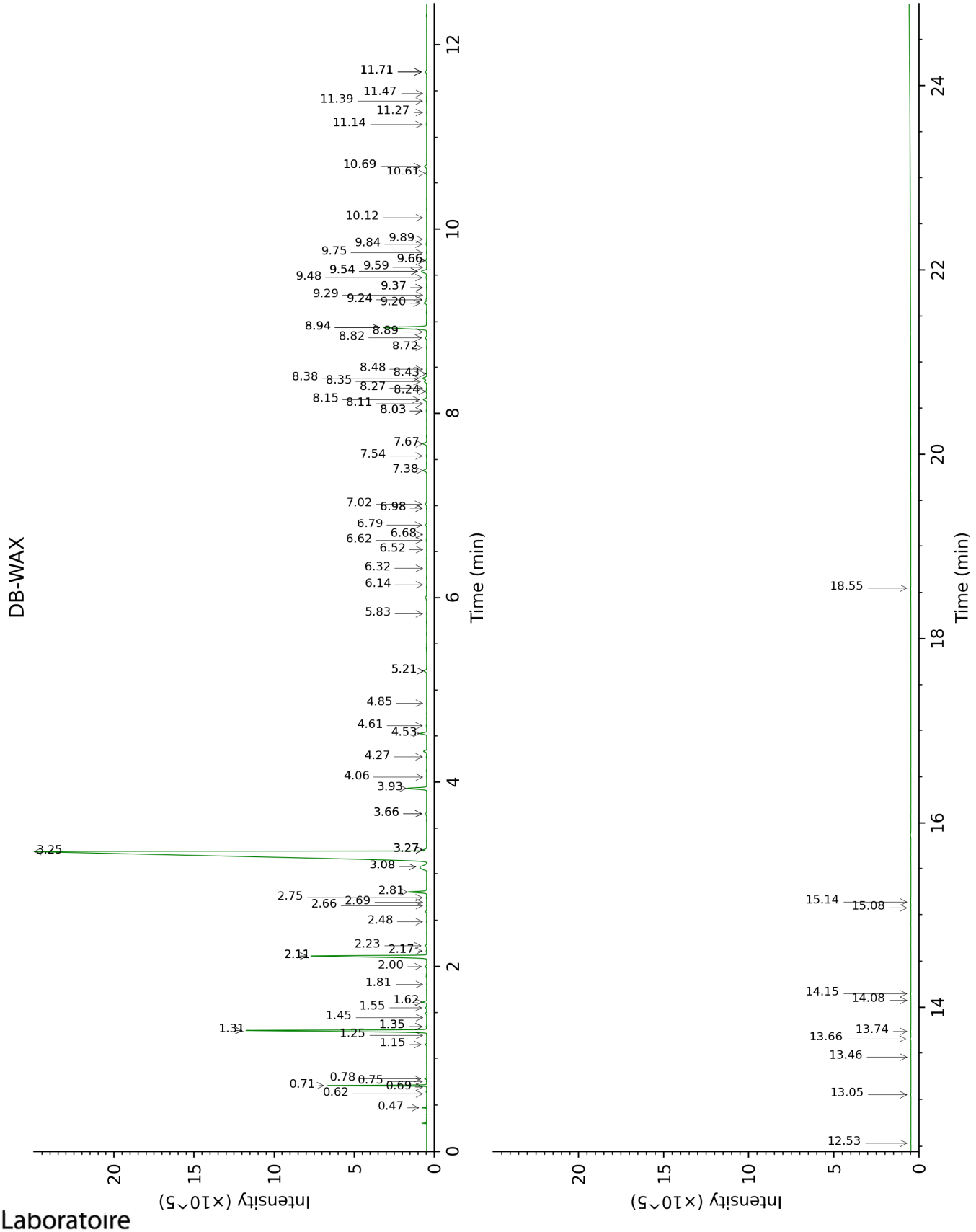

DB-5
Time (min)
Intensity (×10^5)
12.36
11.89
11.64
11.51
11.54
11.34
11.17
10.90
10.88
10.73
10.61
10.40
10.21
10.03
9.68
9.56
9.11
8.95
8.74
8.53
8.28
8.22
8.08
8.12
8.04
7.93
7.89
7.76
7.80
7.65
7.53
7.40
7.28
7.31
7.24
7.13
7.09
6.90
6.98
6.94
6.81
6.78
6.73
6.60
6.48
6.51
6.39
6.27
6.29
6.22
6.05
6.10
6.00
5.96
5.81
5.73
5.42
5.46
5.39
5.25
5.07
4.84
4.70
4.73
4.59
4.45
4.36
4.21
4.15
3.90
3.86
3.63
3.56
3.45
3.29
3.20
3.04
2.86
2.78
2.53
2.19
2.03
2.05
1.95
1.38
1.27
1.24
1.07
1.08
1.03
0.77
0.66
0.68
0.70
0.60
0.56
0.56
0.47
0.41
0.35
0.37
14.90
13.57
12.99
12.86
12.89
12.76
12.72
12.68
12.46


DB-WAX
Time (min)
Intensity (×10^5)
11.71
11.47
11.39
11.27
11.14
10.69
10.61
10.12
9.89
9.84
9.75
9.66
9.59
9.54
9.48
9.37
9.29
9.24
9.20
8.94
8.89
8.82
8.72
8.48
8.43
8.38
8.35
8.27
8.24
8.15
8.11
8.03
7.67
7.54
7.38
7.02
6.98
6.79
6.68
6.62
6.52
6.32
6.14
5.83
5.21
4.85
4.61
4.53
4.27
4.06
3.93
3.66
3.27
3.25
3.08
2.81
2.75
2.69
2.66
2.48
2.23
2.17
2.11
2.00
1.81
1.62
1.55
1.45
1.35
1.31
1.25
1.15
0.78
0.75
0.71
0.69
0.62
0.47
18.55
15.14
15.08
14.15
14.08
13.74
13.66
13.46
13.05
12.53

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.35	500	0.06	0.78	909	0.05
Pentane	0.37	500	0.01			
Formic acid	0.40	500	0.02			
Isobutyral	0.47	541	0.05	0.47	782	0.08
