

Date : November 03, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22J31-PTH02

Customer identification : Organic Lavender Infused Frankincense - Somaliland and USA - LA3101R

Type : Essential oil

Source : Blend of oils

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 : Amélie Simard, Analyste

Analysis date : November 02, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., Chimiste 2013-174

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.

PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.4771 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

No adulterant 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
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
Toluene	0.06	Simple phenolic
Unknown	0.02	Alkene
Unknown	0.01	Unknown
Hashishene	0.92	Monoterpene
Tricyclene	0.06	Monoterpene
α -Thujene	0.99	Monoterpene
α -Pinene	43.80	Monoterpene
Camphene	0.63	Monoterpene
Unknown	0.02	Monoterpene
α -Fenchene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.36	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.01	Monoterpene
Sabinene	5.01	Monoterpene
β -Pinene	1.53	Monoterpene
Pseudolimonene isomer	0.03	Monoterpene
Dehydro-1,8-cineole	0.02	Monoterpenic ether
6-Methyl-5-hepten-2-one	0.03	Aliphatic ketone
Myrcene	8.38	Monoterpene
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.19	Monoterpene
Octanal	0.01	Aliphatic aldehyde
Δ^3 -Carene	0.14	Monoterpene
ortho-Methylanisole	0.08	Simple phenolic
α -Terpinene	0.02	Monoterpene
para-Cymene	4.16	Monoterpene
Limonene	11.57	Monoterpene
1,8-Cineole	0.70	Monoterpenic ether
ortho-Cymene	0.06	Monoterpene
(Z)- β -Ocimene	0.33	Monoterpene
Unknown	0.02	Unknown
(E)- β -Ocimene	0.07	Monoterpene
γ -Terpinene	0.05	Monoterpene
cis-Sabinene hydrate	0.11	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
Unknown	0.02	Oxygenated monoterpene
meta-Cymenene	0.02	Monoterpene
para-Cymenene	0.05	Monoterpene
γ -Campholenal	0.01	Aliphatic alcohol
trans-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Terpinolene	0.03	Monoterpene
6,7-Epoxyterpinene	0.07	Monoterpenic ether
trans-Sabinene hydrate	0.09	Monoterpenic alcohol

Perillene	0.01	Monoterpenic ether
Linalool	0.20	Monoterpenic alcohol
Unknown	0.04	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
β -Thujone	0.06	Monoterpenic ketone
Octen-3-yl acetate	0.01	Aliphatic ester
(E)-4,8-Dimethylnona-1,3,7-triene	0.08	Terpene derivative
α -Campholenal	0.12	Monoterpenic aldehyde
cis-para-Menth-2-en-1-ol	0.07	Monoterpenic alcohol
Octan-3-yl acetate	0.02	Aliphatic ester
trans-Pinocarveol	0.44	Monoterpenic alcohol
Camphor	0.03	Monoterpenic ketone
cis-Verbenol	0.14	Monoterpenic alcohol
trans-Verbenol	0.70	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.04	Monoterpenic alcohol
Sabinaketone	0.03	Normonoterpenic ketone
Unknown	0.05	Oxygenated monoterpene
Pinocarvone	0.04	Monoterpenic ketone
Borneol	0.08	Monoterpenic alcohol
α -Phellandren-8-ol	0.02	Monoterpenic alcohol
Umbellulone	0.04	Monoterpenic ketone
Terpinen-4-ol	0.61	Monoterpenic alcohol
Thuj-3-en-10-al	0.09	Monoterpenic aldehyde
Cryptone	0.02	Normonoterpenic ketone
para-Cymen-8-ol	0.19	Monoterpenic alcohol
α -Terpineol	0.15	Monoterpenic alcohol
Myrtenal	0.04	Monoterpenic aldehyde
Myrtenol	0.15	Monoterpenic alcohol
cis- α -Phellandrene epoxide (iPr vs Me)	0.03	Monoterpenic ether
Verbenone	0.43	Monoterpenic ketone
trans-Piperitol	0.06	Monoterpenic alcohol
Octyl acetate	0.04	Aliphatic ester
trans-Carveol	0.19	Monoterpenic alcohol
cis-Carveol	0.04	Monoterpenic alcohol
Methyl decyl ether	0.09	Aliphatic ether
Carvone	0.13	Monoterpenic ketone
Carvotanacetone	0.03	Monoterpenic ketone
Unknown	0.14	Unknown
Linalyl acetate	0.02	Monoterpenic ester
3,5-Dimethoxytoluene	0.06	Simple phenolic
Unknown	0.04	Oxygenated monoterpene
Bornyl acetate	0.26	Monoterpenic ester
para-Cymen-7-ol	0.06	Monoterpenic alcohol
Perilla alcohol	0.03	Monoterpenic alcohol
Carvacrol	0.03	Monoterpenic alcohol
para-Menth-5-en-1,2-diol isomer III	0.29	Monoterpenic alcohol
Bicycloelemene	0.03	Sesquiterpene
α -Cubebene	0.21	Sesquiterpene
Cyclosativene II	0.05	Sesquiterpene
α -Ylangene	0.01	Sesquiterpene
Neryl acetate	0.03	Monoterpenic ester
α -Copaene	0.84	Sesquiterpene

