Date : November 09, 2021

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 21J28-PTH03
Customer identification : Sage - Spain - S10106204R
Type : Essential oil
Source : *Salvia officinalis*
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 : Seydou Ka, Ph. D.
Analysis date : October 29, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid
Refractive index: 1.4658 ± 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	0.04	Aliphatic aldehyde
2-Methylbutyral	0.02	Aliphatic aldehyde
2-Ethylfuran	0.01	Furan
Isoamyl alcohol	tr	Aliphatic alcohol
Hexanal	0.01	Aliphatic aldehyde
(*Z*)-Salvene	0.43	Normonoterpene
(*E*)-Salvene	0.08	Normonoterpene
Hexanol	tr	Aliphatic alcohol
Hashishene	0.04	Monoterpene
Tricyclene	0.16	Monoterpene
α-Thujene	0.15	Monoterpene
α-Pinene	5.34	Monoterpene
α-Fenchene	0.10	Monoterpene
Camphene	4.77	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.13	Monoterpene
β-Pinene	1.79	Monoterpene
Octen-3-ol	0.14	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	0.95	Monoterpene
α-Phellandrene	0.09	Monoterpene
Pseudolimonene	0.04	Monoterpene
Δ3-Carene	0.02	Monoterpene
α-Terpinene	0.30	Monoterpene
para-Cymene	0.95	Monoterpene
Limonene	2.24	Monoterpene
1,8-Cineole	9.86	Monoterpenic ether
(*Z*)-β-Ocimene	0.10	Monoterpene
(*E*)-β-Ocimene	0.04	Monoterpene
γ-Terpinene	0.49	Monoterpene
cis-Sabinene hydrate	0.04	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
para-Cymenene	0.07	Monoterpene
Terpinolene	0.27	Monoterpene
α-Thujone	28.54	Monoterpenic ketone
Linalool	0.48	Monoterpenic alcohol
Dehydrosabinaketone	0.02	Normonoterpenic ketone
β-Thujone	4.03	Monoterpenic ketone
cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
cis-Limonene oxide	0.02	Monoterpenic ether
Camphor	19.97	Monoterpenic ketone
Camphene hydrate	0.05	Monoterpenic alcohol
Sabinaketone	0.01	Normonoterpenic ketone
Isoborneol	0.04	Monoterpenic alcohol

Pinocamphone	0.08	Monoterpenic ketone
Thujol	0.25	Monoterpenic alcohol
Borneol	1.53	Monoterpenic alcohol
δ-Terpineol	0.04	Monoterpenic alcohol
