

Date : December 21, 2018

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18L17-PTH06-1-CC

Customer identification : Jasmine Sambac - India - J1010689R

Type : Absolute

Source : *Jasminum sambac*

Customer : Plant Therapy


ANALYSIS

Method: PC-PA-014-17J19 - 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 : December 18, 2018

Checked and approved by :



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

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PHYSICOCHEMICAL DATA

Physical aspect: Orange brownish liquid

Refractive index: 1.5030 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Ethanol	0.12	0.16	Aliphatic alcohol
Ethyl acetate	tr	tr	Aliphatic ester
Hexan-3-ol	0.01	0.01	Aliphatic alcohol
Hexan-2-ol	0.01	0.01	Aliphatic alcohol
(3Z)-Hexenol	0.30	0.34	Aliphatic alcohol
(2E)-Hexenol	0.07	0.08	Aliphatic alcohol
Hexanol	0.05	0.05	Aliphatic alcohol
(3Z)-Hexenyl formate	tr	0.01	Aliphatic ester
Prenyl acetate	0.01	tr	Aliphatic ester
Benzaldehyde	0.01	0.01	Simple phenolic
6-Methyl-5-hepten-2-one	0.01	0.01	Aliphatic ketone
(3Z)-Hexenyl acetate	1.33	1.45	Aliphatic ester
Hexyl acetate	0.01	0.01	Aliphatic ester
(2E)-Hexenyl acetate	0.02	0.02	Aliphatic ester
Caproic acid	0.12	0.10*	Aliphatic acid
Benzyl alcohol	8.20*	9.08	Simple phenolic
(Z)- β -Ocimene	[8.20]*	tr	Monoterpene
(E)- β -Ocimene	0.03	0.03	Monoterpene
cis-Linalool oxide (fur.)	0.02	0.02	Monoterpenic alcohol
Benzyl formate	0.02	0.02	Phenolic ester
para-Cresol	0.15*	0.02	Simple phenolic
trans-Linalool oxide (fur.)	[0.15]*	0.16	Monoterpenic alcohol
Methyl benzoate	0.49	0.54	Phenolic ester
Linalool	7.93	8.67	Monoterpenic alcohol
Phenylethyl alcohol	0.93	1.06	Simple phenolic
Benzeneacetonitrile	1.40	1.60	Simple phenolic
para-Vinylanisole	tr	0.01	Simple phenolic
Benzyl acetate	7.91*	8.68*	Phenolic ester
cis-Linalool oxide (pyr.)	[7.91]*	0.13	Monoterpenic alcohol
Ethyl benzoate	[7.91]*	0.09*	Phenolic ester
Unknown	0.58	0.65	Unknown
trans-Linalool oxide (pyr.)	0.10	13.79*	Monoterpenic alcohol
(3Z)-Hexenyl butyrate	0.57*	0.06	Aliphatic ester
Methyl salicylate	[0.57]*	[1.03]*	Phenolic ester
Benzoic acid	[0.57]*	0.66	Simple phenolic
(3Z)-Hexenyl 2-methylbutyrate	0.03	0.02	Aliphatic ester
(3Z)-Hexenyl isovalerate	0.02	0.01	Aliphatic ester
Phenylethyl acetate	0.49*	0.34	Phenolic ester
Unknown	[0.49]*	0.12	Unknown
Geraniol	0.09	[0.10]*	Monoterpenic alcohol
Phenylacetic acid?	0.06*		Phenolic acid
Ethyl salicylate	[0.06]*	0.03	Phenolic ester
Unknown	0.16		Unknown
2,6-Dimethyl-1,7-octadiene-3,6-diol	0.10	0.14*	Monoterpenic alcohol
1-Nitro-2-phenylethane	2.11*	0.10	Simple phenolic
Indole	[2.11]*	2.69*	Indole
(E)-Cinnamyl alcohol	0.20	0.37	Phenylpropanoid
Methyl anthranilate	4.83	5.34	Phenolic ester