β-Bourbonene	0.24	Sesquiterpene
1,5-diepi-β-Bourbonene	0.03	Sesquiterpene
Geranyl acetate	0.04	Monoterpenic ester
β-Cubebene	0.05	Sesquiterpene
β-Elemene	0.43	Sesquiterpene
Hexyl hexanoate	0.08	Aliphatic ester
α-Gurjunene	0.15	Sesquiterpene
β-Cedrene	0.03	Sesquiterpene
β-Caryophyllene	1.80	Sesquiterpene
β-Copaene	0.02	Sesquiterpene
<i>trans</i> -α-Bergamotene	0.12	Sesquiterpene
6,9-Guaiadiene	0.07	Sesquiterpene
α-Humulene	0.48	Sesquiterpene
allo-Aromadendrene	0.14	Sesquiterpene
(<i>E</i>)-β-Farnesene	0.02	Sesquiterpene
γ-Murolene	0.26	Sesquiterpene
Germacrene D	0.07	Sesquiterpene
β-Selinene	0.17	Sesquiterpene
α-Selinene	0.11	Sesquiterpene
epi-Cubebol	0.15	Sesquiterpenic alcohol
α-Murolene	0.15	Sesquiterpene
Cubebol	0.22	Sesquiterpenic alcohol
γ-Cadinene	0.20	Sesquiterpene
δ-Cadinene	0.35	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene
Isocaryophyllene epoxide B	0.08	Sesquiterpenic ether
(<i>E</i>)-Nerolidol	0.03	Sesquiterpenic alcohol
Caryophyllene oxide	1.37	Sesquiterpenic ether
Spathulenol	0.08	Sesquiterpenic alcohol
10-epi-Liguloxide	0.02	Sesquiterpenic ether
Caryophyllene oxide isomer	0.26	Sesquiterpenic ether
Viridiflorol	0.72	Sesquiterpenic alcohol
Copaborneol	0.07	Sesquiterpenic alcohol
Humulene epoxide II	0.27	Sesquiterpenic ether
10-epi-Cubebol	0.03	Sesquiterpenic alcohol
τ-Cadinol	0.12	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.03	Sesquiterpenic alcohol
Unknown	0.03	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5β-ol	0.05	Sesquiterpenic alcohol
α-Phellandrene dimer II	0.06	Diterpene
α-Phellandrene dimer III	0.03	Diterpene
Unknown	0.04	Oxygenated sesquiterpene
(3 <i>E</i>)-Cembrene A	0.17	Diterpene
Cembrene C	0.03	Diterpene
Verticilla-4(20),7,11-triene	0.03	Diterpene
Incensole	0.06	Diterpenic alcohol
Serratol	0.33	Diterpenic alcohol
Consolidated total	95.79%	