Isopinocamphone	0.02	Monoterpenic ketone
Terpinen-4-ol	0.46	Monoterpenic alcohol
Thuj-3-en-10-al	0.02	Monoterpenic aldehyde
para-Cymen-8-ol	0.01	Monoterpenic alcohol
endo-Isocamphonone	0.06	Monoterpenic ketone
α-Terpineol	0.33	Monoterpenic alcohol
Myrtenol	0.08	Monoterpenic alcohol
4-Hydroxy-β-thujone	0.06	Monoterpenic alcohol
Unknown	0.01	Unknown
trans-Carveol	0.02	Monoterpenic alcohol
Bornyl formate	tr	Monoterpenic ester
Cuminal	0.01	Monoterpenic aldehyde
Carvone	0.03	Monoterpenic ketone
Carvotanacetone	0.02	Monoterpenic ketone
Geraniol	0.04	Monoterpenic alcohol
Linalyl acetate	0.02	Monoterpenic ester
Unknown	0.01	Unknown
Bornyl acetate	1.29	Monoterpenic ester
trans-Sabinyl acetate	0.23	Monoterpenic ester
Unknown	0.03	Unknown
Thymol	0.02	Monoterpenic alcohol
α-Terpinyl acetate	0.05	Monoterpenic ester
Eugenol	0.01	Phenylpropanoid
α-Ylangene	0.02	Sesquiterpene
α-Copaene	0.04	Sesquiterpene
β-Bourbonene	0.01	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
Isocaryophyllene	0.04	Sesquiterpene
α-Gurjunene	0.01	Sesquiterpene
β-Caryophyllene	3.33	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.04	Sesquiterpene
Unknown	0.07	Unknown
Aromadendrene	0.14	Sesquiterpene
Selina-5,11-diene	0.01	Sesquiterpene
Unknown	0.18	Unknown
α-Humulene	4.20	Sesquiterpene
allo-Aromadendrene	0.14	Sesquiterpene
γ-Muurolene	0.05	Sesquiterpene
Germacrene D	0.04	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
allo-Aromadendr-9-ene	0.05	Sesquiterpene
Viridiflorene	0.29	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
5-Methyl-2,4-diisopropylphenol	0.01	Terpene derivative
γ-Cadinene	0.04	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
δ-Cadinene	0.06	Sesquiterpene
Isocaryophyllene epoxide B	0.01	Sesquiterpenic ether

Caryophyllene oxide	0.16	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Globulol	0.09	Sesquiterpenic alcohol
Viridiflorol	1.79	Sesquiterpenic alcohol
Humulene epoxide I	0.08	Sesquiterpenic ether
Ledol?	0.03	Oxygenated sesquiterpene
