Date : August 11, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22H09-PTH01
Customer identification : Carrot Seed - India - C40109R
Type : Essential oil
Source : *Daucus carota*
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 11, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia

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PHYSICOCHEMICAL DATA

Physical aspect: Yellow orange liquid
Refractive index: 1.4923 ± 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
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Hexanal	0.01	Aliphatic aldehyde
Heptanal	0.03	Aliphatic aldehyde
Angelic acid	0.03	Aliphatic acid
α-Thujene	0.01	Monoterpene
α-Pinene	0.53	Monoterpene
Camphene	0.05	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
β-Pinene	0.40	Monoterpene
Sabinene	0.05	Monoterpene
Myrcene	0.49	Monoterpene
Octanal	0.02	Aliphatic aldehyde
Δ3-Carene	0.01	Monoterpene
α-Terpinene	0.02	Monoterpene
para-Cymene	0.05	Monoterpene
Limonene	0.30	Monoterpene
β-Phellandrene	0.03	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.02	Monoterpene
γ-Terpinene	0.03	Monoterpene
Unknown	0.01	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.02	Monoterpene
para-Cymenene	0.02	Monoterpene
trans-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Linalool	0.06	Monoterpenic alcohol
Nonanal	0.04	Aliphatic aldehyde
endo-Fenchol	0.01	Monoterpenic alcohol
α-Campholenal	0.01	Monoterpenic aldehyde
trans-Pinocarveol	0.04	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
trans-Verbenol	0.02	Monoterpenic alcohol
Pinocarvone	0.01	Monoterpenic ketone
(2*E*)-Nonenal	0.06	Aliphatic aldehyde
α-Phellandren-8-ol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	0.05	Monoterpenic alcohol
Myrtenol	0.04	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
trans-Carveol	0.02	Monoterpenic alcohol
Nerol	0.01	Monoterpenic alcohol
Cuminal	0.02	Monoterpenic aldehyde
Neral	0.02	Monoterpenic aldehyde

Unknown	0.02	Oxygenated monoterpene
Vitispirane	0.02	Terpenic ether
Bornyl acetate	0.03	Monoterpenic ester
Unknown	0.02	Oxygenated monoterpene
α-Cubebene	0.02	Sesquiterpene
Dehydro-ar-ionene	0.02	Miscellaneous
α-Terpinyl acetate	0.03	Monoterpenic ester
Unknown	0.03	Sesquiterpene
Eugenol	0.02	Phenylpropanoid
Daucene	2.87	Sesquiterpene
β-Bourbonene	0.02	Sesquiterpene
Unknown	0.42	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
β-Elemene	0.03	Sesquiterpene
Unknown	0.03	Unknown
Longifolene	0.05	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
Sesquithujene	0.03	Sesquiterpene
β-Caryophyllene	0.54	Sesquiterpene
cis-α-Bergamotene	0.03	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.03	Sesquiterpene
β-Copaene	0.06	Sesquiterpene
(*Z*)-β-Farnesene?	0.02	Sesquiterpene
trans-α-Bergamotene	0.60	Sesquiterpene
Sesquisabinene A	0.15	Sesquiterpene
α-Humulene	0.08	Sesquiterpene
Unknown	0.10	Sesquiterpene
Acora-3,10(14)-diene	0.15	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
(*E*)-β-Farnesene	1.51	Sesquiterpene
γ-Decalactone	0.06	Aliphatic lactone
Unknown	0.57	Sesquiterpene
Dauca-5,8-diene?	0.10	Sesquiterpene
γ-Muurolene	0.04	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
β-Selinene	0.06	Sesquiterpene
ar-Curcumene	0.17	Sesquiterpene
Isodaucene	0.80	Sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Methyl (*E*)-isoeugenol	0.62	Phenylpropanoid
α-Zingiberene	0.10	Sesquiterpene
γ-Cadinene	tr	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.05	Sesquiterpene
β-Bisabolene	1.94	Sesquiterpene
Sesquicineole	0.02	Sesquiterpenic ether
β-Sesquiphellandrene	0.07	Sesquiterpene
δ-Cadinene	0.03	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
Dauca-4(11),8-diene	0.12	Sesquiterpene
(*E*)-γ-Bisabolene	0.03	Sesquiterpene
(*E*)-α-Bisabolene	0.08	Sesquiterpene
Isocaryophyllene epoxide B	0.08	Sesquiterpenic ether

