

Date : March 06, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B20-PLG23-1-CC

Customer identification : Ylang Ylang #3

Type : Essential oil

Source : *Cananga odorata* var. *genuina* (Ylang-ylang)

Customer : Plant Guru

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 : Sarah-Eve Tremblay, M. Sc. A., Chimiste

Analysis date : March 01, 2018

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: 1.5045 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
3-Buten-2-one	tr	tr	Aliphatic ketone
2-Methyl-3-buten-2-ol	tr	tr	Aliphatic alcohol
Prenol	tr	tr	Aliphatic alcohol
Unknown	tr	tr	Unknown
3-Methyl-3-butenyl acetate	tr	tr	Aliphatic ester
Prenyl acetate	0.01	0.03*	Aliphatic ester
α -Pinene	0.10	0.10	Monoterpene
Camphene	0.01	tr	Monoterpene
Benzaldehyde	0.02	0.01	Simple phenolic
Sabinene	0.03*		Monoterpene
β -Pinene	[0.03]*	0.02	Monoterpene
6-Methyl-5-hepten-2-one	0.01	0.01	Aliphatic ketone
Myrcene	0.07	0.07	Monoterpene
Δ^3 -Carene	tr	tr	Monoterpene
(3Z)-Hexenyl acetate	0.01	0.01	Aliphatic ester
para-Methylanisole	0.45	0.45	Simple phenolic
1,8-Cineole	0.05*	0.03*	Monoterpenic ether
Limonene	[0.05]*	0.02	Monoterpene
β -Phellandrene	[0.05]*	[0.03]*	Monoterpene
Benzyl alcohol	0.04*	0.04	Simple phenolic
(Z)- β -Ocimene	[0.04]*	0.02	Monoterpene
(E)- β -Ocimene	0.03	[0.03]*	Monoterpene
γ -Terpinene	tr	0.01	Monoterpene
para-Cresol	0.01	0.07	Simple phenolic
Terpinolene	0.01	0.02	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.01	tr	Monoterpenic alcohol
Methyl benzoate	0.27	0.29*	Phenolic ester
Linalool	1.84	1.89	Monoterpenic alcohol
Camphor	tr	tr	Monoterpenic ketone
ortho-Dimethoxybenzene	0.01		Simple phenolic
Unknown	tr	0.11*	Phenylpropanoid
Benzyl acetate	0.24	0.34*	Phenolic ester
Ethyl benzoate	0.03*	0.22*	Phenolic ester
para-Cresyl acetate	[0.03]*		Phenolic ester
α -Terpineol	0.10	19.26*	Monoterpenic alcohol
Methyl salicylate	0.04	11.19*	Phenolic ester
Nerol	0.03	0.04*	Monoterpenic alcohol
Phenylethyl acetate	0.03	[0.04]*	Phenolic ester
Geraniol	0.72	0.68	Monoterpenic alcohol
Geranial	0.05	0.07	Monoterpenic aldehyde
(E)-Anethole	0.02	0.04	Phenylpropanoid
1-Nitro-2-phenylethane	0.03	0.03	Simple phenolic
(E)-Cinnamyl alcohol	0.02	tr	Phenylpropanoid
4-Vinylguaiaacol	0.01	0.27	Simple phenolic
Bicycloelemene	0.13*	0.19*	Sesquiterpene
δ -Elemene	[0.13]*	0.04	Sesquiterpene
Benzyl butyrate	0.01		Phenolic ester
α -Cubebene	0.27	0.24	Sesquiterpene