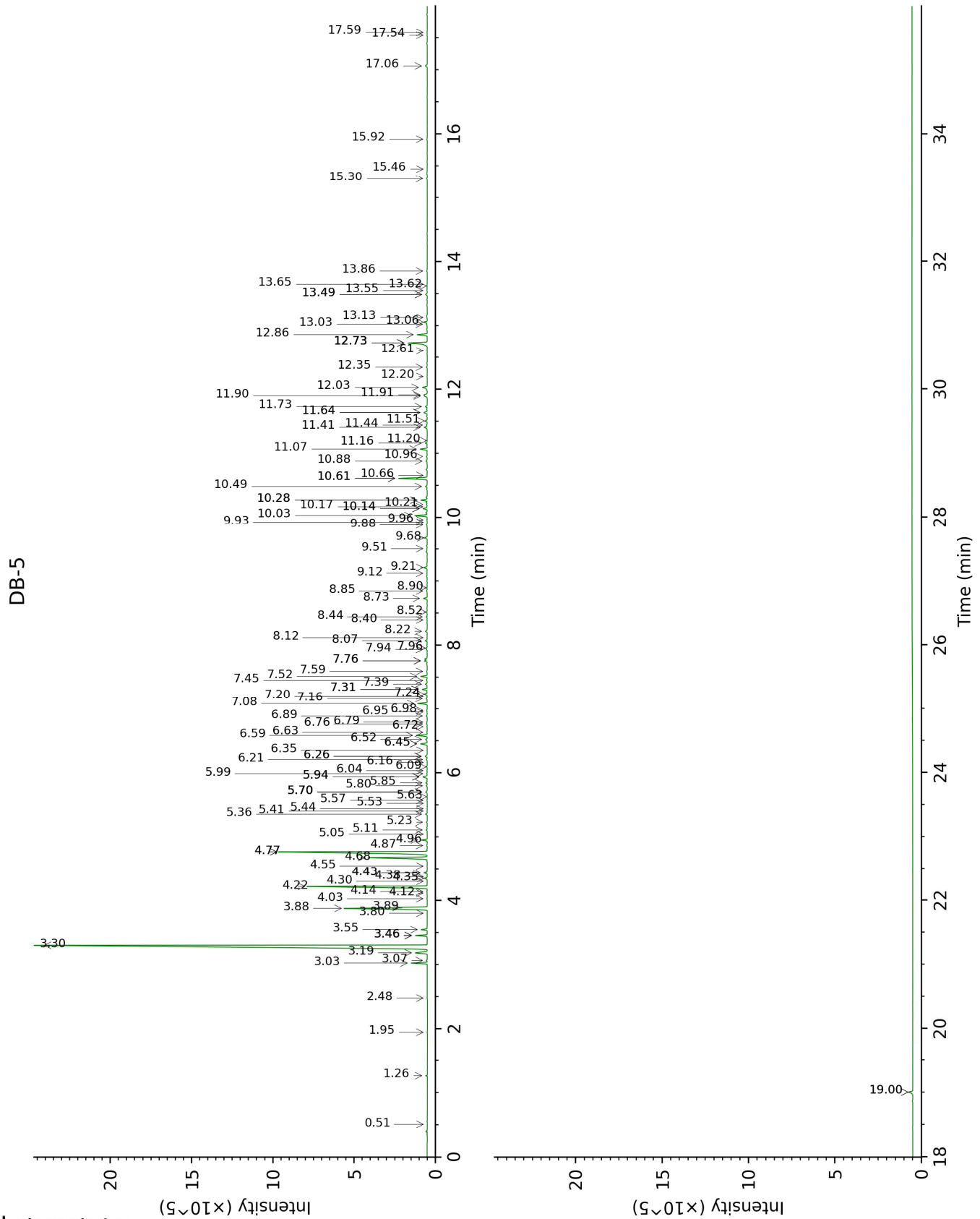
tr: The compound has been detected below 0.005% of total signal.