2-Methyl-3-buten-2-ol	0.56	607	tr	1.45	1013	tr
Ethyl acetate	0.56	610	tr	0.62	853	tr
Isobutanol	0.60	621	0.03	2.11*	1079	6.64
Isovaleral	0.66	642	2.41	0.71	885	2.41
3-Methyl-2-butanone	0.68	648	0.02	0.75	901	0.01
2-Methylbutyral	0.70	653	0.01	0.69	879	tr
3-Methyl-2-butanol?	0.77	676	0.01			
Dimethylhexane isomer II?	1.03	727	tr			
Isoamyl alcohol	1.07	732	0.14	3.27*	1176	0.17
2-Methylbutanol	1.08*	733	0.07	3.27*	1176	[0.17]
4-Methyl-2-pentanone	1.08*	733	[0.07]	1.15	969	0.06
4-Methyl-2-pentanol	1.24	755	0.97	2.81	1139	0.99
Toluene	1.27	760	0.01	1.35*	1002	0.03
Methyl isovalerate	1.38	774	tr	1.26	987	tr
3-Methyl-2-butyl acetate	1.95	832	0.07			
2-Methylpentanol	2.03	838	tr			
4-Methylpentanol	2.05	840	0.01			
2-Pentylacetate	2.19	851	0.01			
Isovaleric acid	2.53*†	879	0.21	9.20	1622	0.18
Isoamyl acetate	2.53*†	879	[0.21]	2.22	1090	0.09
Isopropyl isovalerate	2.78	899	0.01	1.81	1049	0.01
4-Methyl-2-pentyl acetate	2.86	905	6.69	2.11*	1079	[6.64]
Hashishene	3.04	917	0.03	1.31*	996	9.31
α-Thujene	3.20	927	0.02	1.35*	1002	[0.03]
α-Pinene	3.29	933	9.36	1.31*	996	[9.31]
Camphene	3.45*†	944	0.27	1.62	1030	0.21
α-Fenchene	3.45*†	944	[0.27]	1.55	1024	0.06
Thuja-2,4(10)-diene	3.56	951	0.03	2.17	1085	0.03
6-Methyl-2-heptanone	3.63	956	0.01	3.66*	1207	0.07
6-Methyl-2-heptanol?	3.86	970	0.01			
Isoamyl propionate	3.90*	973	0.09	3.08*	1161	1.13

