

GC/MS BATCH NUMBER: B10104

ESSENTIAL OIL: BASIL LINALOOL
BOTANICAL NAME: OCIMUM BASILICUM
ORIGIN: EGYPT

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BASIL LINALOOL OIL	%
LINALOOL	50.1
1,8-CINEOLE + β -PHELLANDRENE	8.8
trans- α -BERGAMOTENE	5.7
EUGENOL	4.0
γ -CADINENE	2.5
τ -CADINOL	2.3
β -ELEMENE	1.6
METHYLCHAVICOL	1.2

Comments from Robert Tisserand: Radiant, green, sweet-spicy odor quality. Constituents are in expected amounts.

Date : May 23, 2018

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18E11-PTH2-1-CC

Customer identification : Basil Linalool - Egypt - B10104710R

Type : Essential oil

Source : *Ocimum basilicum* ct. Linalool

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

Analysis date : May 22, 2018

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.4740 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Isovaleral	0.01	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	0.01	Aliphatic aldehyde
2-Ethylfuran	0.01	tr	Furan
Isoamyl alcohol	0.01	0.01*	Aliphatic alcohol
2-Methylbutanol	tr	[0.01]*	Aliphatic alcohol
(2E)-Hexenal	tr	tr	Aliphatic aldehyde
(3Z)-Hexenol	0.02	0.08*	Aliphatic alcohol
Hexanol	tr	tr	Aliphatic alcohol
Hashishene	0.01	0.48*	Monoterpene
α -Thujene	0.04	0.04	Monoterpene
α -Pinene	0.47	[0.48]*	Monoterpene
Camphene	0.09	0.09	Monoterpene
Thuja-2,4(10)-diene	0.01	0.49*	Monoterpene
β -Pinene	1.42*	0.92	Monoterpene
Sabinene	[1.42]*	[0.49]*	Monoterpene
Octen-3-ol	0.05	0.09*	Aliphatic alcohol
Octan-3-one	0.04	0.55*	Aliphatic ketone
Myrcene	0.99	0.99	Monoterpene
α -Phellandrene	0.02*	0.01	Monoterpene
Pseudolimonene	[0.02]*	0.01	Monoterpene
Δ 3-Carene	0.01	0.01	Monoterpene
(3Z)-Hexenyl acetate	0.02	0.02	Aliphatic ester
α -Terpinene	0.08	0.08	Monoterpene
ortho-Cymene	0.01	0.15*	Simple phenolic
para-Cymene	0.15	[0.15]*	Monoterpene
Limonene	9.14*	0.39	Monoterpene
1,8-Cineole	[9.14]*	8.70*	Monoterpenic ether
β -Phellandrene	[9.14]*	[8.70]*	Monoterpene
(Z)- β -Ocimene	0.06	0.06	Monoterpene
(E)- β -Ocimene	0.53	[0.55]*	Monoterpene
γ -Terpinene	0.09	0.10	Monoterpene
cis-Sabinene hydrate	0.14	0.20*	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.05	0.05	Monoterpenic alcohol
Octanol	0.06	0.12	Aliphatic alcohol
trans-Linalool oxide (fur.)	0.17*	[0.20]*	Monoterpenic alcohol
Terpinolene	[0.17]*	0.12	Monoterpene
6,7-Epoxyterpinene	0.04	0.03	Monoterpenic ether
Linalool	50.10	50.23*	Monoterpenic alcohol
Phenylethyl alcohol	0.02	0.01	Simple phenolic
Octen-3-yl acetate	0.07	[0.08]*	Aliphatic ester
cis-para-Menth-2-en-1-ol	0.02	[50.23]*	Monoterpenic alcohol
Camphor	0.45	0.43	Monoterpenic ketone
(E)-Myroxide	0.17	0.16	Monoterpenic ether
Isomenthone	0.04	0.04	Monoterpenic ketone
Borneol	0.13	3.95*	Monoterpenic alcohol
δ -Terpineol	0.16*	0.16	Monoterpenic alcohol
cis-Linalool oxide (pyr.)	[0.16]*	1.44	Monoterpenic alcohol
Terpinen-4-ol	0.58	0.59	Monoterpenic alcohol