Humulene epoxide II	0.31	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Caryophylladienol I	tr	Sesquiterpenic alcohol
Caryophylladienol II	0.03	Sesquiterpenic alcohol
β-Eudesmol	0.01	Sesquiterpenic alcohol
7-epi-α-Eudesmol	0.04	Sesquiterpenic alcohol
Hydroxydihydrocaryophyllene analog	0.01	Sesquiterpenic alcohol
Unknown	0.03	Sesquiterpene
Phytone	0.01	Terpenic ketone
Isopimaradiene isomer I	0.04	Diterpene
Unknown	0.02	Unknown
Unknown	tr	Unknown
Manool	0.37	Diterpenic alcohol
Unknown	0.02	Unknown
Consolidated total	**98.61%**	

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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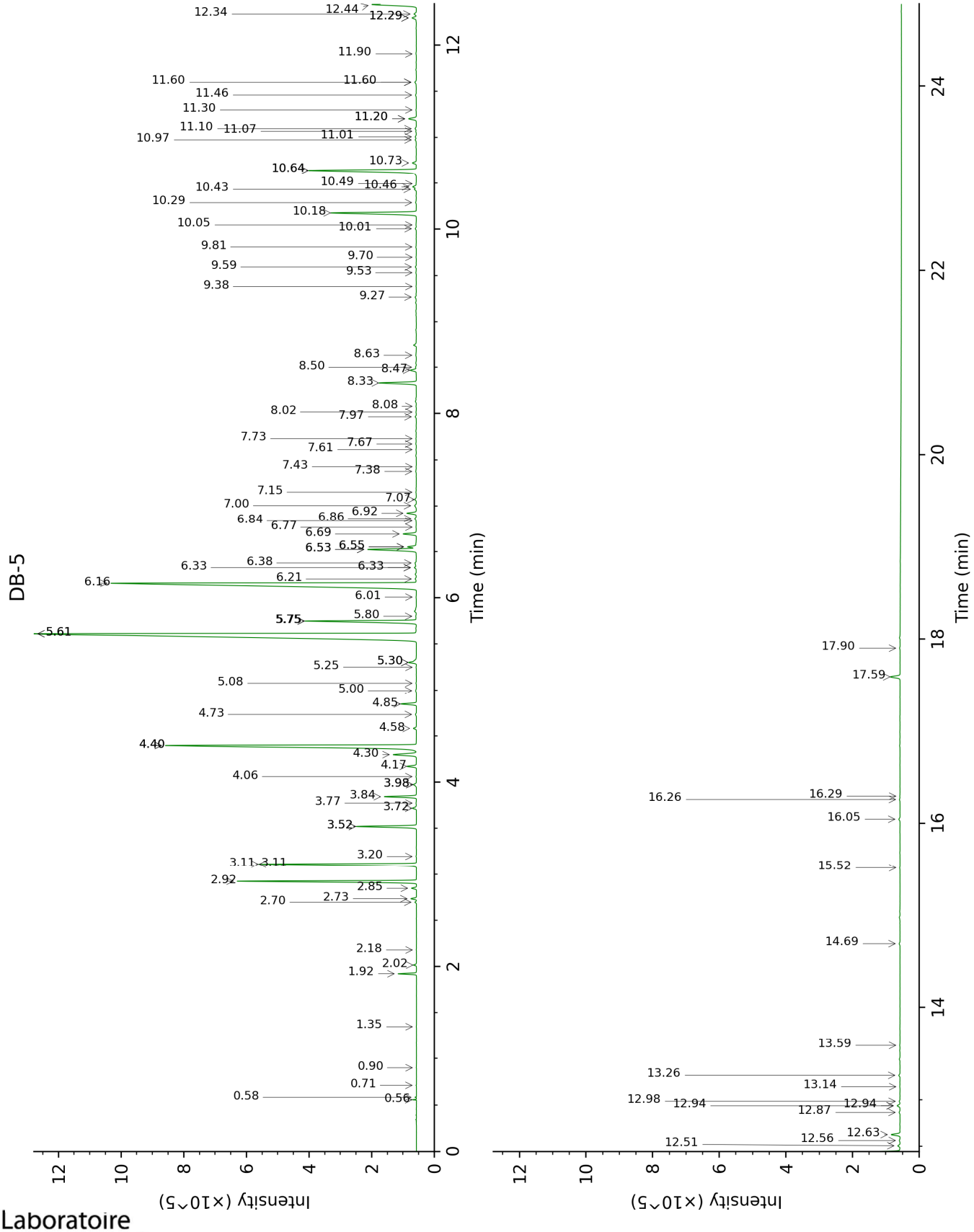
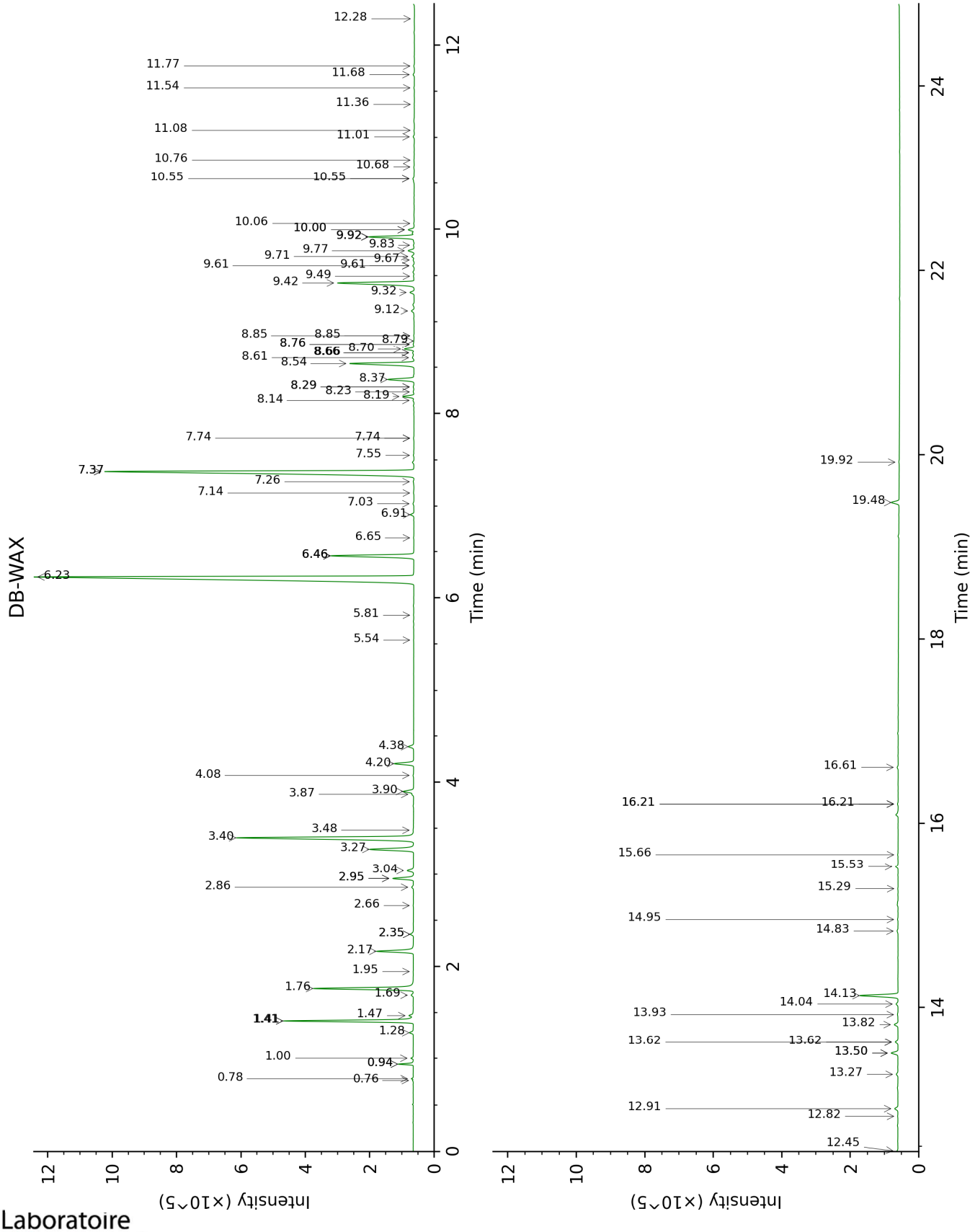

DB-5
Time (min)
Intensity (×10^5)
12.34
12.44
12.29
11.90
11.60
11.60
11.46
11.30
11.20
11.10
11.07
11.01
10.97
10.73
10.64
10.49
10.46
10.43
10.29
10.18
10.05
10.01
9.81
9.70
9.59
9.53
9.38
9.27
8.63
8.50
8.47
8.33
8.08
8.02
7.97
7.73
7.67
7.61
7.43
7.38
7.15
7.07
7.00
6.92
6.86
6.84
6.77
6.69
6.55
6.53
6.38
6.33
6.33
6.21
6.16
6.01
5.80
5.75
5.61
5.30
5.25
5.08
5.00
4.85
4.73
4.58
4.40
4.30
4.17
4.06
3.98
3.84
3.77
3.72
3.52
3.20
3.11
3.11
2.92
2.85
2.73
2.70
2.18
2.02
1.92
1.35
0.90
0.71
0.58
0.56
17.90
17.59
16.26
16.29
16.05
15.52
14.69
13.59
13.26
13.14
12.98
12.94
12.94
12.87
12.63
12.56
12.51


DB-WAX
Time (min)
Intensity (×10^5)
12.28
11.77
11.68
11.54
11.36
11.08
11.01
10.76
10.68
10.55
10.55
10.06
10.00
9.92
9.83
9.77
9.71
9.67
9.61
9.61
9.49
9.42
9.32
9.12
8.85
8.85
8.79
8.76
8.70
8.66
8.61
8.54
8.37
8.29
8.23
8.19
8.14
7.74
7.74
7.55
7.37
7.26
7.14
7.03
6.91
6.65
6.46
6.23
5.81
5.54
4.38
4.20
4.08
3.90
3.87
3.48
3.40
3.27
3.04
2.95
2.86
2.66
2.35
2.17
1.95
1.76
1.69
1.47
1.41
1.28
1.00
0.94
0.78
0.76
19.92
19.48
16.61
16.21
16.21
15.66
15.53
15.29
14.95
14.83
14.13
14.04
13.93
13.82
13.62
13.62
13.50
13.27
12.91
12.82
12.45

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.56	641	0.04	0.78	888	0.05
2-Methylbutyral	0.58	651	0.02	0.76	881	0.02
2-Ethylfuran	0.71	701	0.01	0.94*	916	0.43