β-Pinene	3.90*	973	[0.09]	2.00	1068	0.08
6-Methyl-5-hepten-2-one	4.15	989	0.03	4.85	1296	0.01
Myrcene	4.21*	994	0.05	2.74	1134	0.03
trans-Dehydroxylinalool oxide	4.21*	994	[0.05]	3.27*	1176	[0.17]
α-Phellandrene	4.36*†	1003	0.02	2.66	1128	0.01
Pseudolimonene	4.36*†	1003	[0.02]	2.70	1130	0.01
Δ3-Carene	4.44	1008	0.02	2.48	1114	0.02
para-Methylanisole	4.59	1017	0.01	6.14	1385	0.01
para-Cymene	4.70†	1024	71.14	3.93	1227	1.18
Limonene	4.73†	1026	[71.14]	3.08*	1161	[1.13]
1,8-Cineole	4.84†	1033	[71.14]	3.25	1174	68.46
2-Heptyl acetate	5.07	1047	0.01	4.06	1236	0.02
γ-Terpinene	5.25	1058	0.05	3.66*	1207	[0.07]
Unknown [m/z 45, 69 (51), 43 (29), 56 (26), 57 (23), 55 (23)...]	5.39	1067	0.01			
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.42	1069	0.03	4.61	1278	0.03
cis-Linalool oxide (fur.)	5.46	1072	0.01	6.32	1398	0.01
Methyl benzoate	5.73*	1088	0.11	8.43	1560	0.02
γ-Campholenal	5.73*	1088	[0.11]			
α-Pinene oxide	5.81	1093	0.19	5.21*	1317	0.19
Isoamyl 2-methylbutyrate	5.96	1103	0.04	4.27	1252	0.03
2-Nonanol	6.00	1105	0.04	7.54	1491	0.04
Amyl isovalerate	6.05	1109	0.40	4.53	1271	0.40
endo-Fenchol	6.10	1111	0.24	8.15	1538	0.24
3-Methyl-3-butenyl isovalerate analog	6.22	1119	0.03	5.21*	1317	[0.19]
α-Campholenal	6.27	1122	0.05	6.79	1434	0.07
3-Methylpentyl isobutyrate?	6.30	1124	0.18			
Nopinone	6.39	1130	0.02	8.03*	1528	0.04
trans-Pinocarveol	6.48*	1136	3.09	8.94*	1600	3.09
cis-para-Mentha-2,8-dien-1-ol	6.48*	1136	[3.09]	9.29	1629	0.01
Camphor	6.51	1138	0.02	6.98*	1448	0.02
Epoxyterpinolene	6.60*	1144	0.03	6.52	1414	0.01
Camphene hydrate	6.60*	1144	[0.03]	8.27	1548	0.02
Nerol oxide	6.73	1152	0.01	6.68	1426	0.01
Pinocamphone	6.78	1155	0.08	7.02	1451	0.08