Unknown	1.34	Oxygenated sesquiterpene
Spathulenol	0.02	Sesquiterpenic alcohol
Germacrene D-4-ol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.46	Sesquiterpenic ether
Caryophyllene oxide isomer	0.05	Sesquiterpenic ether
trans-Dauc-8-en-4β-ol	2.71	Sesquiterpenic alcohol
Carotol	71.68	Sesquiterpenic alcohol
Humulene epoxide II	0.09	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.28	Oxygenated sesquiterpene
Unknown	0.21	Oxygenated sesquiterpene
Muurola-4,10(14)-dien-1β-ol?	0.35	Sesquiterpenic alcohol
Caryophylladienol I	0.15	Sesquiterpenic alcohol
Daucol	2.37	Sesquiterpenic alcohol
τ-Muurolol	0.05	Sesquiterpenic alcohol
τ-Cadinol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.04	Sesquiterpenic alcohol
α-Cadinol	0.07	Sesquiterpenic alcohol
Unknown	0.38	Oxygenated sesquiterpene
Unknown	0.27	Unknown
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.05	Sesquiterpenic alcohol
α-Asarone	0.05	Phenylpropanoid
Shyobunol	0.08	Sesquiterpenic alcohol
Juniper camphor	0.04	Sesquiterpenic alcohol
(2*Z*,6*E*)-Farnesol	0.05	Sesquiterpenic alcohol
(2*E*,6*E*)-Farnesol	0.05	Sesquiterpenic alcohol
Drimenol	0.07	Sesquiterpenic alcohol
Unknown	0.10	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Phytone	0.08	Terpenic ketone
Palmitic acid	0.11	Aliphatic acid
para-Camphorene	0.04	Diterpene
Consolidated total	**96.11%**	