para-Cymen-8-ol	0.02	0.02	Monoterpenic alcohol
α -Terpineol	0.84	[3.95]*	Monoterpenic alcohol
Methylchavicol	1.15	1.24	Phenylpropanoid
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.04	0.04*	Monoterpenic alcohol
Octyl acetate	0.19	0.20	Aliphatic ester
Nerol	0.02	0.02	Monoterpenic alcohol
Citronellol	0.29	0.30	Monoterpenic alcohol
Cuminal	0.02*	0.01	Monoterpenic aldehyde
Unknown	[0.02]*	[0.04]*	Oxygenated monoterpene
Carvone	0.02	0.02	Monoterpenic ketone
Geraniol	0.19	0.21	Monoterpenic alcohol
Linalyl acetate	0.05	0.04	Monoterpenic ester
Chavicol	0.02	0.03	Phenylpropanoid
Geranial	0.02	0.11*	Monoterpenic aldehyde
Citronellyl formate	0.05	0.06	Monoterpenic ester
Bornyl acetate	0.90	0.89	Monoterpenic ester
Lavandulyl acetate	0.01	0.04	Monoterpenic ester
<i>trans</i> -Pinocarvyl acetate	0.02	0.02	Monoterpenic ester
Geranyl formate	0.03	0.05	Monoterpenic ester
δ -Elemene isomer	0.03	0.03	Sesquiterpene
exo-2-Hydroxycineole acetate	0.07	0.03	Monoterpenic ester
α -Cubebene	0.07	[0.09]*	Sesquiterpene
Eugenol	4.04	4.07	Phenylpropanoid
Neryl acetate	0.13	[0.11]*	Monoterpenic ester
α -Copaene	0.17	0.16	Sesquiterpene
β -Bourbonene	0.29	0.27	Sesquiterpene
1,5-diepi- β -Bourbonene	0.10*	0.02	Sesquiterpene
<i>cis</i> - β -Elemene	[0.10]*	0.08	Sesquiterpene
Geranyl acetate	0.14*	0.21	Monoterpenic ester
β -Cubebene	[0.14]*	0.20	Sesquiterpene
β -Elemene	1.61	7.57*	Sesquiterpene
Unknown	0.09		Unknown
α -Gurjunene	0.14*	0.02	Sesquiterpene
α -Cedrene	[0.14]*	0.03	Sesquiterpene
Methyleugenol	0.02	0.03*	Phenylpropanoid
β -Caryophyllene	0.40	[7.57]*	Sesquiterpene
β -Copaene	0.04	0.20*	Sesquiterpene
β -Gurjunene	0.15	[0.20]*	Sesquiterpene
Aromadendrene	5.86*	0.07	Sesquiterpene
<i>trans</i> - α -Bergamotene	[5.86]*	[7.57]*	Sesquiterpene
α -Guaiene	[5.86]*	0.03	Sesquiterpene
(<i>Z</i>)- β -Farnesene?	[5.86]*	0.05	Sesquiterpene
<i>cis</i> -Muurola-3,5-diene	0.18*	0.11	Sesquiterpene
<i>cis</i> - β -Bergamotene?	[0.18]*		Sesquiterpene
α -Humulene	0.74*	0.51*	Sesquiterpene
Cadina-4,11-diene	[0.74]*	0.01	Sesquiterpene
allo-Aromadendrene	0.76*	0.07	Sesquiterpene
(<i>E</i>)- β -Farnesene	[0.76]*	0.38	Sesquiterpene
<i>cis</i> -Muurola-4(15),5-diene	[0.76]*	[0.51]*	Sesquiterpene
Germacrene D	2.98	[3.95]*	Sesquiterpene
β -Selinene	0.50	1.19*	Sesquiterpene

