

Date : June 30, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21F22-PTH05


Customer identification : Basil Linalool - Egypt - B10109208R

Type : Essential oil

Source : *Ocimum basilicum* ct. Linalool

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - 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 : June 23, 2021

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: 1.4764 ± 0.0003 (20 °C; method PC-MAT-016)

NFT 75-244:1992 - OIL OF BASIL, LINALOOL TYPE

Compound	Min. %	Max. %	Observed %	Complies?
1,8-Cineole	2.0	8.0	9.2	No
(E)-β-Ocimene	0.2	2.0	0.6	Yes
Camphor	0.2	1.5	0.5	Yes
Linalool	45.0	62.0	47.6	Yes
Terpinen-4-ol	tr	4.00	0.54	Yes
Methylchavicol	tr	30.0	0.6	Yes
Eugenol	2	15	6	Yes
Refractive index	1.4750	1.4950	1.4764	Yes

CONCLUSION

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

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Ethanol	0.01	Aliphatic alcohol
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	0.01	Furan
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
(2E)-Hexenal	0.01	Aliphatic aldehyde
(3Z)-Hexenol	0.03	Aliphatic alcohol
Hashishene	0.02	Monoterpene
α -Thujene	0.04	Monoterpene
α -Pinene	0.54	Monoterpene
Camphene	0.11	Monoterpene
Thuja-2,4(10)-diene	tr	Monoterpene
Benzaldehyde	0.01	Simple phenolic
β -Pinene	1.00	Monoterpene
Sabinene	0.51	Monoterpene
Octan-3-one	0.04	Aliphatic ketone
Myrcene	1.07	Monoterpene
α -Phellandrene	0.02	Monoterpene
Pseudolimonene	0.01	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
(3Z)-Hexenyl acetate	0.04	Aliphatic ester
α -Terpinene	0.07	Monoterpene
para-Cymene	0.14	Monoterpene
Limonene	0.41	Monoterpene
1,8-Cineole	9.24	Monoterpenic ether
(Z)- β -Ocimene	0.06	Monoterpene
(E)- β -Ocimene	0.65	Monoterpene
γ -Terpinene	0.08	Monoterpene
cis-Sabinene hydrate	0.16	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.05	Monoterpenic alcohol
Octanol	0.02	Aliphatic alcohol
Fenchone	0.06	Monoterpenic ketone
Terpinolene	0.14	Monoterpene
trans-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
para-Cymenene	0.01	Monoterpene
6,7-Epoxymyrcene	0.04	Monoterpenic ether
Linalool	47.63	Monoterpenic alcohol
Hotrienol	0.03	Monoterpenic alcohol
Phenylethyl alcohol	0.01	Simple phenolic
Octen-3-yl acetate	0.01	Aliphatic ester
cis-para-Menth-2-en-1-ol	0.07	Monoterpenic alcohol
(Z)-Myroxide	0.02	Monoterpenic ether
Camphor	0.49	Monoterpenic ketone
(E)-Myroxide	0.18	Monoterpenic ether