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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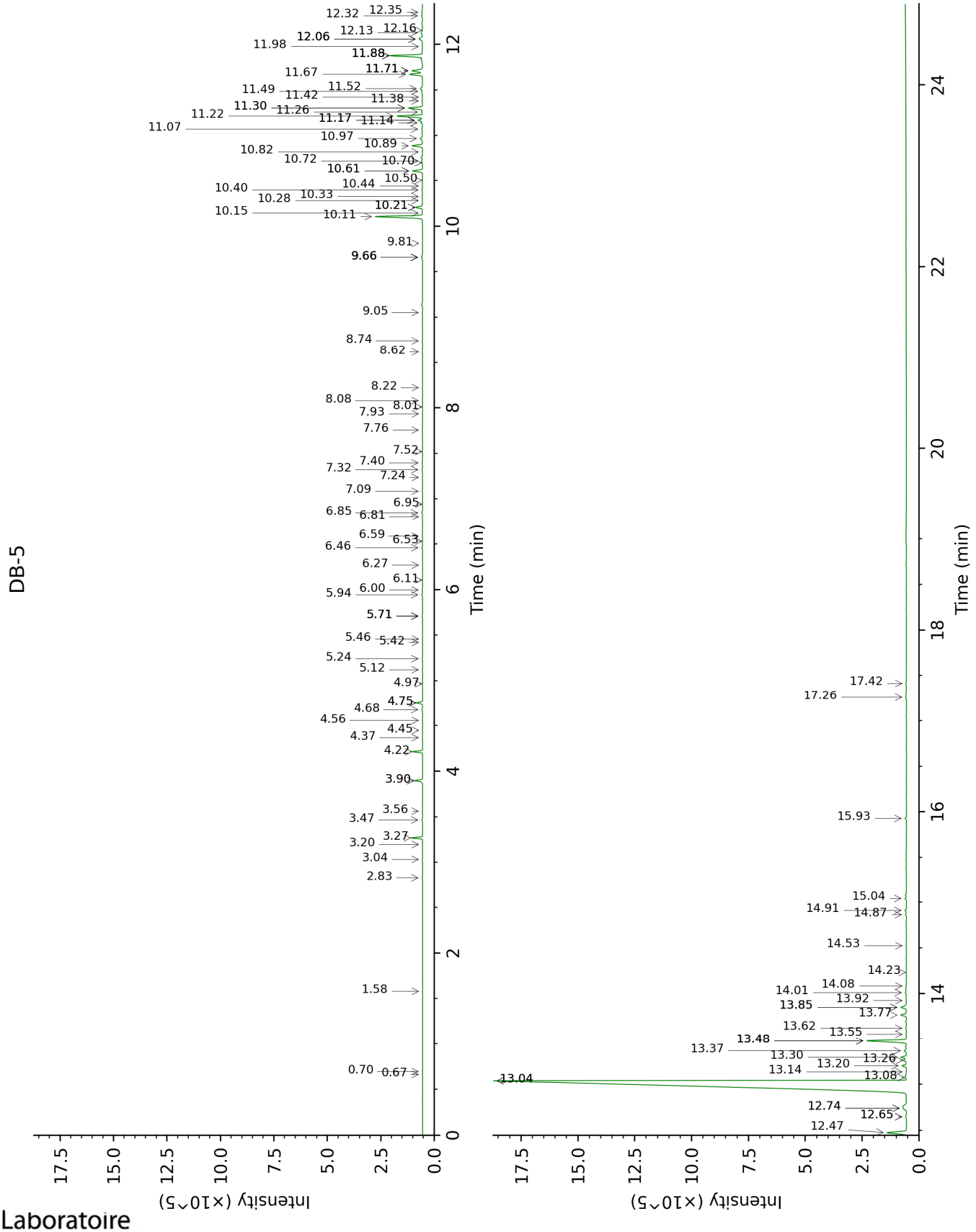
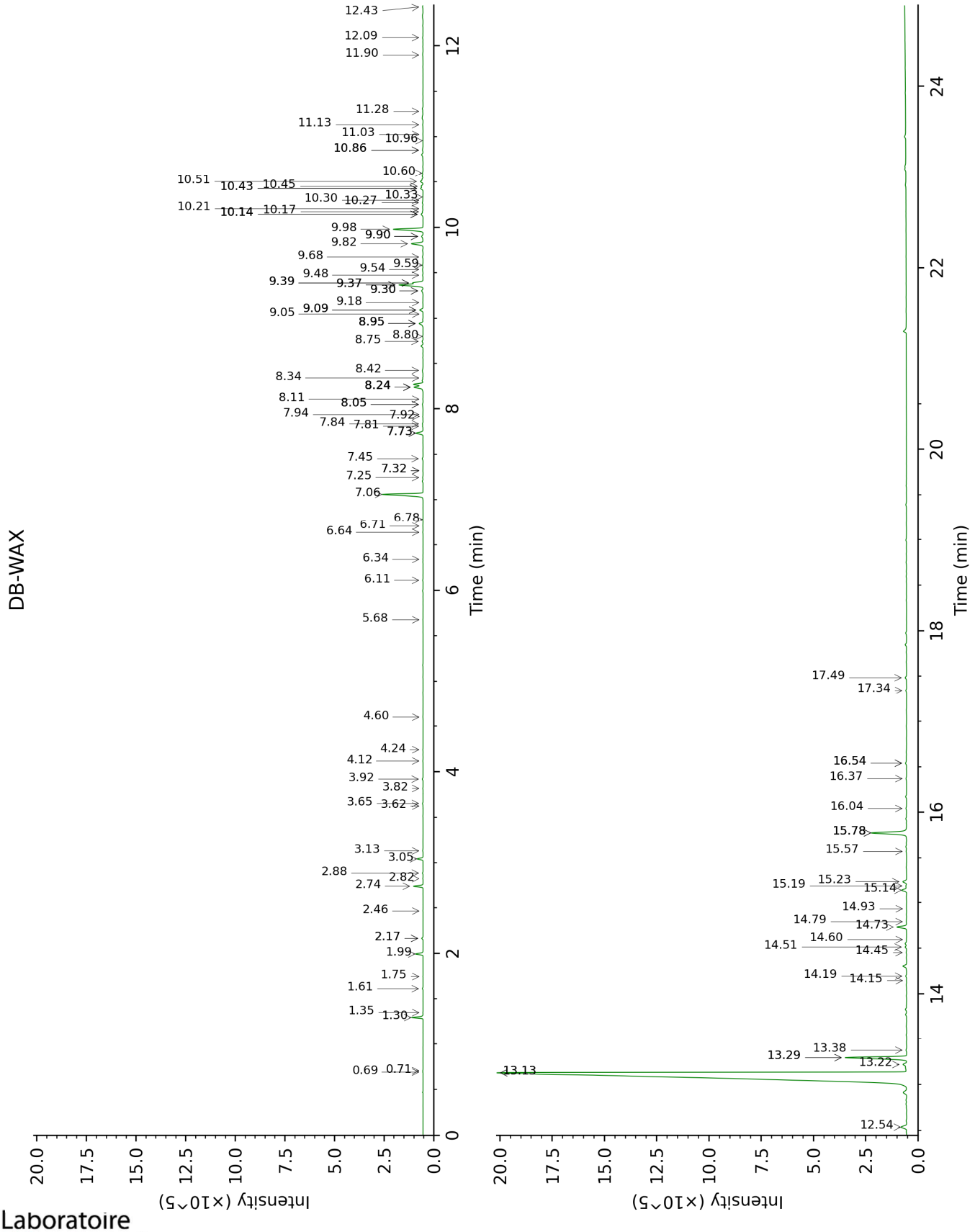