Eugenol	0.03	[0.14]*	Phenylpropanoid
8-Hydroxylinalool isomer	0.24	0.30*	Monoterpenic alcohol
Neryl acetate	0.01	0.01	Monoterpenic ester
Butyl benzoate	0.01	0.02	Phenolic ester
(3Z)-Hexenyl (3Z)-hexenoate	0.02	[8.68]*	Aliphatic ester
β -Cubebene	0.02	0.02	Sesquiterpene
(3Z)-Hexenyl hexanoate?	0.10		Aliphatic ester
β -Elemene	0.14	0.20*	Sesquiterpene
(Z)-Jasmone	0.03	0.03	Jasmonate
Dimethyl anthranilate	0.03	3.81*	Phenolic ester
Ethyl anthranilate	0.02	0.01	Phenolic ester
β -Caryophyllene	0.06	[0.20]*	Sesquiterpene
(E)-Cinnamyl acetate	0.05	[0.14]*	Phenylpropanoid ester
α -Humulene	0.10	[0.09]*	Sesquiterpene
(E)- β -Farnesene	0.04	0.02	Sesquiterpene
Oxindole?	0.02		Indole
γ -Muurolene	0.06	0.06	Sesquiterpene
Germacrene D	0.48	0.53	Sesquiterpene
Bicyclogermacrene	0.25*	0.18	Sesquiterpene
epi-Cubebol	[0.25]*	0.03	Sesquiterpenic alcohol
α -Muurolene	0.30*	0.13	Sesquiterpene
(3Z,6E)- α -Farnesene	[0.30]*	0.20	Sesquiterpene
(3E,6E)- α -Farnesene	12.94*	[13.79]*	Sesquiterpene
γ -Cadinene	[12.94]*	1.03	Sesquiterpene
δ -Cadinene	0.54	[1.03]*	Sesquiterpene
10-epi-Cubebol?	0.03	0.31*	Sesquiterpenic alcohol
α -Cadinene	0.04	0.05	Sesquiterpene
Methyl N-formylanthranilate	0.04	0.03	Phenolic ester
Hexenyl benzoate isomer	tr	tr	Phenolic ester
(E)-Nerolidol	0.10	[0.31]*	Sesquiterpenic alcohol
(3Z)-Hexenyl benzoate	0.01	5.53*	Phenolic ester
Germacrene D-4-ol	8.74*	[3.81]*	Sesquiterpenic alcohol
Spathulenol	[8.74]*	[5.53]*	Sesquiterpenic alcohol
Hexyl benzoate	[8.74]*	0.10	Phenolic ester
(2E)-Hexenyl benzoate	[8.74]	0.28	Phenolic ester
Methyl N-acetylanthranilate	0.32	[0.66]*	Phenolic ester
Ledol	0.01	0.01	Sesquiterpenic alcohol
τ -Cadinol	0.15*	0.24	Sesquiterpenic alcohol
τ -Muurolol	[0.15]*	0.09	Sesquiterpenic alcohol
α -Muurolol	0.02	0.03	Sesquiterpenic alcohol
α -Cadinol	0.20	0.25*	Sesquiterpenic alcohol
Unknown	0.02		Unknown
(3E,5E)-7-Hydroxyfarnesene	0.08	0.12	Sesquiterpenic alcohol
Methyl (E)-jasmonate	0.09	[2.69]*	Jasmonate
Shyobunol	0.06	[0.30]*	Sesquiterpenic alcohol
Unknown	0.19	0.22	Unknown
Pentadecanal	0.06	0.07	Aliphatic aldehyde
(2E,6E)-Farnesol	0.12	4.65	Sesquiterpenic alcohol
Oplopanone	0.14	0.61*	Sesquiterpenic alcohol
Unknown	0.53	[0.61]*	Unknown
Benzyl benzoate	0.59	0.69	Phenolic ester
Unknown	0.01		Unknown