Isomenthone	0.01	Monoterpenic ketone
Borneol	0.12	Monoterpenic alcohol
δ-Terpineol	0.17	Monoterpenic alcohol
Terpinen-4-ol	0.54	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	0.90	Monoterpenic alcohol
Methylchavicol	0.57	Phenylpropanoid
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.05	Monoterpenic alcohol
Octyl acetate	0.22	Aliphatic ester
Citronellol	0.01	Monoterpenic alcohol
Nerol	0.01	Monoterpenic alcohol
Unknown	0.05	Oxygenated monoterpene
Carvone	0.01	Monoterpenic ketone
Geraniol	0.12	Monoterpenic alcohol
Linalyl acetate	0.05	Monoterpenic ester
Geranial	0.02	Monoterpenic aldehyde
Citronellyl formate	0.10	Monoterpenic ester
<i>trans</i> -Linalool oxide acetate (pyr.)	0.09	Monoterpenic ester
Bornyl acetate	1.04	Monoterpenic ester
Lavandulyl acetate	0.01	Monoterpenic ester
<i>trans</i> -Pinocarvyl acetate	0.03	Monoterpenic ester
Geranyl formate	0.02	Monoterpenic ester
exo-2-Hydroxycineole acetate	0.09	Monoterpenic ester
α-Cubebene	0.09	Sesquiterpene
Eugenol	5.73	Phenylpropanoid
Neryl acetate	0.03	Monoterpenic ester
α-Ylangene	0.01	Sesquiterpene
α-Copaene	0.16	Sesquiterpene
1,5-diepi-β-Bourbonene	tr	Sesquiterpene
β-Bourbonene	0.24	Sesquiterpene
Geranyl acetate	0.09	Monoterpenic ester
β-Cubebene	0.14	Sesquiterpene
β-Elemene	1.63	Sesquiterpene
Unknown	0.08	Unknown
Methyleugenol	0.11	Phenylpropanoid
α-Gurjunene	0.01	Sesquiterpene
β-Caryophyllene	0.37	Sesquiterpene
β-Copaene	0.05	Sesquiterpene
β-Gurjunene	0.11	Sesquiterpene
α-Guaiene	5.69*	Sesquiterpene
<i>trans</i> -α-Bergamotene	[5.69]*	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	0.05	Sesquiterpene
<i>cis</i> -β-Bergamotene?	0.12	Sesquiterpene
Cadina-4,11-diene	0.08	Sesquiterpene
α-Humulene	0.77	Sesquiterpene
allo-Aromadendrene	0.06	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.53	Sesquiterpene
(<i>E</i>)-β-Farnesene	0.14	Sesquiterpene
Germacrene D	3.01	Sesquiterpene
β-Selinene	0.10	Sesquiterpene
<i>trans</i> -β-Bergamotene	0.36	Sesquiterpene
allo-Aromadendr-9-ene	0.03	Sesquiterpene

Bicyclogermacrene	0.97	Sesquiterpene
α -Muurolene	0.23	Sesquiterpene
(Z)- α -Bisabolene	1.28	Sesquiterpene
δ -Guaiene	1.12	Sesquiterpene
γ -Cadinene	2.39	Sesquiterpene
(Z)- γ -Bisabolene	0.06	Sesquiterpene
<i>trans</i> -Calamenene	0.22	Sesquiterpene
δ -Cadinene	0.14	Sesquiterpene
β -Sesquiphellandrene	0.20	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.03	Sesquiterpene
10- <i>epi</i> -Cubebol?	0.01	Sesquiterpenic alcohol
α -Cadinene	0.06	Sesquiterpene
Maaliol	0.14	Sesquiterpenic alcohol
(<i>E</i>)-Nerolidol	0.15	Sesquiterpenic alcohol
Germacrene D-4-ol	0.02	Sesquiterpenic alcohol
Spathulenol	0.20	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Globulol	0.03	Sesquiterpenic alcohol
Viridiflorol	0.02	Sesquiterpenic alcohol
Humulene epoxide II	0.03	Sesquiterpenic ether
10- <i>epi</i> - γ -Eudesmol	0.02	Sesquiterpenic alcohol
10- <i>epi</i> -Cubenol	0.46	Sesquiterpenic alcohol
τ -Cadinol	2.53	Sesquiterpenic alcohol
β -Eudesmol	0.09	Sesquiterpenic alcohol
α -Eudesmol	0.03	Sesquiterpenic alcohol
α -Cadinol	0.10	Sesquiterpenic alcohol
α -Bisabolol	0.03	Sesquiterpenic alcohol
Unknown	0.01	Lignan
Geranyl tiglate	0.04	Monoterpenic ester
Mint sulfide?	0.05	Sesquiterpenic sulfide
Phytone	0.02	Terpenic ketone
Phytol	0.01	Diterpenic alcohol
Consolidated total	97.81%	