Bicyclogermacrene	0.92*	0.89	Sesquiterpene
Viridiflorene	[0.92]*	0.02	Sesquiterpene
(Z)- α -Bisabolene	1.31	2.41*	Sesquiterpene
δ -Guaiene	1.10	[1.19]*	Sesquiterpene
γ -Cadinene	2.55*	[2.41]*	Sesquiterpene
β -Bisabolene	[2.55]*	0.01	Sesquiterpene
<i>trans</i> -Calamenene	0.33*	0.23	Sesquiterpene
δ -Cadinene	[0.33]*	[2.41]*	Sesquiterpene
Zonarene	[0.33]*	[2.41]*	Sesquiterpene
10-epi-Cubebol?	0.10		Sesquiterpenic alcohol
α -Cadinene	0.07	0.08	Sesquiterpene
(Z)-Nerolidol	0.06	0.05	Sesquiterpenic alcohol
Maaliol	0.11	0.12	Sesquiterpenic alcohol
(E)-Nerolidol	0.15	0.18	Sesquiterpenic alcohol
Spathulenol	0.20	0.22	Sesquiterpenic alcohol
Caryophyllene oxide	0.01*	0.05	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.01]*	0.01	Sesquiterpenic ether
Globulol	0.03	0.03	Sesquiterpenic alcohol
Humulene epoxide II	0.02	[0.03]*	Sesquiterpenic ether
10-epi-Cubenol	0.50		Sesquiterpenic alcohol
1,10-diepi-Cubenol	0.01	0.10	Sesquiterpenic alcohol
τ -Cadinol	2.27	2.26	Sesquiterpenic alcohol
β -Eudesmol	0.11	0.10*	Sesquiterpenic alcohol
α -Eudesmol	0.08	0.08	Sesquiterpenic alcohol
α -Cadinol	0.01	0.01	Sesquiterpenic alcohol
α -Bisabolol	0.04	[0.10]*	Sesquiterpenic alcohol
Unknown	0.05		Lignan
Mint sulfide?	0.02		Sesquiterpenic sulfide
Phytone	0.02	0.02	Terpenic ketone
Phytol	0.02	0.02	Diterpenic alcohol
Total identified	97.83%	96.38%	

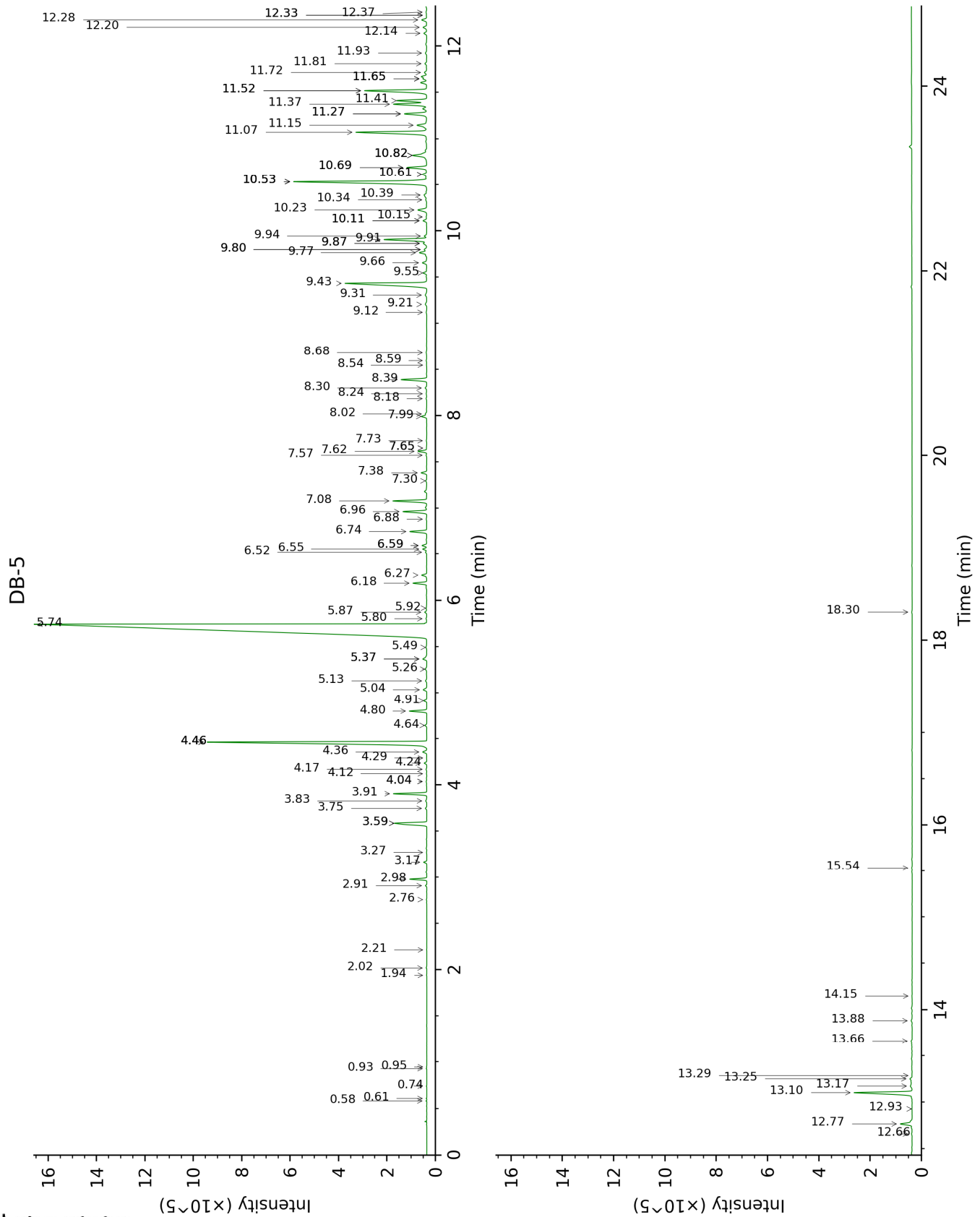
*: Two or more compounds are coeluting on this column