Eugenol	0.38	0.41	Phenylpropanoid
α -Ylangene	1.69*	[0.19]*	Sesquiterpene
Neryl acetate	[1.69]*	0.02	Monoterpenic ester
α -Copaene	[1.69]	1.41	Sesquiterpene
β -Bourbonene	0.05	0.06	Sesquiterpene
Geranyl acetate	4.75*	2.98	Monoterpenic ester
β -Cubebene	[4.75]*	0.15	Sesquiterpene
β -Elemene	0.06	17.82*	Sesquiterpene
Cyperene	0.01	0.02	Sesquiterpene
Methyleugenol	0.02	0.02	Phenylpropanoid
β -Caryophyllene	17.24	[17.82]*	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.54*	[0.29]*	Sesquiterpene
β -Copaene	[0.54]*	0.34	Sesquiterpene
Aromadendrene	0.08	0.09	Sesquiterpene
(<i>E</i>)-Cinnamyl acetate	0.37*	0.40	Phenylpropanoid ester
<i>trans</i> -Muuroala-3,5-diene	[0.37]*	0.02	Sesquiterpene
9-epi-Isocaryophyllene	[0.37]*	0.01	Sesquiterpene
α -Humulene	4.62	4.36	Sesquiterpene
(<i>E</i>)-Isoeugenol	0.02	0.01	Phenylpropanoid
<i>cis</i> -Cadina-1(6),4-diene	0.41	0.15	Sesquiterpene
<i>cis</i> -Muuroala-4(15),5-diene	[0.41]	[0.22]*	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.36	0.46	Sesquiterpene
γ -Muurolole	19.55*	3.08	Sesquiterpene
Germacrene D	[19.55]*	[19.26]*	Sesquiterpene
<i>trans</i> -Muuroala-4(15),5-diene	0.37	[19.26]*	Sesquiterpene
γ -Amorphene	1.43*	[19.26]*	Sesquiterpene
Prenyl benzoate	[1.43]*	0.56*	Phenolic ester
Bicyclogermacrene	[1.43]*	[0.34]*	Sesquiterpene
epi-Cubebol	[1.43]*	0.02	Sesquiterpenic alcohol
α -Muurolole	1.55	1.78	Sesquiterpene
δ -Amorphene	3.12*	0.75	Sesquiterpene
(3 <i>Z</i> ,6 <i>E</i>)- α -Farnesene	[3.12]*	0.07	Sesquiterpene
Unknown	[3.12]*		Sesquiterpene
(<i>Z</i>)- γ -Bisabolene	11.49*	0.74	Sesquiterpene
Cubebol	[11.49]*	0.02	Sesquiterpenic alcohol
γ -Cadinene	[11.49]*	1.76*	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	[11.49]*	[11.19]*	Sesquiterpene
Zonarene	5.26*	[1.76]*	Sesquiterpene
<i>trans</i> -Calamenene	[5.26]*	0.16	Sesquiterpene
δ -Cadinene	[5.26]*	4.68	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.32	0.33	Sesquiterpene
Guaiacylacetone	0.40*	0.01	Phenylpropanoid
α -Cadinene	[0.40]*	0.37	Sesquiterpene
α -Calacorene	0.06	0.04*	Sesquiterpene
<i>cis</i> -Dracunculifoliol	0.01	[0.04]*	Sesquiterpenic alcohol
Isocaryophyllene epoxide B	0.08*	0.01	Sesquiterpenic ether
α -Elemol	[0.08]*	0.02	Sesquiterpenic alcohol
Germacrene B	[0.08]*	0.05	Sesquiterpene
Sesquirosefuran?	0.03	0.01	Sesquiterpenic ether
β -Calacorene	0.19*	0.06	Sesquiterpene
(<i>E</i>)-Nerolidol	[0.19]*	[0.56]*	Sesquiterpenic alcohol
(3 <i>Z</i>)-Hexenyl benzoate	0.08	0.07	Phenolic ester

