

Green Hojari Frankincense Essential Oil

ESSENTIAL OIL ANALYSIS

Laboratoire
PhytoChemia





CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION 

Internal code : 18I25-FSE11-1-CC 

Customer identification : Frankincense - Nigeria - II091918


Type : Essential oil

Source : *Boswellia dalzielii*

Customer : Flowers Shining Everywhere Inc.




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 

Checked and approved by :


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

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4655 ± 0.0003 (20 °C)



CONCLUSION

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



ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
2-Methyl-3-buten-2-ol	tr	0.02	Aliphatic alcohol
3-Methyl-2-butanone	tr	0.13	Aliphatic ketone
Unknown	tr	tr	Unknown
Toluene	0.02	9.97*	Simple phenolic
Unknown	0.01	0.01	Alkene
Unknown	0.03	0.03	Alkene
Unknown	0.02	0.02	Unknown
Unknown	tr	tr	Monoterpene
Unknown	0.01		Monoterpene
Hashishene	0.76	71.98*	Monoterpene
Tricyclene	0.08	0.08	Monoterpene
α -Thujene	9.75	[9.97]*	Monoterpene
α -Pinene	71.50	[71.98]*	Monoterpene
Unknown	0.03	0.02	Monoterpene
Unknown	0.13	0.16	Monoterpene
α -Fenchene	0.81*	0.01	Monoterpene
Camphene	[0.81]*	0.78	Monoterpene
Thuja-2,4(10)-diene	0.30	1.35*	Monoterpene
Sabinene	2.93*	[1.35]*	Monoterpene
β -Pinene	[2.93]*	1.83	Monoterpene
Pseudolimonene isomer	0.02	0.03	Monoterpene
Menthatriene isomer 0	0.05*	0.04	Monoterpene
Dehydro-1,8-cineole	[0.05]*	0.03	Monoterpenic ether
Myrcene	3.50	3.58	Monoterpene
3-para-Menthene?	0.03	0.01	Monoterpene
α -Phellandrene	0.10*	0.06	Monoterpene
Menthatriene isomer I	[0.10]*	0.05	Monoterpene
ortho-Methylanisole	0.22	0.21	Simple phenolic
Δ 3-Carene	0.19	0.21	Monoterpene
α -Terpinene	0.03	0.05	Monoterpene
Unknown	0.03*	0.02	Monoterpene
ortho-Cymene	[0.03]*	0.97*	Simple phenolic
para-Cymene	0.92	[0.97]*	Monoterpene
Unknown	2.69	0.24*	Unknown
β -Phellandrene	[2.69]*	0.22*	Monoterpene
Limonene	[2.69]*	2.39	Monoterpene
1,8-Cineole	[2.69]*	[0.22]*	Monoterpenic ether
Unknown	[2.69]*	0.03	Monoterpene
Cymene analog	0.01	0.02	Monoterpene
Unknown	0.28*	0.01	Unknown
(Z)- β -Ocimene	[0.28]*	0.29	Monoterpene
Unknown	0.04		Unknown
(E)- β -Ocimene	0.10	0.11	Monoterpene
γ -Terpinene	0.06	0.07	Monoterpene
cis-Sabinene hydrate	0.01	0.02	Monoterpenic alcohol
Unknown	0.01	0.02	Oxygenated monoterpene
Unknown	0.06	0.05	Oxygenated monoterpene
Isoperillene	0.04		Monoterpenic ether

γ -Campholenal	0.10*	0.01	Aliphatic alcohol
para-Cymenene	[0.10]*	0.01	Monoterpene
Terpinolene	[0.10]*	0.03	Monoterpene
α -Pinene oxide	0.05	0.04	Monoterpenic ether
trans-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Perillene	0.05*	0.03*	Monoterpenic ether
Filifolone?	[0.05]*	[0.24]*	Monoterpenic ketone
Linalool	0.14*	0.11	Monoterpenic alcohol
α -Thujone	[0.14]*	[0.03]*	Monoterpenic ketone
endo-Fenchol	0.20*	tr	Monoterpenic alcohol
β -Thujone	[0.20]*	0.19	Monoterpenic ketone
Verbenol analog?	[0.20]*	0.02	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.03*	0.01	Monoterpenic alcohol
Chrysanthenone	[0.03]*	0.02	Monoterpenic ketone
α -Campholenal	0.36	0.35*	Monoterpenic aldehyde
trans-Pinocarveol	0.50	0.51	Monoterpenic alcohol
trans-Sabinol	0.19*	0.13*	Monoterpenic alcohol
cis-Verbenol	[0.19]*	0.11*	Monoterpenic alcohol
Camphor	[0.19]*	0.06	Monoterpenic ketone
trans-Verbenol	0.71	0.74	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.08	[0.11]*	Monoterpenic alcohol
Citronellal	0.05*	[0.35]*	Monoterpenic aldehyde
Sabinaketone	[0.05]*	0.05	Normonoterpenic ketone
Unknown	0.05	0.07	Oxygenated monoterpene
Pinocarvone	0.02	0.01	Monoterpenic ketone
Borneol	0.02	[0.13]	Monoterpenic alcohol
α -Phellandren-8-ol	0.13	0.15	Monoterpenic alcohol
Isopinocampone	0.07*	0.03	Monoterpenic ketone
cis-Sabinol	[0.07]*	0.16*	Monoterpenic alcohol
Terpinen-4-ol	0.06	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.05	0.06	Monoterpenic alcohol
α -Terpineol	0.09	[0.13]*	Monoterpenic alcohol
Myrtenal	0.04	0.10	Monoterpenic aldehyde
Myrtenol	0.09	[0.16]*	Monoterpenic alcohol
Verbenone	0.18	0.21	Monoterpenic ketone
trans-Carveol	0.05	0.10*	Monoterpenic alcohol
cis-Carveol	tr	0.03	Monoterpenic alcohol
Carvone	0.01	0.03	Monoterpenic ketone
Unknown	0.02	[0.10]*	Oxygenated monoterpene
3,5-Dimethoxytoluene	0.04	[0.10]*	Simple phenolic
Isopiperitenone	0.02	0.01	Monoterpenic ketone
Bornyl acetate	0.08	0.09	Monoterpenic ester
Thymol	0.01	0.03	Monoterpenic alcohol
Carvacrol	0.03	0.01	Monoterpenic alcohol
α -Copaene	0.03	0.02	Sesquiterpene
β -Caryophyllene	0.02		Sesquiterpene
trans- α -Bergamotene	0.02		Sesquiterpene
α -Phellandrene dimer II	0.01		Diterpene
(3E)-Cembrene A	0.05		Diterpene
Cembrenol	0.01		Diterpenic alcohol
Incensole	0.05*	0.03	Diterpenic alcohol
Serratol	[0.05]*	0.03	Diterpenic alcohol