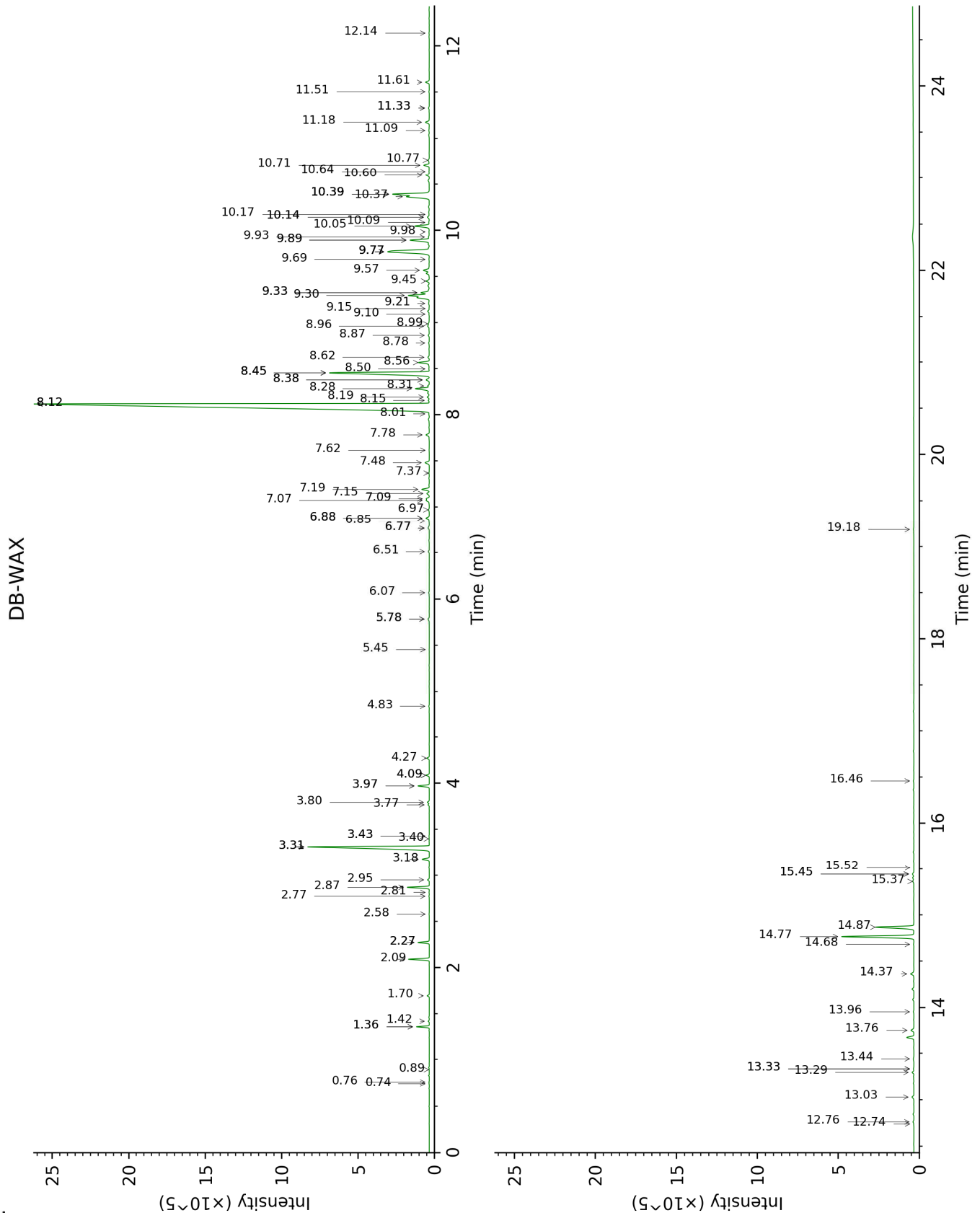
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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	%
Isovaleral	0.58	637	0.01	0.76	883	0.01
2-Methylbutyral	0.61	647	0.01	0.74	876	0.01
2-Ethylfuran	0.74	693	0.01	0.89	914	tr
Isoamyl alcohol	0.93	725	0.01	3.43*	1177	0.01
2-Methylbutanol	0.95	728	tr	3.43*	1177	[0.01]
(2E)-Hexenal	1.94	844	tr	3.40	1175	tr
(3Z)-Hexenal	2.02	851	0.02	5.78*	1348	0.08
Hexanol	2.21	868	tr	5.45	1324	tr
Hashishene	2.76	911	0.01	1.36*	991	0.48
α-Thujene	2.91	922	0.04	1.42	1000	0.04
α-Pinene	2.98	926	0.47	1.36*	991	[0.48]
Camphene	3.17	939	0.09	1.70	1028	0.09
Thuja-2,4(10)-diene	3.27	946	0.01	2.27*	1085	0.49
β-Pinene	3.59*	967	1.42	2.09	1067	0.92
Sabinene	3.59*	967	[1.42]	2.27*	1085	[0.49]
Octen-3-ol	3.75	978	0.05	6.77*	1419	0.09
Octan-3-one	3.83	984	0.04	3.97*	1217	0.55
Myrcene	3.91	989	0.99	2.87	1134	0.99
α-Phellandrene	4.04*	998	0.02	2.77	1127	0.01
Pseudolimonene	4.04*	998	[0.02]	2.81	1130	0.01