DB-5
Time (min)
Intensity (×10^5)
12.32
12.35
12.06
12.13
12.16
11.98
11.88
11.67
11.71
11.49
11.52
11.42
11.38
11.30
11.26
11.22
11.17
11.14
11.07
10.97
10.89
10.82
10.72
10.70
10.61
10.50
10.44
10.40
10.33
10.28
10.21
10.15
10.11
9.81
9.66
9.05
8.74
8.62
8.22
8.08
8.01
7.93
7.76
7.52
7.40
7.32
7.24
7.09
6.95
6.85
6.81
6.59
6.53
6.46
6.27
6.11
6.00
5.94
5.71
5.46
5.42
5.24
5.12
4.97
4.75
4.68
4.56
4.45
4.37
4.22
3.90
3.56
3.47
3.27
3.20
3.04
2.83
1.58
0.70
0.67
17.42
17.26
15.93
15.04
14.91
14.87
14.53
14.23
14.08
14.01
13.92
13.85
13.77
13.62
13.55
13.48
13.37
13.30
13.26
13.20
13.14
13.08
13.04
12.74
12.65
12.47


DB-WAX
Time (min)
Intensity (×10^5)
12.43
12.09
11.90
11.28
11.13
11.03
10.96
10.86
10.60
10.51
10.43
10.45
10.30
10.27
10.33
10.21
10.14
10.17
9.98
9.90
9.82
9.68
9.54
9.59
9.48
9.39
9.37
9.30
9.18
9.05
9.09
8.95
8.75
8.80
8.42
8.34
8.24
8.11
8.05
7.94
7.92
7.84
7.81
7.73
7.45
7.32
7.25
7.06
6.78
6.64
6.71
6.34
6.11
5.68
4.60
4.24
4.12
3.92
3.82
3.65
3.62
3.13
3.05
2.88
2.82
2.74
2.46
2.17
1.99
1.75
1.61
1.35
1.30
0.69
0.71
17.49
17.34
16.54
16.37
16.04
15.78
15.57
15.19
15.23
15.14
14.93
14.79
14.73
14.51
14.60
14.45
14.19
14.15
13.38
13.29
13.22
13.13
12.54