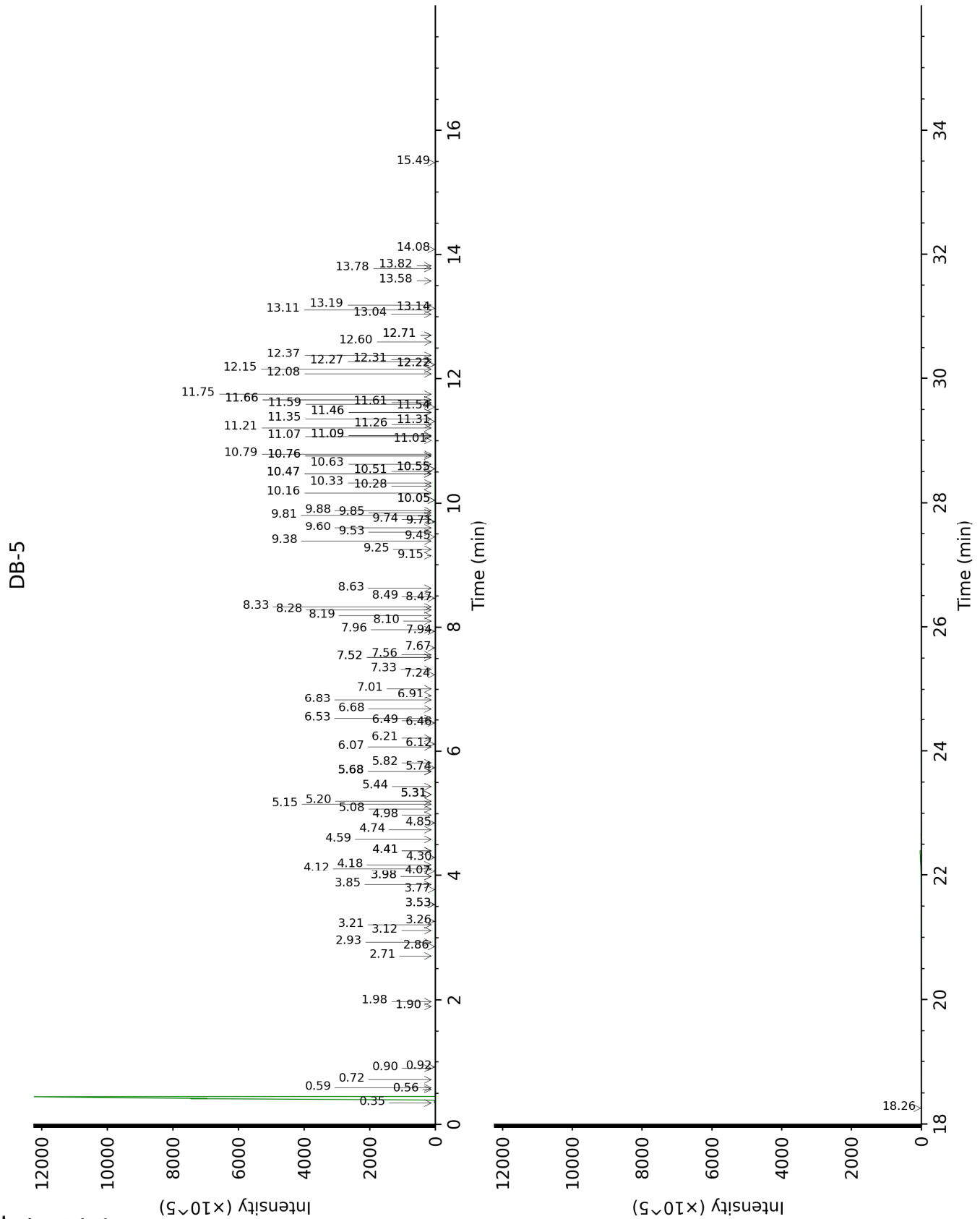
*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of total signal.