Phenylethyl benzoate	0.25	0.21	Phenolic ester
Phytone	0.02	[0.14]*	Terpenic ketone
Phytadiene isomer I	0.02		Diterpene
Benzyl salicylate	0.07	0.09	Phenolic ester
Methyl palmitate	0.45	0.49	Aliphatic ester
meta-Camphorene	0.03	[0.25]*	Diterpene
Isophytol	0.01	0.02	Diterpenic alcohol
Palmitic acid	1.15	1.16	Aliphatic acid
para-Camphorene	0.01	0.25	Diterpene
(<i>E,E</i>)-Geranylinalool	1.11	1.24*	Diterpenic alcohol
(<i>E</i>)-Cinnamyl benzoate	0.31		Phenylpropanoid ester
Methyl linoleate	0.30	0.47	Aliphatic ester
Methyl α -linolenate	2.90	3.02	Aliphatic ester
Phytol	0.01	0.01	Diterpenic alcohol
Methyl stearate	0.30	[0.66]*	Aliphatic ester
α -Linolenic acid	2.64	1.92	Aliphatic acid
Ethyl linoleate	0.23	[1.24]*	Aliphatic ester
Ethyl α -linolenate	0.17	0.11	Aliphatic ester
Docosene isomer	0.15	0.19	Alkene
Unknown	0.26		Unknown
(9 <i>Z</i>)-Eicosenol?	0.04		Aliphatic alcohol
(9 <i>Z</i>)-Tricosene	0.15	0.15	Alkene
4,8,12,16-Tetramethylheptadecan-4-olide?	0.19		Terpenic lactone
Tetracosene isomer	0.30		Alkene
Unknown	0.03		Unknown
2-Monopalmitin	0.20		Glyceride
Benzyl palmitate	0.22		Phenolic ester
Benzyl oleate	0.10		Phenolic ester
Benzyl α -linolenate	0.87		Phenolic ester
Benzyl stearate	0.03		Phenolic ester
(<i>E</i>)-Phytyl benzoate?	0.02	0.02	Phenolic ester
Squalene	0.69	0.79	Triterpene
2,3-Oxidosqualene	0.46	0.50	Triterpenic ether
Benzyl arachidate	0.10		Phenolic ester
2,6,10,15,19,23-Hexamethyl-(6 <i>E</i> ,10 <i>E</i> ,14 <i>E</i> ,18 <i>E</i>)-1,6,10,14,18,22-tetracosahexaen-3-ol	0.06		Triterpenic alcohol
Unknown	0.04		Triterpenic alcohol
α -Tocopherol	0.05		Tocopherol
Unknown	0.01		Unknown
Benzyl behenate	0.19		Phenolic ester
Unknown	1.80		Unknown
α -Amyrin	0.11		Triterpenic alcohol
Unknown	1.64		Unknown
Total identified	77.97%	86.24%	