Spathulenol	0.17*	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	[0.17]*	0.08	Sesquiterpenic ether
10-epi-Junenol	0.11*	[0.11]*	Sesquiterpenic alcohol
<i>trans</i> -Dracunculifoliol	[0.11]*	[0.11]*	Sesquiterpenic alcohol
Unknown	0.12	0.08	Sesquiterpenic alcohol
Unknown	0.14*	0.08	Oxygenated sesquiterpene
Viridiflorol	[0.14]*	0.06	Sesquiterpenic alcohol
Guaiol	0.07	0.06	Sesquiterpenic alcohol
Copaborneol	0.04	0.01	Sesquiterpenic alcohol
Humulene epoxide II	0.01		Sesquiterpenic ether
Junenol	0.57*	0.37	Sesquiterpenic alcohol
10-epi-Cubenol	[0.57]*		Sesquiterpenic alcohol
(<i>E</i>)-Isoeugenyl acetate	0.05	0.06	Phenylpropanoid ester
1-epi-Cubenol	0.31	[0.56]*	Sesquiterpenic alcohol
Cubenol	2.34*	0.09	Sesquiterpenic alcohol
τ -Cadinol	[2.34]*	0.75	Sesquiterpenic alcohol
τ -Muurolol	[2.34]*	1.03	Sesquiterpenic alcohol
α -Muurolol	0.30	0.39	Sesquiterpenic alcohol
α -Cadinol	1.96	1.92	Sesquiterpenic alcohol
<i>cis</i> -Calamene-10-ol	0.02	0.02	Sesquiterpenic alcohol
(3 <i>E</i> ,5 <i>E</i>)-7-Hydroxyfarnesene	0.05	0.06	Sesquiterpenic alcohol
Unknown	0.22	0.21	Oxygenated sesquiterpene
(2 <i>E</i> ,6 <i>Z</i>)-Farnesol	0.02	0.02	Sesquiterpenic alcohol
(2 <i>E</i> ,6 <i>E</i>)-Farnesol	1.89	1.88	Sesquiterpenic alcohol
Benzyl benzoate	5.93	5.95	Phenolic ester
(2 <i>E</i> ,6 <i>E</i>)-Farnesyl acetate	1.77	1.74	Sesquiterpenic ester
Benzyl salicylate	1.57	1.43	Phenolic ester
Geranyl benzoate	0.17	0.20	Phenolic ester
Total identified	96.77%	95.27%	

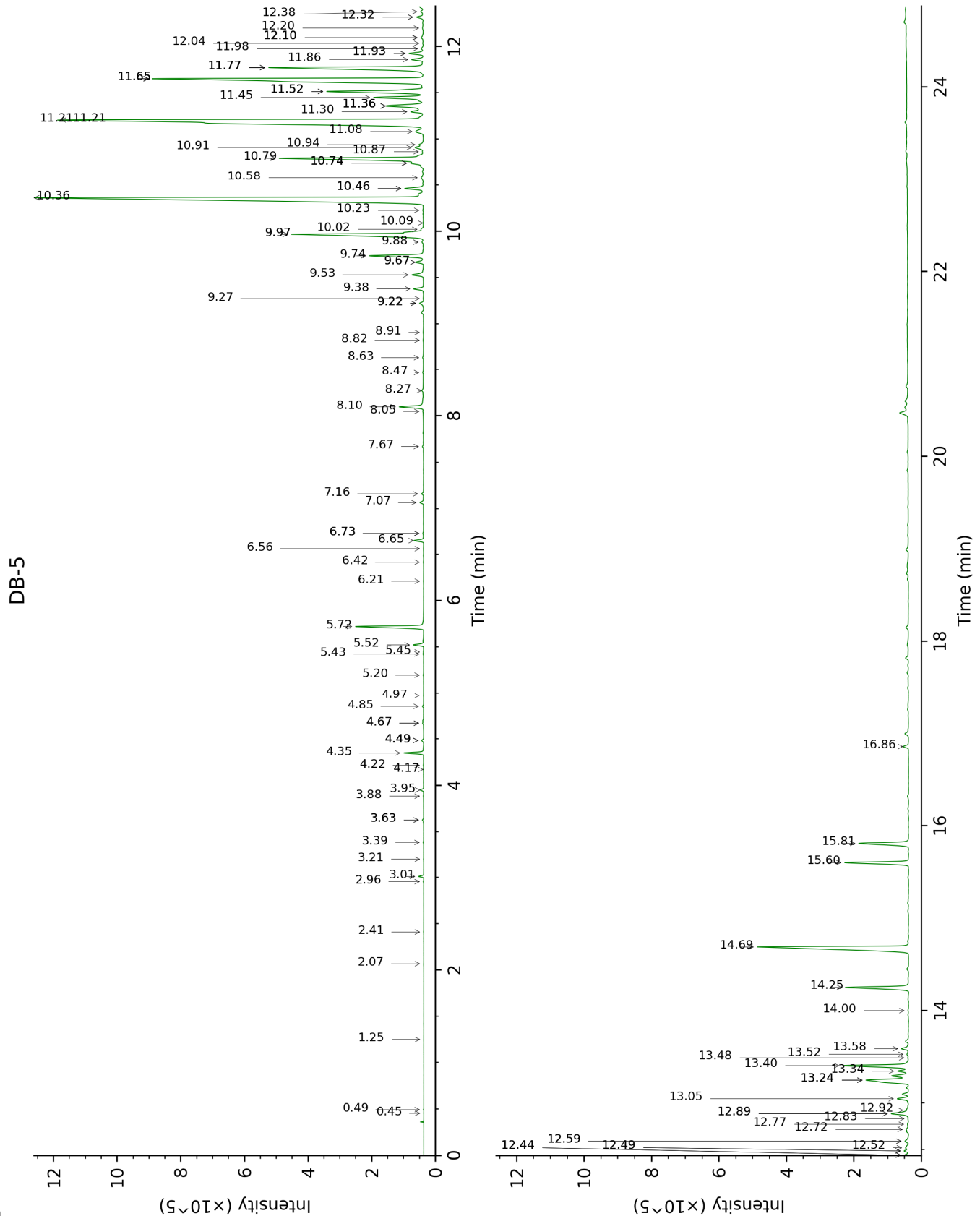
*: Two or more compounds are coeluting on this column