Δ3-Carene	4.12	1003	0.01	2.58	1112	0.01
(3Z)-Hexenyl acetate	4.17	1006	0.02	4.83	1278	0.02
α-Terpinene	4.24	1010	0.08	2.95	1140	0.08
ortho-Cymene	4.29	1014	0.01	4.09*	1226	0.15
para-Cymene	4.36	1018	0.15	4.09*	1226	[0.15]
Limonene	4.46*	1025	9.14	3.18	1158	0.39
1,8-Cineole	4.46*	1025	[9.14]	3.31*	1168	8.70
β-Phellandrene	4.46*	1025	[9.14]	3.31*	1168	[8.70]
(Z)-β-Ocimene	4.64	1036	0.06	3.77	1203	0.06
(E)-β-Ocimene	4.80	1046	0.53	3.97*	1217	[0.55]
γ-Terpinene	4.91	1053	0.09	3.80	1205	0.10
cis-Sabinene hydrate	5.04	1061	0.14	6.88*	1427	0.20
cis-Linalool oxide (fur.)	5.13	1067	0.05	6.51	1400	0.05
Octanol	5.26	1075	0.06	8.19	1525	0.12
trans-Linalool oxide (fur.)	5.37*	1082	0.17	6.88*	1427	[0.20]
Terpinolene	5.37*	1082	[0.17]	4.27	1239	0.12
6,7-Epoxymyrcene	5.49	1090	0.04	6.07	1368	0.03
Linalool	5.74	1106	50.10	8.12*	1520	50.23
Phenylethyl alcohol	5.80	1110	0.02	12.14	1851	0.01
Octen-3-yl acetate	5.87	1114	0.07	5.78*	1348	[0.08]
cis-para-Menth-2-en-1-ol	5.92	1117	0.02	8.12*	1520	[50.23]