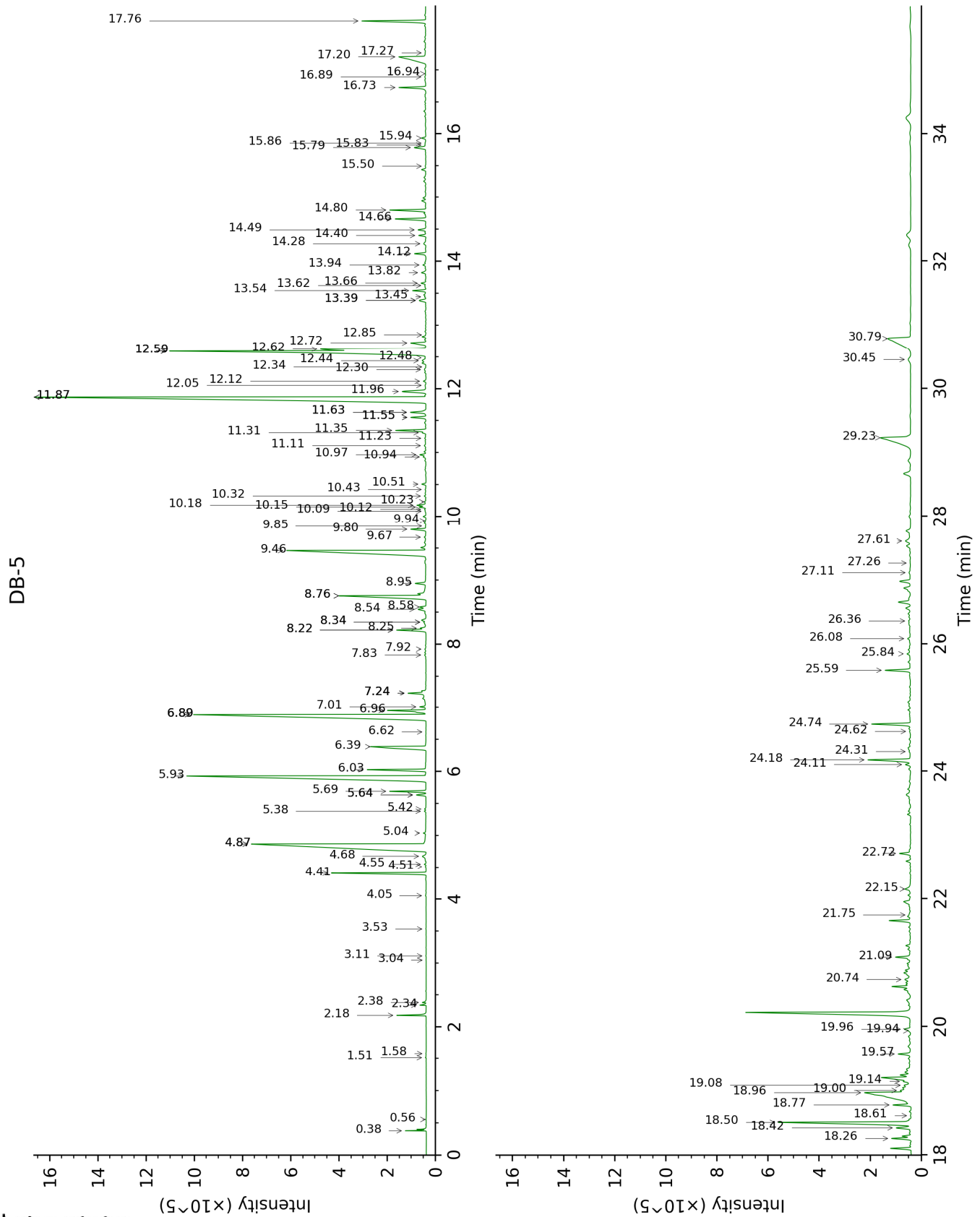
*: Two or more compounds are coeluting on this column