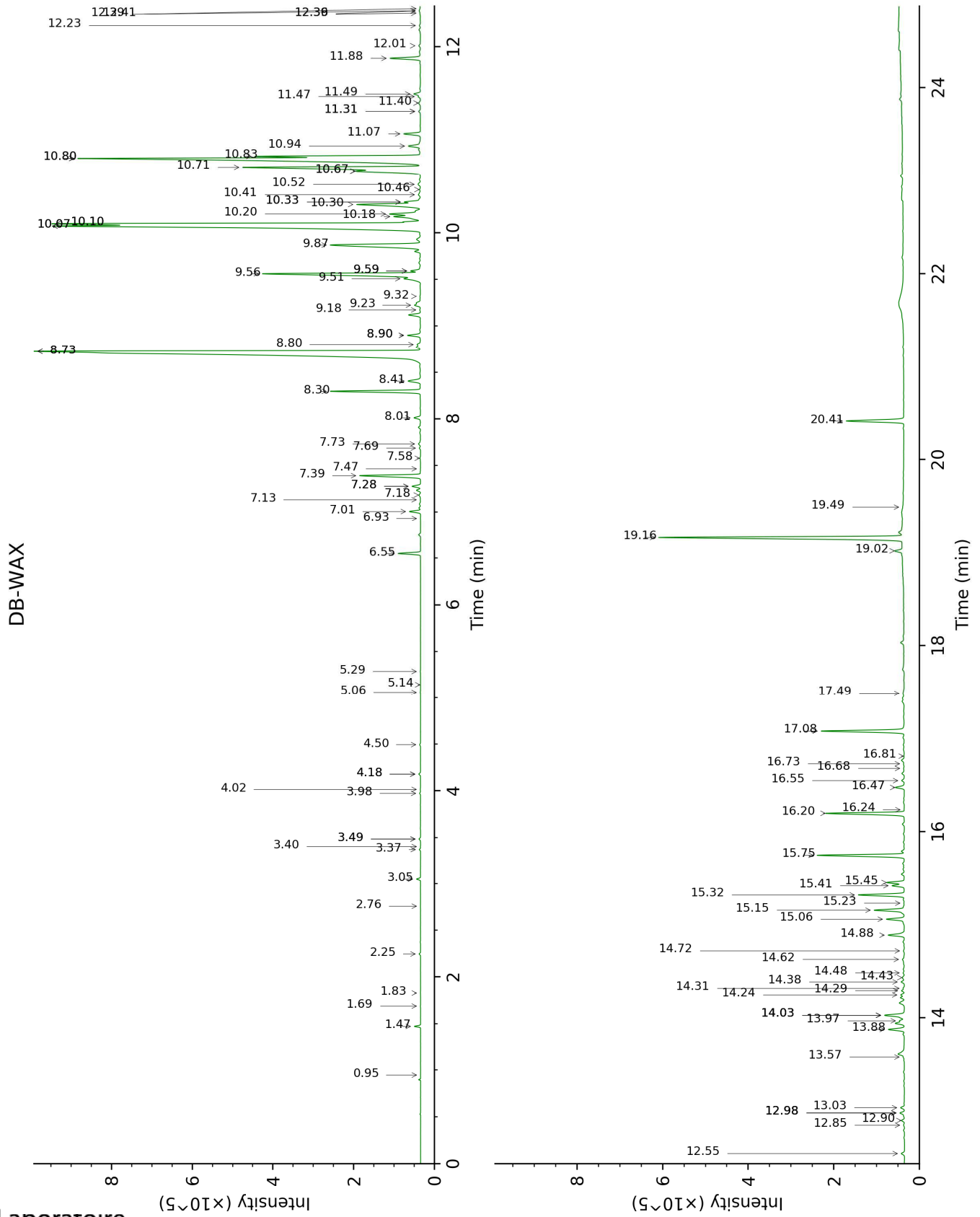
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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	%
3-Buten-2-one	0.45	577	tr	0.95	910	tr
2-Methyl-3-buten-2-ol	0.49	605	tr	1.69	1016	tr
Prenol	1.25	772	tr	5.14	1287	tr
Unknown [m/z 43, 72 (40), 57 (15)... 98 (4)]	2.07	852	tr	6.93	1415	tr
3-Methyl-3-butenyl acetate	2.41	881	tr	3.40	1161	tr
Prenyl acetate	2.96	921	0.01	4.18*	1218	0.03
α -Pinene	3.01	925	0.10	1.47	995	0.10
Camphene	3.20	938	0.01	1.83	1030	tr
Benzaldehyde	3.39	950	0.02	7.58	1462	0.01
Sabinene	3.63*	966	0.03			
β -Pinene	3.63*	966	[0.03]	2.25	1069	0.02
6-Methyl-5-hepten-2-one	3.88	983	0.01	5.29	1297	0.01
Myrcene	3.95	988	0.07	3.05	1134	0.07
Δ^3 -Carene	4.17	1002	tr	2.76	1112	tr
(3Z)-Hexenyl acetate	4.22	1005	0.01	5.06	1281	0.01
para-Methylanisole	4.35	1013	0.45	6.55	1387	0.45
1,8-Cineole	4.49*	1022	0.05	3.49*	1167	0.03
Limonene	4.49*	1022	[0.05]	3.37	1159	0.02
β -Phellandrene	4.49*	1022	[0.05]	3.49*	1167	[0.03]
Benzyl alcohol	4.67*	1034	0.04	12.01	1819	0.04
(Z)- β -Ocimene	4.67*	1034	[0.04]	3.98	1204	0.02
(E)- β -Ocimene	4.85	1045	0.03	4.18*	1218	[0.03]
γ -Terpinene	4.97	1052	tr	4.02	1207	0.01
para-Cresol	5.20	1066	0.01	14.38	2036	0.07
Terpinolene	5.43	1081	0.01	4.50	1241	0.02
<i>trans</i> -Linalool oxide (fur.)	5.45	1082	0.01	7.13	1430	tr
Methyl benzoate	5.52	1087	0.27	8.90*	1563	0.29
Linalool	5.72	1099	1.84	8.30	1516	1.89
Camphor	6.21	1131	tr	7.47	1454	tr
ortho-Dimethoxybenzene	6.42	1144	0.01			
Unknown [m/z 133, 77 (86), 105 (75), 79 (68), 134 (48)]	6.56	1153	tr	12.98*	1904	0.11
Benzyl acetate	6.65	1158	0.24	10.33*	1677	0.34
Ethyl benzoate	6.73*	1163	0.03	9.59*	1617	0.22
para-Cresyl acetate	6.73*	1163	[0.03]			
α -Terpineol	7.07	1185	0.10	10.07*†	1656	19.26
Methyl salicylate	7.16	1191	0.04	10.80*	1716	11.19
Nerol	7.67	1225	0.03	11.31*	1758	0.04
Phenylethyl	8.05	1250	0.03	11.31*	1758	[0.04]