Camphor	6.18	1134	0.45	7.19	1450	0.43
(E)-Myroxide	6.27	1140	0.17	7.09	1443	0.16
Isomenthone	6.52	1156	0.04	6.97	1434	0.04
Borneol	6.55	1158	0.13	9.77*	1650	3.95
δ-Terpineol	6.59*	1161	0.16	9.45	1624	0.16
cis-Linalool oxide (pyr.)	6.59*	1161	[0.16]	10.36	1698	1.44
Terpinen-4-ol	6.74	1170	0.58	8.56	1554	0.59
para-Cymen-8-ol	6.88	1179	0.02	11.51	1795	0.02
α-Terpineol	6.96	1185	0.84	9.77*	1650	[3.95]
Methylchavicol	7.08	1192	1.15	9.30	1612	1.24
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	7.30	1206	0.04	11.33*	1780	0.04
Octyl acetate	7.38	1212	0.19	7.07	1441	0.20
Nerol	7.57	1225	0.02	11.09	1760	0.02
Citronellol	7.62	1228	0.29	10.71	1728	0.30
Cuminal	7.65*	1230	0.02	10.64	1722	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.65*	1230	[0.02]	11.33*	1780	[0.04]
Carvone	7.73	1235	0.02	9.98	1668	0.02
Geraniol	7.99	1253	0.19	11.61	1804	0.21
Linalyl acetate	8.02	1255	0.05	8.16	1523	0.04
Chavicol	8.18	1266	0.02	16.46	2269	0.03
Geranial	8.24	1269	0.02	10.14*	1680	0.11
Citronellyl formate	8.30	1274	0.05	8.87	1578	0.06
Bornyl acetate	8.39	1280	0.90	8.28	1532	0.89
Lavandulyl acetate	8.54	1290	0.01	8.78	1571	0.04
trans-Pinocarvyl acetate	8.59	1294	0.02	9.10	1596	0.02
Geranyl formate	8.68	1299	0.03	9.93	1663	0.05
δ-Elemene isomer	9.12	1330	0.03	6.85	1425	0.03
exo-2-Hydroxycineole acetate	9.21	1336	0.07	10.09	1676	0.03
α-Cubebene	9.31	1344	0.07	6.77*	1419	[0.09]
Eugenol	9.43	1353	4.04	14.77	2097	4.07
Neryl acetate	9.55	1360	0.13	10.14*	1680	[0.11]
α-Copaene	9.66	1368	0.17	7.15	1447	0.16
β-Bourbonene	9.76	1376	0.29	7.48	1472	0.27
1,5-diepi-β-Bourbonene	9.80*	1378	0.10	7.37	1463	0.02
cis-β-Elemene	9.80*	1378	[0.10]	8.31	1535	0.08
Geranyl acetate	9.86*	1383	0.14	10.60	1718	0.21
β-Cubebene	9.86*	1383	[0.14]	7.78	1494	0.20
β-Elemene	9.91	1386	1.61	8.45*	1546	7.57
Unknown [m/z 161, 105 (83), 119 (69), 81 (34), 91 (29), 93 (28)...204]	9.94	1389	0.09			