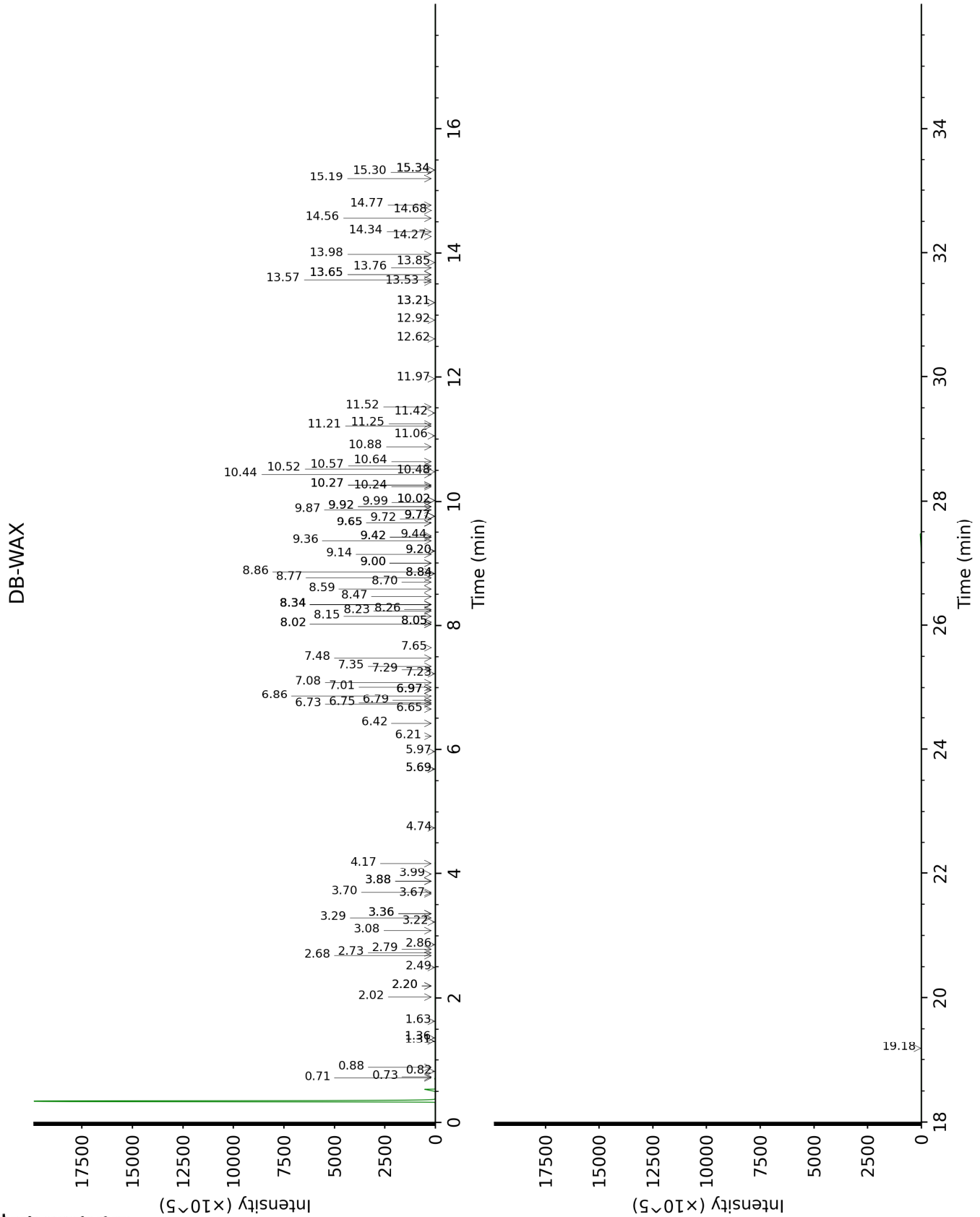
Note: no correction factor was applied

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.

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.35	504	0.01	0.82	907	0.02
Isovaleral	0.56	642	0.01	0.73	887	0.01
2-Methylbutyral	0.59	653	0.01	0.72	881	0.01
2-Ethylfuran	0.72	701	0.01	0.88	918	0.01
Isoamyl alcohol	0.90	731	0.01	3.36*	1180	0.01
2-Methylbutanol	0.92	734	tr	3.36*	1180	[0.01]
(2E)-Hexenal	1.90	849	0.01	3.29	1175	0.01
(3Z)-Hexenol	1.98	855	0.03	5.69*	1350	0.10
Hashishene	2.71	915	0.02	1.31*	991	0.54
α -Thujene	2.86	926	0.04	1.36	998	0.04
α -Pinene	2.93	930	0.54	1.31*	991	[0.54]
Camphene	3.12	943	0.11	1.63	1026	0.10
Thuja-2,4(10)-diene	3.21	949	tr	2.20*	1084	0.52
Benzaldehyde	3.26	953	0.01	7.23	1463	0.03
β -Pinene	3.53*	971	1.54	2.02	1066	1.00
Sabinene	3.53*	971	[1.54]	2.20*	1084	[0.52]
Octan-3-one	3.77	988	0.04	3.88*	1220	0.66
Myrcene	3.86	993	1.07	2.79	1134	1.05
α -Phellandrene	3.98*	1002	0.02	2.68	1126	0.02
Pseudolimonene	3.98*	1002	[0.02]	2.73	1129	0.01
Δ 3-Carene	4.07	1008	0.01	2.49	1110	0.01
(3Z)-Hexenyl acetate	4.12	1010	0.04	4.74	1286	0.04
α -Terpinene	4.18	1014	0.07	2.86	1140	0.07
para-Cymene	4.30	1022	0.14	3.99	1229	0.14
Limonene	4.41*	1029	9.69	3.08	1158	0.41
1,8-Cineole	4.41*	1029	[9.69]	3.22	1169	9.24
(Z)- β -Ocimene	4.59	1040	0.06	3.68	1205	0.06
(E)- β -Ocimene	4.74	1050	0.65	3.88*	1220	[0.66]
γ -Terpinene	4.85	1057	0.08	3.70	1207	0.08
cis-Sabinene hydrate	4.98	1065	0.16	6.79	1430	0.22
cis-Linalool oxide (fur.)	5.08	1072	0.05	6.42	1403	0.05
Octanol	5.15	1076	0.02	8.06*	1526	0.06
Fenchone	5.20	1080	0.06			
Terpinolene	5.31*	1086	0.20	4.17	1242	0.14
trans-Linalool oxide (fur.)	5.31*	1086	[0.20]	6.75	1428	0.01
para-Cymenene	5.31*	1086	[0.20]	6.22	1388	0.01
6,7-Epoxy-myrcene	5.44	1094	0.04	5.97	1370	0.05
Linalool	5.68*	1110	47.73	8.02*	1523	47.71
Hotrienol	5.68*	1110	[47.73]	8.70	1576	0.03
Phenylethyl alcohol	5.68*	1110	[47.73]	11.97	1849	0.01
Octen-3-yl acetate	5.74	1114	0.01	5.69*	1350	[0.10]
cis-para-Menth-2-en-1-ol	5.82	1119	0.07	8.02*	1523	[47.71]
(Z)-Myroxide	6.07	1136	0.02	6.73	1426	0.02