Isoamyl alcohol	0.90	732	tr	3.48	1176	0.03
Hexanal	1.35	800	0.01	1.95	1044	0.01
(*Z*)-Salvene	1.92	852	0.43	0.94*	916	[0.43]
(*E*)-Salvene	2.02	860	0.08	1.00	926	0.07
Hexanol	2.18	874	tr	5.54	1325	0.01
Hashishene	2.70	915	0.04	1.41*	992	5.38
Tricyclene	2.73	918	0.16	1.28	971	0.16
α-Thujene	2.85	926	0.15	1.47	997	0.20
α-Pinene	2.92	931	5.34	1.41*	992	[5.38]
α-Fenchene	3.11*	944	4.82	1.69	1019	0.10
Camphene	3.11*	944	[4.82]	1.76	1026	4.77
Thuja-2,4(10)-diene	3.20	949	0.01	2.35*	1084	0.15
Sabinene	3.52*	971	1.92	2.35*	1084	[0.15]
β-Pinene	3.52*	971	[1.92]	2.17	1066	1.79
Octen-3-ol	3.72	985	0.14	6.91	1423	0.15
6-Methyl-5-hepten-2-one	3.78	988	0.02			
Myrcene	3.84	993	0.95	2.95*	1134	0.95
α-Phellandrene	3.98*	1002	0.12	2.86	1126	0.09
Pseudolimonene	3.98*	1002	[0.12]	2.95*	1134	[0.95]
Δ3-Carene	4.06	1008	0.02	2.66	1110	0.01
α-Terpinene	4.17	1014	0.30	3.04	1140	0.30
para-Cymene	4.30	1022	0.95	4.20	1231	0.95
Limonene	4.40*	1029	12.08	3.28	1159	2.24
1,8-Cineole	4.40*	1029	[12.08]	3.40	1169	9.86
(*Z*)-β-Ocimene	4.58	1040	0.10	3.87	1206	0.06
(*E*)-β-Ocimene	4.73	1050	0.04	4.08	1221	0.04
γ-Terpinene	4.85	1057	0.49	3.90	1208	0.52
cis-Sabinene hydrate	5.00	1066	0.04	7.03	1432	0.05
cis-Linalool oxide (fur.)	5.08	1072	0.02	6.65	1404	0.01
Fenchone	5.25	1083	0.01	5.81	1344	0.02
para-Cymenene	5.30*	1086	0.34	6.46*	1390	4.11
Terpinolene	5.30*	1086	[0.34]	4.38	1245	0.27
α-Thujone	5.61*	1106	29.19	6.23	1374	28.54
Linalool	5.61*	1106	[29.19]	8.19	1518	0.48
Dehydrosabinaketone	5.75*	1114	4.11	8.76*	1561	0.06
β-Thujone	5.75*	1114	[4.11]	6.46*	1390	[4.11]
cis-para-Menth-2-en-1-ol	5.80	1118	0.03	8.24	1521	0.05
cis-Limonene oxide	6.01	1131	0.02	6.46*	1390	[4.11]
Camphor	6.16	1141	19.97	7.37*	1457	19.92
Camphene hydrate	6.21	1144	0.05	8.61	1550	0.12
Sabinaketone	6.33*	1151	0.07	8.85*	1568	0.02
Isoborneol	6.33*	1151	[0.07]	9.49	1619	0.04
Pinocamphone	6.38	1155	0.08	7.37*	1457	[19.92]
Thujol	6.52*	1164	1.79	10.00*	1659	0.28
Borneol	6.52*	1164	[1.79]	9.92*	1653	2.16

δ-Terpineol	6.55*	1166	0.29	9.61*	1628	0.06