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.66	642	0.01	0.71	885	0.01
2-Methylbutyral	0.70	653	0.01	0.69	879	0.01
Hexanal	1.58	801	0.01	1.75	1043	0.01
Heptanal	2.82	903	0.03	2.88	1145	0.03
Angelic acid	3.04	916	0.03			
α-Thujene	3.20	927	0.01	1.35	1002	0.01
α-Pinene	3.27	932	0.53	1.30	993	0.52
Camphene	3.47	945	0.05	1.61	1029	0.04
Thuja-2,4(10)-diene	3.56	951	0.02	2.16*	1084	0.07
β-Pinene	3.90*	973	0.45	1.99	1067	0.40
Sabinene	3.90*	973	[0.45]	2.16*	1084	[0.07]
Myrcene	4.22	994	0.49	2.74	1134	0.48
Octanal	4.37	1004	0.02	4.24	1250	0.01
Δ3-Carene	4.45	1009	0.01	2.46	1112	0.01
α-Terpinene	4.56	1016	0.02	2.82	1140	0.01
para-Cymene	4.68	1023	0.05	3.92	1226	0.05
Limonene	4.75*	1028	0.33	3.05	1158	0.30
β-Phellandrene	4.75*	1028	[0.33]	3.13	1165	0.03
(*Z*)-β-Ocimene	4.97	1041	0.01	3.62	1204	0.01
(*E*)-β-Ocimene	5.12	1051	0.02	3.82	1219	0.02
γ-Terpinene	5.24	1058	0.03	3.65	1207	0.04
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.42	1069	0.01	4.60	1277	0.02
cis-Linalool oxide (fur.)	5.46	1072	0.01	6.34	1400	0.01
Terpinolene	5.71*	1087	0.04	4.12	1241	0.02
para-Cymenene	5.71*	1087	[0.04]	6.11	1383	0.02
trans-Linalool oxide (fur.)	5.71*	1087	[0.04]	6.71	1428	0.02
Linalool	5.94	1102	0.06	7.84	1513	0.04
Nonanal	6.00	1105	0.04	5.68	1351	0.01
endo-Fenchol	6.11	1112	0.01	8.11	1535	0.01
α-Campholenal	6.27	1122	0.01	6.78	1433	0.01
trans-Pinocarveol	6.46	1135	0.04	8.95*	1601	0.29
trans-para-Menth-2-en-1-ol	6.53	1139	0.01	8.75	1586	0.06
trans-Verbenol	6.59	1143	0.02	9.30*	1630	0.11
Pinocarvone	6.81	1157	0.01	7.73*	1505	0.47
(2*E*)-Nonenal	6.85	1159	0.06	7.45	1484	0.06
α-Phellandren-8-ol	6.94	1166	0.01	9.90*	1680	0.11
Terpinen-4-ol	7.09	1174	0.03	8.34	1553	0.02
para-Cymen-8-ol	7.24	1184	0.02	11.28	1797	0.03
α-Terpineol	7.32	1190	0.05	9.54	1650	0.05
Myrtenol	7.40	1194	0.04	10.60	1739	0.04
Verbenone	7.52	1202	0.03	9.39*†	1637	[2.15]