acetate						
Geraniol	8.10	1253	0.72	11.88	1807	0.68
Geranial	8.27	1265	0.05	10.41	1683	0.07
(E)-Anethole	8.47	1278	0.02	11.47	1772	0.04
1-Nitro-2-phenylethane	8.63	1289	0.03	14.48	2045	0.03
(E)-Cinnamyl alcohol	8.82	1302	0.02	16.24	2219	tr
4-Vinylguaiacol	8.91	1308	0.01	15.42	2136	0.27
Bicycloelemene	9.22*	1330	0.13	7.28*	1440	0.19
δ-Elemene	9.22*	1330	[0.13]	7.18	1434	0.04
Benzyl butyrate	9.27	1334	0.01			
α-Cubebene	9.38	1341	0.27	7.01	1420	0.24
Eugenol	9.53	1352	0.38	15.06	2100	0.41
α-Ylangene	9.67*†	1361	1.69	7.28*	1440	[0.19]
Neryl acetate	9.67*†	1361	[1.69]	10.46	1687	0.02
α-Copaene	9.74†	1366	[1.69]	7.39	1449	1.41
β-Bourbonene	9.88	1376	0.05	7.73	1474	0.06
Geranyl acetate	9.97*	1382	4.75	10.83	1718	2.98
β-Cubebene	9.97*	1382	[4.75]	8.01	1494	0.15
β-Elemene	10.02	1386	0.06	8.73*	1549	17.82
Cyperene	10.09	1391	0.01	7.69	1470	0.02
Methyleugenol	10.23	1401	0.02	13.57	1959	0.02
β-Caryophyllene	10.36	1411	17.24	8.73*	1549	[17.82]
Caryophylla-4(12),8(13)-diene	10.46*	1418	0.54	8.90*	1563	[0.29]
β-Copaene	10.46*	1418	[0.54]	8.41	1525	0.34
Aromadendrene	10.58	1427	0.08	8.80	1555	0.09
(E)-Cinnamyl acetate	10.74*	1439	0.37	14.88	2084	0.40
trans-Muuroala-3,5-diene	10.74*	1439	[0.37]	9.18	1584	0.02
9-epi-Isocaryophyllene	10.74*	1439	[0.37]	9.32	1595	0.01
α-Humulene	10.80	1443	4.62	9.56	1615	4.36
(E)-Isoeugenol	10.87	1448	0.02	16.81	2279	0.01
cis-Cadina-1(6),4-diene	10.91†	1452	0.41	9.23	1588	0.15
cis-Muuroala-4(15),5-diene	10.94†	1454	[0.41]	9.59*	1617	[0.22]
trans-Cadina-1(6),4-diene	11.08	1464	0.36	9.51	1610	0.46
γ-Muurolene	11.21*	1474	19.55	9.87	1640	3.08
Germacrene D	11.21*	1474	[19.55]	10.07*†	1656	[19.26]
trans-Muuroala-4(15),5-diene	11.30	1480	0.37	10.10*†	1658	[19.26]
γ-Amorphene	11.36*	1485	1.43	10.10*†	1658	[19.26]
Prenyl benzoate	11.36*	1485	[1.43]	14.03*	2001	0.56
Bicyclogermacrene	11.36*	1485	[1.43]	10.33*	1677	[0.34]
epi-Cubebol	11.36*	1485	[1.43]	12.23	1838	0.02
α-Muurolene	11.45	1492	1.55	10.30	1674	1.78
δ-Amorphene	11.52*	1496	3.12	10.20	1666	0.75