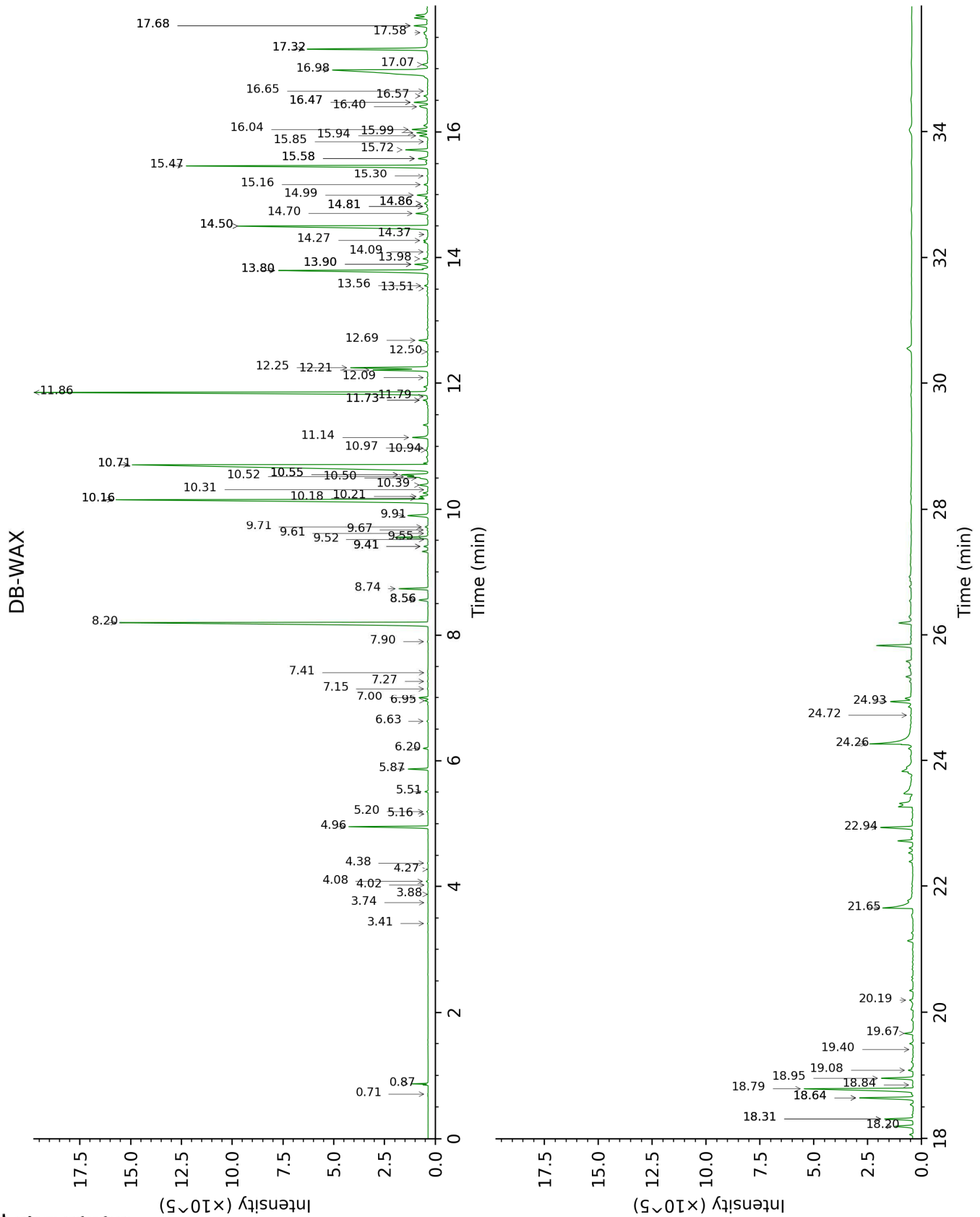
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.38	515	0.12	0.87	910	0.16
Ethyl acetate	0.56	612	tr	0.71	863	tr
Hexan-3-ol	1.51	794	0.01	3.41	1168	0.01
Hexan-2-ol	1.58	802	0.01	3.74	1194	0.01
(3Z)-Hexenol	2.18	853	0.30	5.87	1346	0.34
(2E)-Hexenol	2.34	866	0.07	6.20	1369	0.08
Hexanol	2.38	869	0.05	5.51	1320	0.05
(3Z)-Hexenyl formate	3.04	920	tr	4.27	1234	0.01
Prenyl acetate	3.11	924	0.01	4.02	1215	tr
Benzaldehyde	3.53	951	0.01	7.41	1458	0.01
6-Methyl-5-hepten-2-one	4.05	986	0.01	5.16	1301	0.01
(3Z)-Hexenyl acetate	4.41	1009	1.33	4.96	1286	1.45
Hexyl acetate	4.51	1016	0.01	4.38	1242	0.01
(2E)-Hexenyl acetate	4.55	1018	0.02	5.20	1298	0.02
Caproic acid	4.68	1026	0.12	11.73*	1804	0.10
Benzyl alcohol	4.87*	1038	8.20	11.86	1815	9.08
(Z)- β -Ocimene	4.87*	1038	[8.20]	3.88	1204	tr
(E)- β -Ocimene	5.04	1049	0.03	4.08	1219	0.03
cis-Linalool oxide (fur.)	5.38	1070	0.02	6.63	1400	0.02
Benzyl formate	5.42	1072	0.02	9.61	1628	0.02
para-Cresol	5.64*	1086	0.15	14.09	2019	0.02
trans-Linalool oxide (fur.)	5.64*	1086	[0.15]	7.00	1428	0.16
Methyl benzoate	5.69	1090	0.49	8.74	1559	0.54
Linalool	5.93	1105	7.93	8.20	1517	8.67
Phenylethyl alcohol	6.03	1111	0.93	12.21	1846	1.06
Benzeneacetonitrile	6.39	1134	1.40	12.25	1850	1.60
para-Vinylanisole	6.62	1149	tr	9.52	1620	0.01
Benzyl acetate	6.89*	1167	7.91	10.16*	1672	8.68
cis-Linalool oxide (pyr.)	6.89*	1167	[7.91]	10.50	1700	0.13
Ethyl benzoate	6.89*	1167	[7.91]	9.41*	1611	0.09
Unknown [m/z 43, 69 (35), 41 (26), 83 (25), 57 (22)... 150 (1)]	6.96	1171	0.58	9.55	1623	0.65
trans-Linalool oxide (pyr.)	7.01	1175	0.10	10.71*	1717	13.79
(3Z)-Hexenyl butyrate	7.24*	1190	0.57	6.95	1424	0.06
Methyl salicylate	7.24*	1190	[0.57]	10.55*†	1704	[1.03]
Benzoic acid	7.24*	1190	[0.57]	17.58†	2373	0.66
(3Z)-Hexenyl 2-methylbutyrate	7.83	1230	0.03	7.15	1439	0.02
(3Z)-Hexenyl isovalerate	7.92	1236	0.02	7.27	1448	0.01
Phenylethyl acetate	8.22*	1256	0.49	11.14	1754	0.34
Unknown [m/z 91, 117 (80), 90 (42), 118 (29)... 136 (5)]	8.22*	1256	[0.49]	16.57	2266	0.12
Geraniol	8.25	1258	0.09	11.73*	1804	[0.10]
Phenylacetic acid?	8.34*	1265	0.06			