trans-Carveol	7.76	1218	0.02	11.14	1785	0.03
Nerol	7.94	1230	0.01	10.86*	1760	0.05
Cuminal	8.01	1235	0.02	10.33	1716	0.02
Neral	8.08	1239	0.02	9.30*	1630	[0.11]
Unknown [m/z 109, 119 (84), 91 (81), 134 (55)... 137 (27)...]	8.22	1249	0.02	11.03	1775	0.01
Vitispirane	8.62	1275	0.02	7.32*	1474	0.03
Bornyl acetate	8.74	1284	0.03	8.05*	1530	0.06
Unknown [m/z 109, 43 (84), 134 (43), 41 (28), 151 (26), 91 (24)...]	9.05	1304	0.02	9.18	1620	0.02
α-Cubebene	9.66*	1347	0.11	6.64	1422	0.02
Dehydro-ar-ionene	9.66*	1347	[0.11]			
α-Terpinyl acetate	9.66*	1347	[0.11]	9.48	1644	0.03
Unknown [m/z 119, 159 (36), 134 (34), 202 (18), 91 (15), 120 (11)...]	9.66*	1347	[0.11]	7.25	1468	0.03
Eugenol	9.81	1358	0.02	14.51	2098	0.10
Daucene	10.11	1378	2.87	7.06	1454	2.76
β-Bourbonene	10.15	1381	0.02	7.32*	1474	[0.03]
Unknown [m/z 161, 91 (40), 105 (38), 79 (31), 93 (29), 119 (29)... 204 (1)]	10.21*	1386	0.44	7.73*	1505	[0.47]
Geranyl acetate	10.21*	1386	[0.44]	10.30	1712	0.02
β-Elemene	10.28	1391	0.03	8.24*†	1545	1.24
Unknown [m/z 163, 43 (22), 121 (18), 164 (15), 145 (14)... 193 (2)]	10.33	1394	0.03	12.09	1870	0.03
Longifolene	10.40	1399	0.05	7.81	1511	0.04
Isocaryophyllene	10.44	1402	0.03	7.94	1521	0.02
Sesquithujene	10.50	1407	0.03	7.92	1520	0.02
β-Caryophyllene	10.61*	1415	0.60	8.24*†	1545	[1.24]
cis-α-Bergamotene	10.61*	1415	[0.60]	8.05*	1530	[0.06]
Caryophylla-4(12),8(13)-diene	10.70	1422	0.03	8.42	1560	0.07
β-Copaene	10.72	1423	0.06	8.24*†	1545	[1.24]
(*Z*)-β-Farnesene?	10.82	1430	0.02	9.05	1609	0.01
trans-α-Bergamotene	10.89	1435	0.60	8.24*†	1545	[1.24]
Sesquisabinene A	10.97	1441	0.15	8.95*	1601	[0.29]
α-Humulene	11.07	1449	0.08	9.09*	1613	0.22
Unknown [m/z 109, 124 (27), 79 (10), 91 (10), 145 (10)... 204? (1)]	11.14	1454	0.10	10.43*	1724	0.17

Acora-3,10(14)-diene	11.17*	1456	0.27	9.09*	1613	[0.22]
allo-Aromadendrene	11.17*	1456	[0.27]	8.80	1590	0.02
(*E*)-β-Farnesene	11.22	1460	1.51	9.37*†	1636	2.15
γ-Decalactone	11.26	1463	0.06	14.19	2067	0.06
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.30*	1466	0.86	9.37*†	1636	[2.15]
Dauca-5,8-diene?	11.30*	1466	[0.86]	8.95*	1601	[0.29]
γ-Muurolene	11.38	1472	0.04	9.39*†	1637	[2.15]
Germacrene D	11.42	1475	0.02	9.58	1654	0.03
β-Selinene	11.49	1480	0.06	9.68	1661	0.04
ar-Curcumene	11.52	1482	0.17	10.50	1730	0.18
Isodaucene	11.67	1494	0.80	9.82	1673	0.78
Unknown [m/z 124, 134 (62), 43 (55), 119 (52), 71 (49), 41 (45), 109 (38), 121 (37)... 220 (14)]	11.71*	1496	0.74	10.86*	1760	[0.05]
Methyl (*E*)-isoeugenol	11.71*	1496	[0.74]	14.73	2119	0.62
α-Zingiberene	11.71*	1496	[0.74]	9.90*	1680	[0.11]
γ-Cadinene	11.88*	1509	1.96	10.14*	1700	0.14
(3*E*,6*E*)-α-Farnesene	11.88*	1509	[1.96]	10.27	1710	0.05
β-Bisabolene	11.88*	1509	[1.96]	9.98	1686	1.94
Sesquicineole	11.98	1517	0.02	10.14*	1700	[0.14]
β-Sesquiphellandrene	12.06*	1523	0.31	10.43*	1724	[0.17]
δ-Cadinene	12.06*	1523	[0.31]	10.17	1702	0.03
trans-Calamenene	12.06*	1523	[0.31]	10.96	1770	0.01
Dauca-4(11),8-diene	12.13	1529	0.12	10.14*	1700	[0.14]
(*E*)-γ-Bisabolene	12.16	1531	0.03	10.20	1705	0.02
(*E*)-α-Bisabolene	12.32	1543	0.08	10.45	1726	0.11
Isocaryophyllene epoxide B	12.35	1546	0.08	11.90	1852	0.04
Unknown [m/z 135, 107 (92), 159 (89), 121 (84), 177 (80), 91 (79)... 220 (16)]	12.47	1556	1.34	13.29*	1980	4.04
Spathulenol	12.65*	1569	0.09	14.15	2062	0.02
Germacrene D-4-ol	12.65*	1569	[0.09]	13.38	1988	0.04
Caryophyllene oxide	12.74*†	1577	0.57	12.54	1910	0.46
Caryophyllene oxide isomer	12.74*†	1577	[0.57]	12.43	1900	0.05
trans-Dauc-8-en-4β-ol	13.04*	1600	75.26	13.29*	1980	[4.04]
Carotol	13.04*	1600	[75.26]	13.13*	1965	71.77