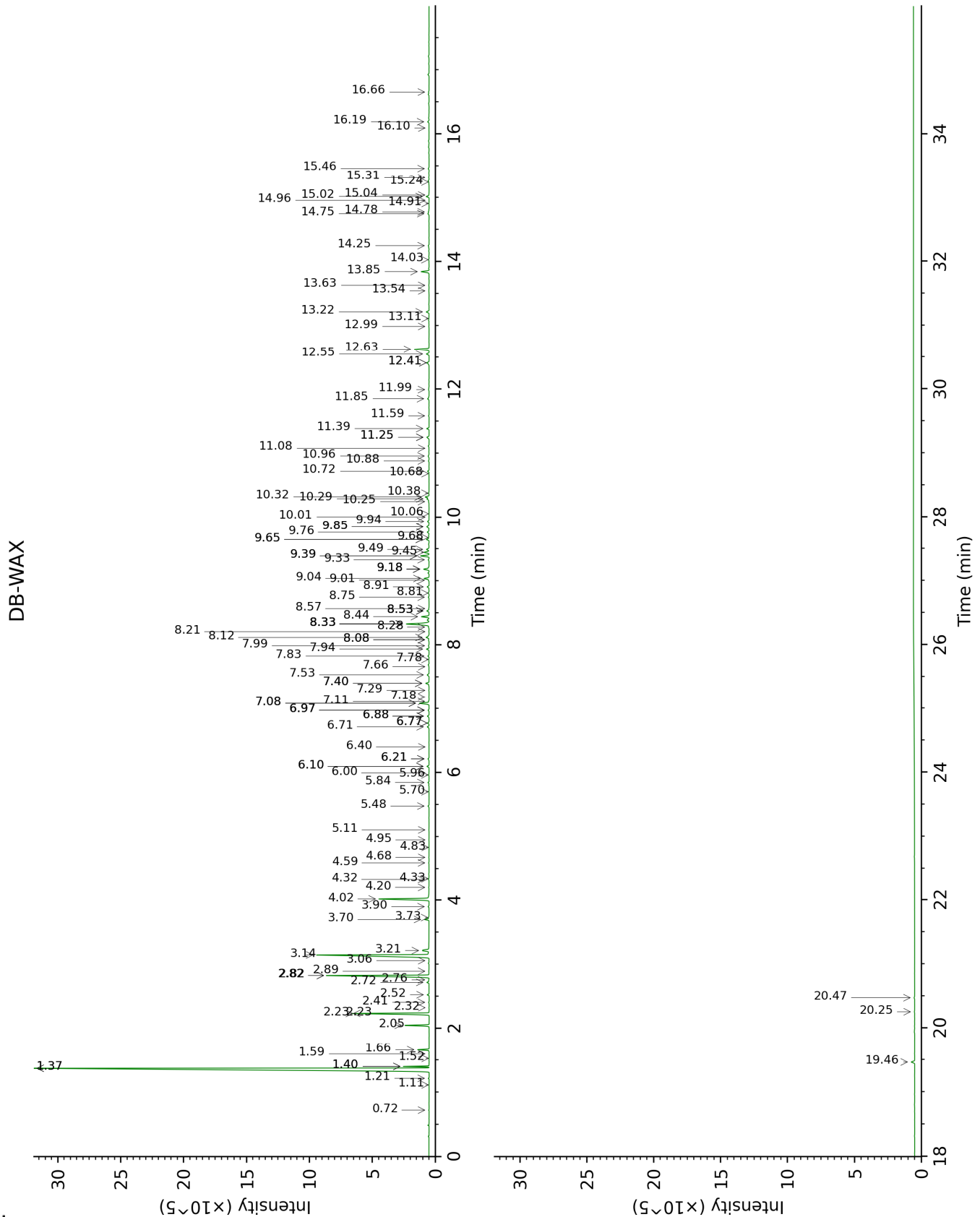
Note: no correction factor was applied

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	%
2-Methyl-3-buten-2-ol	0.51	588	tr	1.52	1015	0.01
Toluene	1.26	758	0.06	1.40*†	1002	[45.89]
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.95	832	0.02	0.72	884	0.02
Unknown [m/z 79, 78 (45), 91 (28), 77 (28), 41 (13), 80 (12), 107 (11)... 122 (1)]	2.48	875	0.01	1.11	958	0.01
Hashishene	3.03	916	0.92	1.37*†	999	45.89
Tricyclene	3.07	919	0.06	1.21	975	0.05
α-Thujene	3.18	927	0.99	1.40*†	1002	[45.89]
α-Pinene	3.30	934	43.80	1.37*†	999	[45.89]
Camphene	3.46*	944	0.65	1.66	1028	0.63
Unknown [m/z 91, 92 (47), 65 (11)... 134 (1)]	3.46*	944	[0.65]	2.32	1096	0.02
α-Fenchene	3.46*	944	[0.65]	1.59	1022	0.01
Thuja-2,4(10)-diene	3.55	950	0.36	2.23*	1087	5.37
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.80	967	0.01	2.82*	1136	8.40
Sabinene	3.88†	972	6.56	2.23*	1087	[5.37]
β-Pinene	3.89†	973	[6.56]	2.05	1068	1.53
Pseudolimonene isomer	4.03	982	0.03	2.41	1103	0.05
Dehydro-1,8-cineole	4.12	988	0.02	3.06	1155	0.02
6-Methyl-5-hepten-2-one	4.14	989	0.03	4.95	1302	0.01
Myrcene	4.22	995	8.38	2.82*	1136	[8.40]
Pseudolimonene	4.30	1000	0.01	2.76	1131	0.03
α-Phellandrene	4.35	1003	0.19	2.72	1128	0.17
Octanal	4.38	1005	0.01	4.32	1254	0.04
Δ3-Carene	4.43*	1008	0.21	2.52	1112	0.14
ortho-Methylanisole	4.43*	1008	[0.21]	5.84	1360	0.08
α-Terpinene	4.55	1015	0.02	2.89	1142	0.02
para-Cymene	4.68	1024	4.16	4.02	1231	4.10
Limonene	4.77*	1029	12.49	3.14	1162	11.57
1,8-Cineole	4.77*	1029	[12.49]	3.21	1168	0.70
ortho-Cymene	4.87	1036	0.06	4.33	1255	0.03
(Z)-β-Ocimene	4.96	1041	0.33	3.70	1207	0.32
Unknown [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	5.05	1047	0.02	7.18	1459	0.02
(E)-β-Ocimene	5.11	1051	0.07	3.90	1222	0.07
γ-Terpinene	5.23	1058	0.05	3.73	1209	0.07