Isopinocamphone	6.55*	1166	[0.29]	7.74*	1483	0.03
Terpinen-4-ol	6.69	1175	0.46	8.70	1557	0.44
Thuj-3-en-10-al	6.77	1180	0.02	8.79	1564	0.01
para-Cymen-8-ol	6.84	1184	0.01	11.68	1799	0.07
endo-Isocamphonone	6.86	1186	0.06	8.66*	1554	0.07
α-Terpineol	6.92	1190	0.33	9.92*	1653	[2.16]
Myrtenol	7.00	1195	0.08	11.01	1742	0.06
4-Hydroxy-β-thujone	7.07	1199	0.06	12.45	1866	0.05
Unknown [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	7.15	1204	0.01	11.08	1748	0.01
trans-Carveol	7.38	1219	0.02	11.54	1786	0.03
Bornyl formate	7.43	1223	tr	8.14	1514	0.05
Cuminal	7.61	1235	0.01	10.76	1721	0.02
Carvone	7.67	1239	0.03			
Carvotanacetone	7.73	1243	0.02	9.61*	1628	[0.06]
Geraniol	7.97	1259	0.04	11.77	1807	0.04
Linalyl acetate	8.02	1262	0.02	8.29*	1525	0.05
Unknown [m/z 107, 43 (83), 59 (54), 109 (50), 108 (43), 67(42)...]	8.08	1266	0.01			
Bornyl acetate	8.33	1283	1.29	8.37	1532	1.28
trans-Sabinyl acetate	8.47	1292	0.23	9.32	1605	0.18
Unknown [m/z 166, 96 (61), 83 (60), 41 (57), 69 (56), 69 (56), 81 (53), 97 (51), 95 (48), 151 (41), 123 (39), 109 (39)...]	8.50	1295	0.03			
Thymol	8.63	1303	0.02	15.29	2133	0.01
α-Terpinyl acetate	9.27	1348	0.05	9.83	1646	0.04
Eugenol	9.38	1356	0.01	14.95	2100	0.02
α-Ylangene	9.53	1367	0.02	7.14	1440	0.02
α-Copaene	9.59	1371	0.04	7.26	1449	0.04
β-Bourbonene	9.70	1379	0.01	7.55	1470	0.03
Geranyl acetate	9.81	1386	0.02	10.68	1715	0.03
Isocaryophyllene	10.01	1400	0.04	8.29*	1525	[0.05]
α-Gurjunene	10.05	1403	0.01	7.74*	1483	[0.03]
β-Caryophyllene	10.18	1413	3.33	8.54	1545	3.29
Caryophylla-4(12),8(13)-diene	10.29	1421	0.04	8.76*	1561	[0.06]
Unknown [m/z 153, 43 (57), 107 (56), 108 (44)... 204 (11)...]	10.43	1432	0.07	13.62*	1972	0.12
Aromadendrene	10.46	1434	0.14	8.66*	1554	[0.07]
Selina-5,11-diene	10.50	1436	0.01	8.85*	1568	[0.02]
Unknown [m/z 153, 43 (55), 168 (33), 41 (28)... 207 (3)...]	10.64*	1448	4.49	13.82	1991	0.18
α-Humulene	10.64*	1448	[4.49]	9.42	1613	4.20
allo-Aromadendrene	10.73	1454	0.14	9.12	1589	0.15
γ-Muurolene	10.98	1472	0.05	9.71	1636	0.12