Camphor	6.12	1139	0.49	7.08	1452	0.51
(E)-Myroxide	6.21	1145	0.18	6.97*†	1444	0.44
Isomenthone	6.46	1161	0.01	6.86	1436	0.01
Borneol	6.49	1163	0.12	9.65*†	1652	4.09
δ-Terpineol	6.53	1166	0.17	9.36	1628	0.17
Terpinen-4-ol	6.68	1175	0.54	8.47	1558	0.54
para-Cymen-8-ol	6.83	1185	0.02	11.42	1800	0.03
α-Terpineol	6.90	1190	0.90	9.65*†	1652	[4.09]
Methylchavicol	7.02	1197	0.57	9.20*†	1615	1.10
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	7.24	1212	0.05	11.25	1785	0.07
Octyl acetate	7.33	1218	0.22	6.97*†	1444	[0.44]
Citronellol	7.52*	1231	0.02	10.57	1728	0.01
Nerol	7.52*	1231	[0.02]	10.88	1754	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.56	1234	0.05	11.21	1782	0.02
Carvone	7.67	1241	0.01	9.87	1669	0.01
Geraniol	7.94	1260	0.12	11.52	1809	0.16
Linalyl acetate	7.96	1261	0.05	8.06*	1526	[0.06]
Geranial	8.10	1271	0.02	9.99	1679	0.02
Citronellyl formate	8.19	1277	0.10	8.76	1581	0.02
trans-Linalool oxide acetate (pyr.)	8.28	1283	0.09	8.84*	1586	0.13
Bornyl acetate	8.33	1286	1.04	8.15	1533	1.10
Lavandulyl acetate	8.47	1296	0.01	8.59	1567	0.02
trans-Pinocarvyl acetate	8.49	1298	0.03	9.00*	1599	0.11
Geranyl formate	8.63	1307	0.02	9.77*	1661	1.20
exo-2-Hydroxycineole acetate	9.15	1340	0.09	10.02*	1682	0.11
α-Cubebene	9.25	1347	0.09	6.65	1420	0.05
Eugenol	9.38	1357	5.73	14.68	2101	5.80
Neryl acetate	9.45	1362	0.03	10.02*	1682	[0.11]
α-Ylangene	9.53	1367	0.01	6.97*†	1444	[0.44]
α-Copaene	9.60	1372	0.16	7.01	1447	0.11
1,5-diepi-β-Bourbonene	9.70*	1380	0.27	7.29	1468	tr
β-Bourbonene	9.70*	1380	[0.27]	7.35	1472	0.24
Geranyl acetate	9.74	1382	0.09	10.44	1716	0.08
β-Cubebene	9.81	1387	0.14	7.65	1494	0.19
β-Elemene	9.85	1390	1.63	8.34*†	1548	[7.52]
Unknown [m/z 161, 105 (83), 119 (69), 81 (34), 91 (29), 93 (28)...204]	9.88	1392	0.08			
Methyleugenol	10.05*	1404	0.15	13.20*	1960	0.13
α-Gurjunene	10.05*	1404	[0.15]	7.48	1482	0.01
β-Caryophyllene	10.16	1413	0.37	8.34*†	1548	[7.52]