(3Z,6E)- α -Farnesene	11.52*	1496	[3.12]	10.52	1692	0.07
Unknown [m/z 119, 41 (95), 123 (53), 80 (49), 161 (44), 105 (42)... 204 (2)]	11.52*	1496	[3.12]			
(Z)- γ -Bisabolene	11.65*	1507	11.49	10.18	1664	0.74
Cubebol	11.65*	1507	[11.49]	12.85	1893	0.02
γ -Cadinene	11.65*	1507	[11.49]	10.67*	1704	1.76
(3E,6E)- α -Farnesene	11.65*	1507	[11.49]	10.80*	1716	[11.19]
Zonarene	11.77*	1516	5.26	10.67*	1704	[1.76]
<i>trans</i> -Calamenene	11.77*	1516	[5.26]	11.50	1774	0.16
δ -Cadinene	11.77*	1516	[5.26]	10.71	1708	4.68
<i>trans</i> -Cadina-1,4-diene	11.86	1523	0.32	10.94	1727	0.33
Guaiacylacetone	11.93*	1528	0.40	19.49	2577	0.01
α -Cadinene	11.93*	1528	[0.40]	11.07	1738	0.37
α -Calacorene	11.98	1532	0.06	12.39*	1852	0.04
<i>cis</i> -Dracunculifoliol	12.04	1537	0.01	12.39*	1852	[0.04]
Isocaryophyllene epoxide B	12.10*	1542	0.08	12.41	1854	0.01
α -Elemol	12.10*	1542	[0.08]	14.32	2029	0.02
Germacrene B	12.10*	1542	[0.08]	11.40	1766	0.05
Sesquirosefuran?	12.20	1550	0.03	12.36	1850	0.01
β -Calacorene	12.32*	1559	0.19	12.90	1897	0.06
(E)-Nerolidol	12.32*	1559	[0.19]	14.03*	2001	[0.56]
(3Z)-Hexenyl benzoate	12.38	1564	0.08	14.62	2059	0.07
Spathulenol	12.44*	1568	0.17	14.72	2067	0.02
Caryophyllene oxide	12.44*	1568	[0.17]	13.03	1910	0.08
10-epi-Junenol	12.49*	1572	0.11	12.98*	1904	[0.11]
<i>trans</i> -Dracunculifoliol	12.49*	1572	[0.11]	12.98*	1904	[0.11]
Unknown cadinol or muurolol analog [m/z 161, 119 (77), 120 (76), 105 (73), 93 (57)... 204 (36)]	12.52	1575	0.12	12.55	1866	0.08
Unknown [m/z 161, 105 (84), 43 (80), 119 (72), 93 (62), 121 (54)... 204 (38), 222 (2)]	12.59*	1580	0.14	14.24	2022	0.08
Viridiflorol	12.59*	1580	[0.14]	14.29	2026	0.06
Guaiol	12.72	1590	0.07	14.43	2040	0.06
Copaborneol	12.77	1594	0.04	15.23	2118	0.01
Humulene epoxide II	12.83	1599	0.01			
Junenol	12.89*	1604	0.57	13.88	1987	0.37
10-epi-Cubenol	12.89*	1604	[0.57]			
(E)-Isoeugenyl	12.92	1607	0.05	17.49	2351	0.06