Ethyl salicylate	8.34*	1265	[0.06]	10.98	1740	0.03
Unknown [m/z 91, 117 (98), 90 (65), 89 (29), 65 (29), 118 (26), 135 (23)]	8.54	1279	0.16			
2,6-Dimethyl-1,7-octadiene-3,6-diol	8.58	1281	0.10	14.81*†	2088	0.14
1-Nitro-2-phenylethane	8.76*	1293	2.11	14.27	2036	0.10
Indole	8.76*	1293	[2.11]	17.32*	2345	2.69
(E)-Cinnamyl alcohol	8.95	1307	0.20	16.04	2211	0.37
Methyl anthranilate	9.46	1337	4.83	15.47	2153	5.34
Eugenol	9.67	1352	0.03	14.86*†	2092	[0.14]
8-Hydroxylinalool isomer	9.80	1361	0.24	16.47*	2256	0.30
Neryl acetate	9.85	1364	0.01	10.32	1684	0.01
Butyl benzoate	9.94	1370	0.01	11.79	1809	0.02
(3Z)-Hexenyl (3Z)-hexenoate	10.09	1381	0.02	10.16*	1672	[8.68]
β-Cubebene	10.12	1383	0.02	7.90	1494	0.02
(3Z)-Hexenyl hexanoate?	10.15	1386	0.10			
β-Elemene	10.18	1388	0.14	8.56*	1545	0.20
(Z)-Jasmone	10.23	1392	0.03	12.50	1872	0.03
Dimethyl anthranilate	10.32	1398	0.03	13.80*	1990	3.81
Ethyl anthranilate	10.43	1406	0.02	15.85	2191	0.01
β-Caryophyllene	10.51	1412	0.06	8.56*	1545	[0.20]
(E)-Cinnamyl acetate	10.94	1444	0.05	14.81*†	2088	[0.14]
α-Humulene	10.97	1446	0.10	9.41*	1611	[0.09]
(E)-β-Farnesene	11.11	1457	0.04	9.67	1632	0.02
Oxindole?	11.23	1466	0.02			
γ-Murolene	11.31	1472	0.06	9.72	1636	0.06
Germacrene D	11.35	1475	0.48	9.91	1651	0.53
Bicyclogermacrene	11.55*	1490	0.25	10.21	1676	0.18
epi-Cubebol	11.55*	1490	[0.25]	12.09	1836	0.03
α-Murolene	11.63*	1496	0.30	10.18	1674	0.13
(3Z,6E)-α-Farnesene	11.63*	1496	[0.30]	10.39	1690	0.20
(3E,6E)-α-Farnesene	11.87*	1515	12.94	10.71*	1717	[13.79]
γ-Cadinene	11.87*	1515	[12.94]	10.52†	1702	1.03
δ-Cadinene	11.96	1522	0.54	10.55*†	1704	[1.03]
10-epi-Cubebol?	12.05	1529	0.03	13.90*	2000	0.31
α-Cadinene	12.12	1534	0.04	10.94	1737	0.05
Methyl N-formylanthranilate	12.30	1548	0.04	18.84	2515	0.03
Hexenyl benzoate isomer	12.34	1552	tr	14.37	2045	tr
(E)-Nerolidol	12.44	1560	0.10	13.90*	2000	[0.31]
(3Z)-Hexenyl benzoate	12.48	1563	0.01	14.50*	2058	5.53
Germacrene D-4-ol	12.59*†	1572	8.74	13.80*	1990	[3.81]
Spathulenol	12.59*†	1572	[8.74]	14.50*	2058	[5.53]
Hexyl benzoate	12.59*†	1572	[8.74]	13.98	2008	0.10
(2E)-Hexenyl benzoate	12.62†	1574	[8.74]	14.70	2077	0.28
Methyl N-acetylanthranilate	12.72	1582	0.32	17.68*†	2385	[0.66]
Ledol	12.85	1592	0.01	13.51	1964	0.01