α-Gurjunene	10.11*	1400	0.14	7.62	1482	0.02
α-Cedrene	10.11*	1400	[0.14]	8.01	1511	0.03
Methyleugenol	10.15	1403	0.02	13.33*	1960	0.03
β-Caryophyllene	10.23	1409	0.40	8.45*	1546	[7.57]
β-Copaene	10.34	1417	0.04	8.38*	1540	0.20
β-Gurjunene	10.39	1421	0.15	8.38*	1540	[0.20]
Aromadendrene	10.53*	1432	5.86	8.62	1559	0.07
<i>trans</i> -α-Bergamotene	10.53*	1432	[5.86]	8.45*	1546	[7.57]
α-Guaiene	10.53*	1432	[5.86]	8.50	1549	0.03
(<i>Z</i>)-β-Farnesene?	10.53*	1432	[5.86]	9.21	1605	0.05
<i>cis</i> -Muurolo-3,5-diene	10.61*	1438	0.18	8.96	1585	0.11
<i>cis</i> -β-Bergamotene?	10.61*	1438	[0.18]			
α-Humulene	10.69*	1444	0.74	9.33*	1614	0.51
Cadina-4,11-diene	10.69*	1444	[0.74]	9.16	1600	0.01
allo-Aromadendrene	10.82*	1454	0.76	8.99	1587	0.07
(<i>E</i>)-β-Farnesene	10.82*	1454	[0.76]	9.57	1634	0.38
<i>cis</i> -Muurolo-4(15),5-diene	10.82*	1454	[0.76]	9.33*	1614	[0.51]
Germacrene D	11.07	1472	2.98	9.77*	1650	[3.95]
β-Selinene	11.15	1478	0.50	9.90*	1660	1.19
Bicyclogermacrene	11.27*	1487	0.92	10.05	1673	0.89
Viridiflorene	11.27*	1487	[0.92]	9.69	1643	0.02
(<i>Z</i>)-α-Bisabolene	11.37	1495	1.31	10.39*	1701	2.41
δ-Guaiene	11.41	1498	1.10	9.90*	1660	[1.19]
γ-Cadinene	11.52*	1506	2.55	10.39*	1701	[2.41]
β-Bisabolene	11.52*	1506	[2.55]	10.17	1683	0.01
<i>trans</i> -Calamenene	11.65*†	1516	0.33	11.18	1767	0.23
δ-Cadinene	11.65*†	1516	[0.33]	10.39*	1701	[2.41]
Zonarene	11.65*†	1516	[0.33]	10.39*	1701	[2.41]
10-epi-Cubebol?	11.72	1522	0.10			
α-Cadinene	11.81	1529	0.07	10.77	1732	0.08
(<i>Z</i>)-Nerolidol	11.92	1538	0.06	13.44	1970	0.05
Maaliol	12.14	1555	0.11	13.03	1932	0.12
(<i>E</i>)-Nerolidol	12.20	1560	0.15	13.76	1999	0.18
Spathulenol	12.28	1566	0.20	14.36	2058	0.22
Caryophyllene oxide	12.33*	1570	0.01	12.76	1907	0.05
Caryophyllene oxide isomer	12.33*	1570	[0.01]	12.74	1905	0.01
Globulol	12.37	1573	0.03	13.96	2018	0.03
Humulene epoxide II	12.66	1596	0.02	13.33*	1960	[0.03]
10-epi-Cubenol	12.77	1604	0.50			
1,10-diepi-Cubenol	12.93	1618	0.01	13.30	1956	0.10
τ-Cadinol	13.10	1632	2.27	14.87	2107	2.26
β-Eudesmol	13.17	1638	0.11	15.44*	2165	0.10
α-Eudesmol	13.25	1645	0.08	15.36	2157	0.08

α-Cadinol	13.28	1647	0.01	15.52	2172	0.01
α-Bisabolol	13.66	1679	0.04	15.44*	2165	[0.10]
Unknown [m/z 133, 93 (97), 131 (85), 145 (83), 107 (69)...220]	13.88	1697	0.05			
Mint sulfide?	14.15	1720	0.02			
Phytone	15.54	1842	0.02	14.68	2088	0.02
Phytol	18.30	2109	0.02	19.18	2572	0.02
Total identified		97.83%			96.38%	
Total reported		97.96%			96.38%	

*: 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