Pinocarvone	6.81	1157	0.25	7.67	1501	0.26
Borneol	6.90	1163	0.24	9.54*	1650	0.51
δ-Terpineol	6.94	1165	0.03	9.24*	1625	0.05
Isopinocamphone	6.98	1168	0.24	7.38	1479	0.25
Terpinen-4-ol	7.09	1174	0.16	8.35	1554	0.18
Unknown [m/z 43, 153 (88), 82 (88), 111 (83), 83 (79), 55 (62), 125 (54)...]	7.13	1177	0.01			
para-Cymen-8-ol	7.24	1184	0.02	11.27	1796	0.01
trans-Isocarveol	7.28	1186	0.15	10.69*	1746	0.15
α-Terpineol	7.31	1189	0.28	9.54*	1650	[0.51]
Myrtenol	7.40	1194	0.07	10.61	1739	0.05
Unknown [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	7.53	1203	0.01	10.69*	1746	[0.15]
3-Methylpentyl isovalerate?	7.65	1211	0.01	5.83	1362	0.02
endo-Fenchyl acetate	7.76*	1218	0.07	6.62	1421	0.04
trans-Carveol	7.76*	1218	[0.07]	11.14	1785	0.03
exo-2-Hydroxycineole	7.80	1221	0.02	11.39	1807	0.02
cis-para-Mentha-1(7),8-dien-2-ol	7.89*	1227	0.14	11.71*	1835	0.10
Unknown [m/z 43, 135 (82), 91 (68), 107 (58), 79 (55), 150 (49)]	7.89*	1227	[0.14]	9.66*	1660	0.08
cis-Carveol	7.93	1230	0.01	11.47	1814	0.01
Myrtenyl formate?	8.04	1237	0.02	8.72	1583	0.03
Carvone	8.08	1239	0.02	9.75	1667	0.03
Carvotanacetone	8.12	1242	0.04	9.24*	1625	[0.05]
Piperitone	8.22	1249	0.02	9.66*	1660	[0.08]
Unknown [m/z 43, 97 (55), 107 (44), 41 (38), 109 (32), 55 (27)...]	8.28	1253	0.01			
Unknown [m/z 83, 43 (68), 69 (67), 41 (39), 82 (38), 98 (37)...]	8.53*	1269	0.04			
Geranial	8.53*	1269	[0.04]	9.89	1679	0.01
Bornyl acetate	8.74	1284	0.03	8.03*	1528	[0.04]
trans-Pinocarvyl acetate	8.95	1297	0.02	8.89	1597	0.02
Carvacrol	9.11	1308	0.01	15.08	2154	0.01
exo-2-Hydroxycineole acetate	9.56	1340	0.05	9.84	1674	0.06
α-Terpinyl acetate	9.68	1348	0.04	9.48	1644	0.07

α-Copaene	10.03	1373	0.01	6.98*	1448	[0.02]
cis-para-Menth-6-ene-2,8-diol?	10.20	1386	0.01			
Unknown [m/z 83, 55 (63), 96 (40), 81 (32), 69 (31)...]	10.40	1399	0.07			
β-Caryophyllene	10.61	1415	0.03	8.24	1545	0.06
β-Gurjunene	10.73	1424	0.01	8.11	1535	0.01
Aromadendrene	10.88	1434	0.28	8.38	1556	0.28
Selina-5,11-diene	10.90	1436	0.01	8.48	1564	0.01
allo-Aromadendrene	11.17	1456	0.09	8.82	1592	0.10
γ-Gurjunene	11.34	1468	0.01	8.94*	1600	[3.09]
β-Selinene	11.51	1481	0.02	9.59	1654	0.01
allo-Aromadendr-9-ene	11.54	1483	0.01	9.37*	1636	0.03
epi-Cubebol	11.64*	1491	0.03	11.71*	1835	[0.10]
Viridiflorene	11.64*	1491	[0.03]	9.37*	1636	[0.03]
γ-Cadinene	11.89	1510	0.01	10.12	1698	0.01
Unknown [m/z 107, 93 (90), 81 (85), 91 (78), 41 (78), 79 (74), 121 (68)... 220 (29)]	12.36	1547	0.02	11.71*	1835	[0.10]
Epiglobulol	12.46	1554	0.02	13.05	1958	0.02
Spathulenol	12.68	1572	0.03	14.15	2062	0.02
Caryophyllene oxide	12.72	1575	0.01	12.53	1909	0.01
Globulol	12.76	1578	0.06	13.66	2014	0.05
Viridiflorol	12.86	1586	0.01	13.74	2023	0.03
Cubeban-11-ol	12.89	1588	0.01	13.46	1996	0.01
Eudesm-5-en-11-ol	12.99	1596	0.01	14.08	2055	0.01
β-Eudesmol	13.57	1644	0.02	15.14	2161	0.02
Benzyl benzoate	14.90	1755	0.02	18.55	2529	0.02
Total identified		**99.19%**			**98.33%**	
Total reported		**99.34%**			**98.36%**	

*: 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