<i>cis</i> -Sabinene hydrate	5.36	1066	0.11	6.77*	1428	0.14
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.41	1069	0.02	4.68	1281	0.02
<i>cis</i> -Linalool oxide (fur.)	5.44	1071	0.01	6.40	1400	0.01
Octanol	5.53	1076	0.01	8.08*	1527	0.07
Unknown [m/z 43, 94 (63), 109 (61), 59 (55), 79 (51)...152 (2)]	5.57	1080	0.02	7.11	1454	0.04
meta-Cymenene	5.63	1083	0.02	6.10*	1378	0.18
para-Cymenene	5.70*	1088	0.14	6.21*	1387	0.11
γ-Campholenal	5.70*	1088	[0.14]	4.83	1293	0.01
<i>trans</i> -Linalool oxide (fur.)	5.70*	1088	[0.14]	6.77*	1428	[0.14]
Terpinolene	5.70*	1088	[0.14]	4.20	1245	0.03
6,7-Epoxyborneol	5.80	1094	0.07	5.96	1368	0.04
<i>trans</i> -Sabinene hydrate	5.85	1097	0.09	7.83	1508	0.10
Perillene	5.94*	1102	0.40	6.00	1371	0.01
Linalool	5.94*	1102	[0.40]	7.94	1516	0.20
Unknown [m/z 119, 109 (94), 43 (61), 95 (56), 91 (48), 77 (32), 152 (32), 137 (31), 134 (24)]	5.99	1105	0.04	8.33*	1547	2.39
Unknown [m/z 109, 81 (54), 91 (32), 79 (22)...]	6.04	1108	0.03	6.10*	1378	[0.18]
β-Thujone	6.10	1112	0.06	6.21*	1387	[0.11]
Octen-3-yl acetate	6.16	1117	0.01	5.70	1349	0.02
(<i>E</i>)-4,8-Dimethylnona-1,3,7-triene	6.21	1120	0.08	4.59	1275	0.03
α-Campholenal	6.26*	1123	0.18	6.88*	1436	0.16
<i>cis</i> -para-Menth-2-en-1-ol	6.26*	1123	[0.18]	7.99	1520	0.07
Octan-3-yl acetate	6.35	1129	0.02	5.11	1306	0.02
<i>trans</i> -Pinocarveol	6.45*	1135	0.47	9.04	1602	0.44
Camphor	6.45*	1135	[0.47]	7.08*	1451	0.83
<i>cis</i> -Verbenol	6.52	1140	0.14	9.18*	1614	0.54
<i>trans</i> -Verbenol	6.59	1144	0.70	9.39*	1631	0.69
meta-Mentha-4,6-dien-8-ol	6.63	1147	0.04	9.18*	1614	[0.54]
Sabinaketone	6.72	1152	0.03	8.57	1565	0.04
Unknown [m/z 97, 81 (96), 109 (80), 43 (53), 53 (40), 41 (36), 56 (29), 95 (25)... 152 (1)]	6.76	1155	0.05	7.40*	1475	0.29
Pinocarvone	6.79	1157	0.04	7.78	1503	0.04
Borneol	6.89	1163	0.08	9.65*	1652	0.23