τ-Cadinol	13.39*	1636	0.15	14.99	2105	0.24
τ-Muurolol	13.39*	1636	[0.15]	15.16	2122	0.09
α-Muurolol	13.45	1641	0.02	15.30	2136	0.03
α-Cadinol	13.54	1649	0.20	15.58*	2164	0.25
Unknown [m/z 99, 161 (100), 43 (92), 204 (74), 71 (73), 121 (65)...]	13.62	1656	0.02			
(3E,5E)-7-Hydroxyfarnesene	13.66	1659	0.08	16.40	2248	0.12
Methyl (E)-jasmonate	13.82	1672	0.09	17.32*	2345	[2.69]
Shyobunol	13.94	1682	0.06	16.47*	2256	[0.30]
Unknown [m/z 99, 43 (47), 161 (42), 71 (39), 204 (31), 121 (28)...]	14.12	1697	0.19	12.69	1889	0.22
Pentadecanal	14.28	1710	0.06	13.56	1968	0.07
(2E,6E)-Farnesol	14.40	1722	0.12	16.98	2309	4.65
Oplopanone	14.49	1729	0.14	18.31*	2454	0.61
Unknown [m/z 105, 77 (42), 69 (29), 161 (19), 83 (16)...]	14.66	1744	0.53	18.31*	2454	[0.61]
Benzyl benzoate	14.80	1756	0.59	18.95	2527	0.69
Unknown [m/z 43, 159 (79), 93 (49), 119 (48), 161 (40), 187 (36)... 238? (2)]	15.50	1817	0.01			
Phenylethyl benzoate	15.79	1844	0.25	19.67	2611	0.21
Phytone	15.83	1847	0.02	14.86*†	2092	[0.14]
Phytadiene isomer I	15.86	1850	0.02			
Benzyl salicylate	15.94	1857	0.07	20.19	2674	0.09
Methyl palmitate	16.72	1930	0.45	15.72	2178	0.49
meta-Camphorene	16.89	1946	0.03	15.58*	2164	[0.25]
Isophytol	16.94	1951	0.01	16.65	2274	0.02
Palmitic acid	17.20	1976	1.15	21.65	2856	1.16
para-Camphorene	17.27	1982	0.01	15.99	2206	0.25
(E,E)-Geranylinalool	17.76	2030	1.11	18.64*	2491	1.24
(E)-Cinnamyl benzoate	18.26	2079	0.31			
Methyl linoleate	18.42	2096	0.30	18.20	2442	0.47
Methyl α-linolenate	18.50	2104	2.90	18.78	2508	3.02
Phytol	18.61	2115	0.01	19.40	2579	0.01
Methyl stearate	18.78	2132	0.30	17.68*†	2385	[0.66]
α-Linolenic acid	18.96	2152	2.64	24.26	3209	1.92
Ethyl linoleate	19.00	2155	0.23	18.64*	2491	[1.24]
Ethyl α-linolenate	19.08	2164	0.17	19.08	2542	0.11
Docosene isomer	19.14	2170	0.15	15.94	2201	0.19
Unknown [m/z 190, 158 (100), 253 (68), 193 (58), 220 (51)]	19.56	2214	0.26			
(9Z)-Eicosenol?	19.94	2254	0.04			
(9Z)-Tricosene	19.96	2257	0.15	17.07	2318	0.15
4,8,12,16-Tetramethylheptadecan-4-olide?	20.74	2342	0.19			