β-Copaene	10.28	1421	0.05	8.26†	1542	7.52
β-Gurjunene	10.33	1425	0.11	8.24	1540	0.11
α-Guaiene	10.47*	1436	5.69	8.34*†	1548	[7.52]
<i>trans</i> -α-Bergamotene	10.47*	1436	[5.69]	8.34*†	1548	[7.52]
<i>cis</i> -Muurolo-3,5-diene	10.51	1439	0.05	8.84*	1586	[0.13]
<i>cis</i> -β-Bergamotene?	10.55*	1442	0.20			
Cadina-4,11-diene	10.55*	1442	[0.20]	9.00*	1599	[0.11]
α-Humulene	10.63	1447	0.77	9.14	1611	0.75
allo-Aromadendrene	10.76*	1457	0.61	8.86	1588	0.06
<i>cis</i> -Muurolo-4(15),5-diene	10.76*	1457	[0.61]	9.20*†	1615	[1.10]
(<i>E</i>)-β-Farnesene	10.79	1459	0.14	9.42*	1633	0.17
Germacrene D	11.01	1476	3.01	9.65*†	1652	[4.09]
β-Selinene	11.07	1480	0.10	9.72	1658	0.07
<i>trans</i> -β-Bergamotene	11.09*	1482	0.41	9.44	1635	0.36
allo-Aromadendr-9-ene	11.09*	1482	[0.41]	9.42*	1633	[0.17]
Bicyclogermacrene	11.21	1491	0.97	9.92*	1674	0.94
α-Muurolole	11.26	1495	0.23	9.92*	1674	[0.94]
(<i>Z</i>)-α-Bisabolene	11.31	1499	1.28	10.24†	1700	3.81
δ-Guaiene	11.35	1502	1.12	9.77*	1661	[1.20]
γ-Cadinene	11.46*	1510	2.56	10.26*†	1702	[3.81]
(<i>Z</i>)-γ-Bisabolene	11.46*	1510	[2.56]	9.77*	1661	[1.20]
<i>trans</i> -Calamenene	11.54	1517	0.22	11.06	1769	0.35
δ-Cadinene	11.59	1520	0.14	10.26*†	1702	[3.81]
β-Sesquiphellandrene	11.61	1522	0.20	10.48	1720	0.20
<i>trans</i> -Cadina-1,4-diene	11.66*	1526	0.11	10.52	1724	0.03
10-epi-Cubebol?	11.66*	1526	[0.11]	13.65*	2002	0.16
α-Cadinene	11.75	1533	0.06	10.64	1734	0.09
Maaliol	12.08	1559	0.14	12.92	1934	0.16
(<i>E</i>)-Nerolidol	12.15	1565	0.15	13.65*	2002	[0.16]
Germacrene D-4-ol	12.22*	1570	0.21	13.53	1990	0.02
Spathulenol	12.22*	1570	[0.21]	14.26	2060	0.20
Caryophyllene oxide	12.27	1574	0.01	12.62	1907	0.01
Globulol	12.31	1577	0.03	13.76	2012	0.02
Viridiflorol	12.37	1582	0.02	13.85	2020	0.03
Humulene epoxide II	12.60	1600	0.03	13.20*	1960	[0.13]
10-epi-γ-Eudesmol	12.71*	1609	0.49	13.98	2033	0.02
10-epi-Cubenol	12.71*	1609	[0.49]	13.57	1994	0.46
τ-Cadinol	13.04	1637	2.53	14.77	2109	2.56
β-Eudesmol	13.11	1642	0.09	15.30	2163	0.08
α-Eudesmol	13.14	1645	0.03	15.19	2152	0.03
α-Cadinol	13.19	1649	0.10	15.34*	2166	0.11
α-Bisabolol	13.58	1681	0.03	15.34*	2166	[0.11]

Unknown [m/z 133, 93 (97), 131 (85), 145 (83), 107 (69)...220]	13.78	1698	0.01			
Geranyl tiglate	13.82	1701	0.04	14.34	2068	0.04
Mint sulfide?	14.08	1724	0.05			
Phytone	15.49	1848	0.02	14.56	2089	0.04
Phytol	18.26	2115	0.01	19.18	2582	0.01
Total identified		98.08%			97.36%	
Total reported		98.22%			97.38%	

*: 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

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