α-Phellandren-8-ol	6.95	1167	0.02	10.00	1681	0.01
Umbellulone	6.98	1168	0.04	8.75	1579	0.07
Terpinen-4-ol	7.08	1175	0.61	8.44	1556	0.63
Thuj-3-en-10-al	7.16	1180	0.09	8.53*	1562	0.20
Cryptone	7.20	1183	0.02	9.01	1600	0.05
para-Cymen-8-ol	7.24	1185	0.19	11.39	1798	0.19
α-Terpineol	7.31*	1190	0.34	9.65*	1652	[0.23]
Myrtenal	7.31*	1190	[0.34]	8.53*	1562	[0.20]
Myrtenol	7.40	1195	0.15	10.72	1741	0.12
cis-α-Phellandrene epoxide (iPr vs Me)	7.45	1199	0.03	10.88	1755	0.06
Verbenone	7.52	1203	0.43	9.49	1639	0.26
trans-Piperitol	7.59	1208	0.06	10.25	1701	0.06
Octyl acetate	7.76*†	1219	0.39	6.97*	1443	0.08
trans-Carveol	7.76*†	1219	[0.39]	11.25*	1786	0.24
cis-Carveol	7.94	1231	0.04	11.59	1816	0.05
Methyl decyl ether	7.96	1232	0.09	5.48	1333	0.09
Carvone	8.07	1240	0.13	9.85*	1668	0.25
Carvotanacetone	8.12	1243	0.03	9.33	1626	0.09
Unknown [m/z 43, 97 (69), 107 (46), 41 (28), 55 (21), 109 (20)...]	8.22	1250	0.14	10.96	1762	0.12
Linalyl acetate	8.40	1262	0.02	8.08*	1527	[0.07]
3,5-Dimethoxytoluene	8.44	1265	0.06	11.25*	1786	[0.24]
Unknown [m/z 109, 41 (22), 81 (14), 43 (11)... 152 (4)]	8.52	1270	0.04			
Bornyl acetate	8.73	1284	0.26	8.12	1530	0.33
para-Cymen-7-ol	8.85	1292	0.06	14.03	2041	0.06
Perilla alcohol	8.90	1295	0.03	13.11	1954	0.03
Carvacrol	9.12	1308	0.03	15.24	2160	0.03
para-Menth-5-en-1,2-diol isomer III	9.21	1314	0.29	15.02	2138	0.26
Bicycloelemene	9.51	1335	0.03	6.97*	1443	[0.08]
α-Cubebene	9.68	1347	0.21	6.71	1424	0.17
Cyclosativene II	9.88	1362	0.05	6.88*	1436	[0.16]
α-Ylangene	9.93	1365	0.01	6.97*	1443	[0.08]
Neryl acetate	9.96	1368	0.03	10.06	1685	0.01
α-Copaene	10.03	1372	0.84	7.08*	1451	[0.83]
β-Bourbonene	10.14*	1380	0.30	7.40*	1475	[0.29]
1,5-diepi-β-Bourbonene	10.14*	1380	[0.30]	7.29	1467	0.03
Geranyl acetate	10.17	1382	0.04	10.38	1712	0.05
β-Cubebene	10.21	1385	0.05	7.66	1495	0.02
β-Elemene	10.28*†	1389	0.51	8.33*	1547	[2.39]
Hexyl hexanoate	10.28*†	1389	[0.51]	8.81	1584	0.08
α-Gurjunene	10.49	1404	0.15	7.53	1485	0.19
β-Cedrene	10.61*	1414	2.03	8.21	1537	0.03
β-Caryophyllene	10.61*	1414	[2.03]	8.33*	1547	[2.39]
β-Copaene	10.66	1417	0.02	8.28	1543	0.06