Germacrene D	11.01	1475	0.04	9.92*	1653	[2.16]
β-Selinene	11.07	1479	0.02	10.00*	1659	[0.28]
allo-Aromadendr-9-ene	11.10	1481	0.05	9.67	1633	0.05
Viridiflorene	11.20*	1489	0.30	9.77	1641	0.29

α-Selinene	11.20*	1489	[0.30]	10.06	1664	0.02
5-Methyl-2,4-diisopropylphenol	11.30	1496	0.01	16.61	2267	0.05
γ-Cadinene	11.46	1508	0.04	10.55*	1704	0.11
trans-Calamenene	11.60*	1519	0.07	11.36	1772	0.01
δ-Cadinene	11.60*	1519	[0.07]	10.55*	1704	[0.11]
Isocaryophyllene epoxide B	11.90	1543	0.01	12.28	1852	0.01
Caryophyllene oxide	12.29*	1574	0.18	12.91	1907	0.16
Caryophyllene oxide isomer	12.29*	1574	[0.18]	12.82	1900	0.01
Globulol	12.34	1577	0.09	14.04	2012	0.09
Viridiflorol	12.44	1585	1.79	14.13	2020	1.80
Humulene epoxide I	12.51	1591	0.08	13.27	1941	0.08
Ledol?	12.56	1595	0.03	13.50*	1962	0.33
Humulene epoxide II	12.63	1600	0.31	13.50*	1962	[0.33]
Unknown [m/z 81, 41 (55), 79 (45), 67 (4), 93 (38)...)	12.87	1620	0.03	13.62*	1972	[0.12]
Unknown [m/z 41, 91 (78), 67 (76), 119 (70), 55 (61)... 220 (7)]	12.94*	1626	0.11	13.92	2001	0.03
Caryophylladienol I	12.94*	1626	[0.11]	16.21*	2226	0.03
Caryophylladienol II	12.98	1630	0.03	16.21*	2226	[0.03]
β-Eudesmol	13.14	1642	0.01	15.53	2157	0.10
7-epi-α-Eudesmol	13.26	1653	0.04	15.66	2170	0.01
Hydroxydihydrocaryophyllene analog	13.59	1679	0.01			
Unknown [m/z 133, 148 (97), 43 (50), 93 (47), 91 (41), 147 (40)...204 (8)]	14.69	1774	0.03			
Phytone	15.52	1847	0.01	14.83	2087	0.05
Isopimaradiene isomer I	16.04	1895	0.04			
Unknown [m/z 43, 93 (95), 91 (69), 41 (67), 107 (62), 81 (62)...]	16.26	1915	0.02			
Unknown [m/z 131, 41 (74), 159 (73), 55 (71), 105 (68)...]	16.29	1919	tr	16.21*	2226	[0.03]
Manool	17.59	2044	0.37	19.48	2587	0.39
Unknown [m/z 204, 109 (57), 80 (50), 93 (32), 81 (28), 161 (26)..]	17.90	2074	0.02	19.92	2639	0.02
Total identified		**98.97%**			**98.60%**	
Total reported		**99.20%**			**98.84%**	

*: Two or more compounds are coeluting on this column
[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
R.T.: Retention time (minutes)
R.I.: Retention index