Humulene epoxide II	13.08	1603	0.09	13.13*	1965	[71.77]
Unknown [m/z 177, 159 (59), 137 (45), 109 (41), 93 (41)...222(2)]	13.14	1608	0.03			
Unknown [m/z 107, 105 (93), 119 (87), 132 (85), 43 (66), 91 (61)...218(35)]	13.20	1613	0.28			
Unknown [m/z 159, 177 (50), 93 (44), 91 (39), 105 (31), 135 (29)...222(9)]	13.26	1618	0.21			
Muurola-4,10(14)-dien-1β-ol?	13.30	1621	0.35	13.22	1974	0.27
Caryophylladienol I	13.37	1627	0.15	15.78*	2226	2.60
Daucol	13.48*	1636	2.44	15.78*	2226	[2.60]
τ-Muurolol	13.48*	1636	[2.44]	14.79	2125	0.05
τ-Cadinol	13.48*	1636	[2.44]	14.60	2106	0.02
α-Muurolol	13.55	1642	0.04	14.93	2140	0.02
α-Cadinol	13.62	1648	0.07	15.18	2165	0.06
Unknown [m/z 59, 95 (61), 149 (33), 81 (31), 107 (29), 108 (26)...222(1)]	13.76	1660	0.38	15.14	2160	0.34
Unknown [m/z 122, 41 (59), 79 (58), 123 (54), 107 (53), 121 (47)... 206 (13)]	13.85*	1667	0.43	15.23	2170	0.27
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	13.85*	1667	[0.43]	16.54*	2306	0.10
α-Asarone	13.92	1673	0.05	17.34	2394	0.06
Shyobunol	14.01	1680	0.08	16.04	2254	0.06
Juniper camphor	14.08	1686	0.04	15.78*	2226	[2.60]
(2*Z*,6*E*)-Farnesol	14.23	1698	0.05	16.37	2288	0.05
(2*E*,6*E*)-Farnesol	14.52	1723	0.05	16.54*	2306	[0.10]
Drimenol	14.87	1753	0.07	17.49	2409	0.11
Unknown [m/z 110, 123 (50), 95 (31), 111 (31), 109 (24)... 236 (t)]	14.91	1757	0.10			
Unknown [m/z 139, 159 (31), 43 (20), 82 (15), 97 (13)... 236 (4)]	15.04	1768	0.09			
Phytone	15.93	1847	0.08	14.45	2092	0.04
Palmitic acid	17.26	1970	0.11			
para-Camphorene	17.42	1985	0.04	15.57	2205	0.06
Total identified		**95.04%**			**94.45%**	
Total reported		**97.65%**			**95.16%**	

*: 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

Note: no correction factor was applied
R.T.: Retention time (minutes)
R.I.: Retention index

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