<i>trans</i> - α -Bergamotene	10.88	1434	0.12	8.33*	1547	[2.39]
6,9-Guaiadiene	10.96	1439	0.07	8.53*	1562	[0.20]
α -Humulene	11.07	1448	0.48	9.18*	1614	[0.54]
allo-Aromadendrene	11.16	1455	0.14	8.91	1592	0.17
(<i>E</i>)- β -Farnesene	11.20	1458	0.02	9.39*	1631	[0.69]
γ -Muurolene	11.41	1473	0.26	9.45	1636	0.44
Germacrene D	11.44	1476	0.07	9.68	1654	0.05
β -Selinene	11.51	1481	0.17	9.76	1661	0.17
α -Selinene	11.64*	1490	0.29	9.85*	1668	[0.25]
epi-Cubebol	11.64*	1490	[0.29]	11.85	1840	0.15
α -Muurolene	11.73	1497	0.15	9.94	1676	0.14
Cubebol	11.90†	1510	0.45	12.41*	1889	0.28
γ -Cadinene	11.92†	1511	[0.45]	10.29†	1705	0.56
δ -Cadinene	12.03	1520	0.35	10.32†	1707	[0.56]
α -Cadinene	12.20	1534	0.03	10.68	1738	0.02
Isocaryophyllene epoxide B	12.35	1545	0.08	11.99	1852	0.05
(<i>E</i>)-Nerolidol	12.61	1566	0.03	13.63	2002	0.04
Caryophyllene oxide	12.73*	1575	1.70	12.63	1909	1.37
Spathulenol	12.73*	1575	[1.70]	14.25	2062	0.08
10-epi-Liguloxide	12.73*	1575	[1.70]	11.08	1772	0.02
Caryophyllene oxide isomer	12.73*	1575	[1.70]	12.55	1902	0.26
Viridiflorol	12.86	1586	0.72	13.84	2023	0.73
Copaborneol	13.03	1598	0.07	14.78	2114	0.08
Humulene epoxide II	13.06	1601	0.27	13.22	1964	0.28
10-epi-Cubenol	13.13	1607	0.03	13.54	1994	0.03
τ -Cadinol	13.49*	1636	0.14	14.75	2111	0.12
τ -Muurolol	13.49*	1636	[0.14]	14.91	2127	0.02
α -Muurolol	13.55	1641	0.03	15.04	2140	0.03
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	13.62	1647	0.03	14.96	2132	0.01
α -Cadinol	13.65	1649	0.02	15.32	2168	0.05
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	13.86	1666	0.05	16.66	2307	0.06
α -Phellandrene dimer II	15.30	1789	0.06	12.41*	1889	[0.28]
α -Phellandrene dimer III	15.46	1802	0.03	12.99	1943	0.04
Unknown [m/z 43, 107 (97), 81 (83), 121 (77), 123 (74), 93 (73)... 220 (26)...]	15.92	1845	0.04	20.25	2719	0.04
(3 <i>E</i>)-Cembrene A	17.06	1950	0.17	15.46	2182	0.09
Cembrene C	17.54	1995	0.03	16.10	2248	0.02
Verticilla-4(20),7,11-triene	17.59	1999	0.03	16.19	2258	0.14
Incensole	19.00*	2140	0.36	20.47	2746	0.06

Serratol	19.00*	2140	[0.36]	19.46	2623	0.33
Total identified		96.30%			95.67%	
Total reported		96.75%			95.98%	

*: 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