acetate						
1-epi-Cubenol	13.05	1617	0.31	14.03*	2001	[0.56]
Cubenol	13.24*†	1633	2.34	13.97	1996	0.09
τ-Cadinol	13.24*†	1633	[2.34]	15.15	2110	0.75
τ-Muurolol	13.24*†	1633	[2.34]	15.32	2126	1.03
α-Muurolol	13.34	1641	0.30	15.45	2140	0.39
α-Cadinol	13.40	1646	1.96	15.75	2169	1.92
cis-Calamenen-10-ol	13.48	1653	0.02	16.73	2270	0.02
(3E,5E)-7-Hydroxyfarnesene	13.52	1656	0.05	16.55	2252	0.06
Unknown [m/z 123, 95 (31), 81 (29), 105 (27)... 222 (5)]	13.58	1661	0.22	16.47	2244	0.21
(2E,6Z)-Farnesol	14.00	1695	0.02	16.68	2265	0.02
(2E,6E)-Farnesol	14.25	1717	1.89	17.08	2307	1.88
Benzyl benzoate	14.69	1754	5.93	19.16	2538	5.95
(2E,6E)-Farnesyl acetate	15.60	1835	1.77	16.20	2215	1.74
Benzyl salicylate	15.81	1854	1.57	20.42	2687	1.43
Geranyl benzoate	16.86	1951	0.17	19.02	2522	0.20
Total identified		96.77%			95.27%	
Total reported		97.12%			95.64%	

*: 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