Tetracosene isomer	21.09	2381	0.30			
Unknown [m/z 219, 218 (99), 217 (50), 108 (31), 220 (17), 216 (14)]	21.75	2456	0.03			
2-Monopalmitin	22.15	2503	0.20			
Benzyl palmitate	22.72	2571	0.22			
Benzyl oleate	24.10	2744	0.10			
Benzyl α -linolenate	24.18	2753	0.87			
Benzyl stearate	24.31	2770	0.03			
(E)-Phytyl benzoate?	24.62	2810	0.02	24.72	3274	0.02
Squalene	24.74	2825	0.69	22.94	3026	0.79
2,3-Oxidosqualene	25.59	2939	0.46	24.93	3306	0.50
Benzyl arachidate	25.84	2974	0.10			
2,6,10,15,19,23-Hexamethyl-(6E,10E,14E,18E)-1,6,10,14,18,22-tetracosahexaen-3-ol	26.08	3006	0.06			
Unknown [m/z 41, 119 (14), 147 (13), 40 912), 94 (12), 133 (12)...]	26.36	3040	0.04			
α -Tocopherol	27.11	3128	0.05			
Unknown [m/z 109, 95 (52), 69 (51), 57 (47), 97 (45)... 278 (9)...]	27.26	3143	0.01			
Benzyl behenate	27.61	3177	0.19			
Unknown [m/z 322, 245 (66), 122 (37), 204 (34), 321 (30), 323 (26)...]	29.23	3309	1.80			
α -Amyrin	30.45	3387	0.11			
Unknown [m/z 245, 246 (20), 243 (14), 217 (12), 218 (9), 91 (7), 244 (6)]	30.79	3406	1.64			
Total identified		77.97%			86.24%	
Total reported		83.25%			87.22%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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