Total identified	98.00%	98.32%	
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*: 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

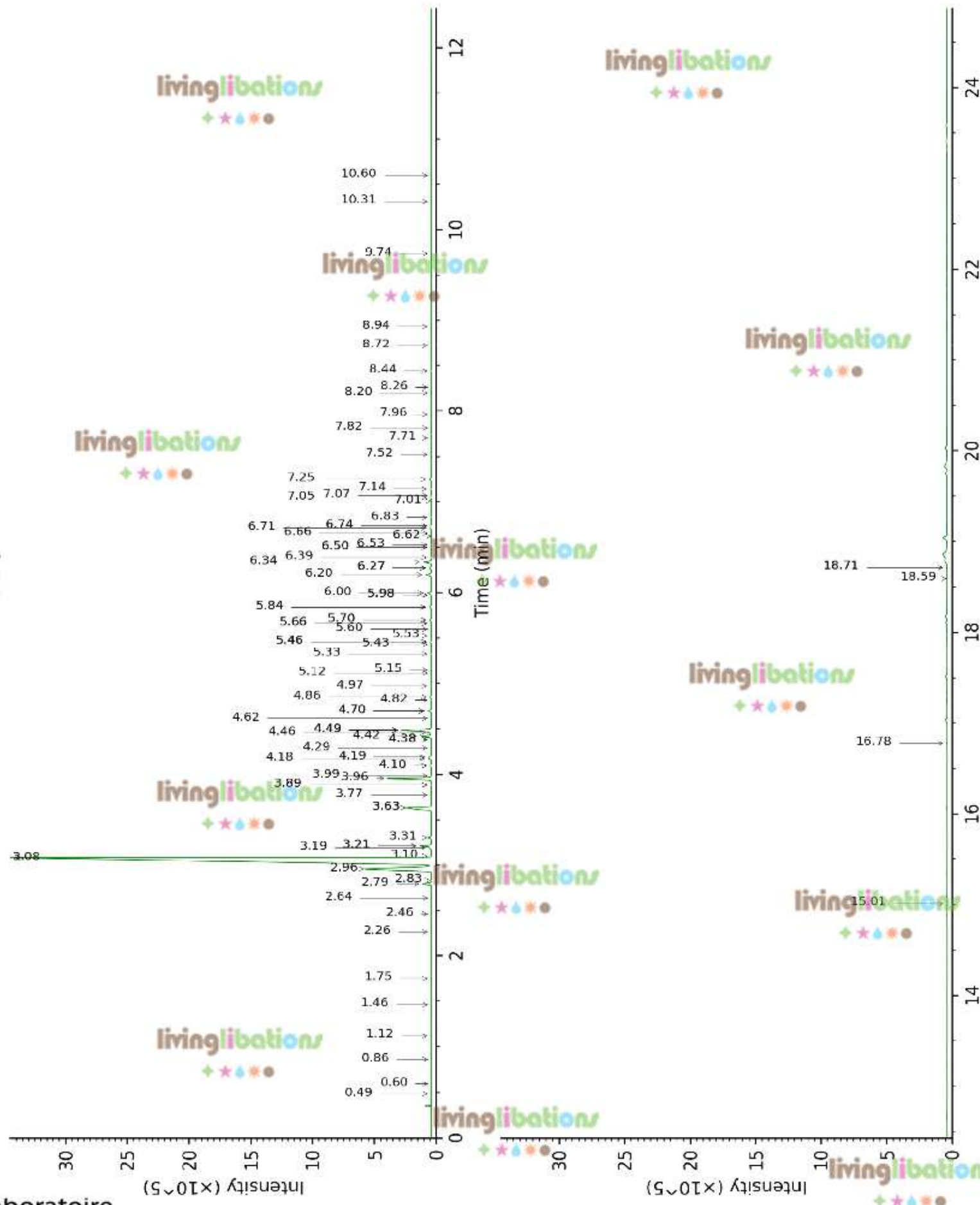




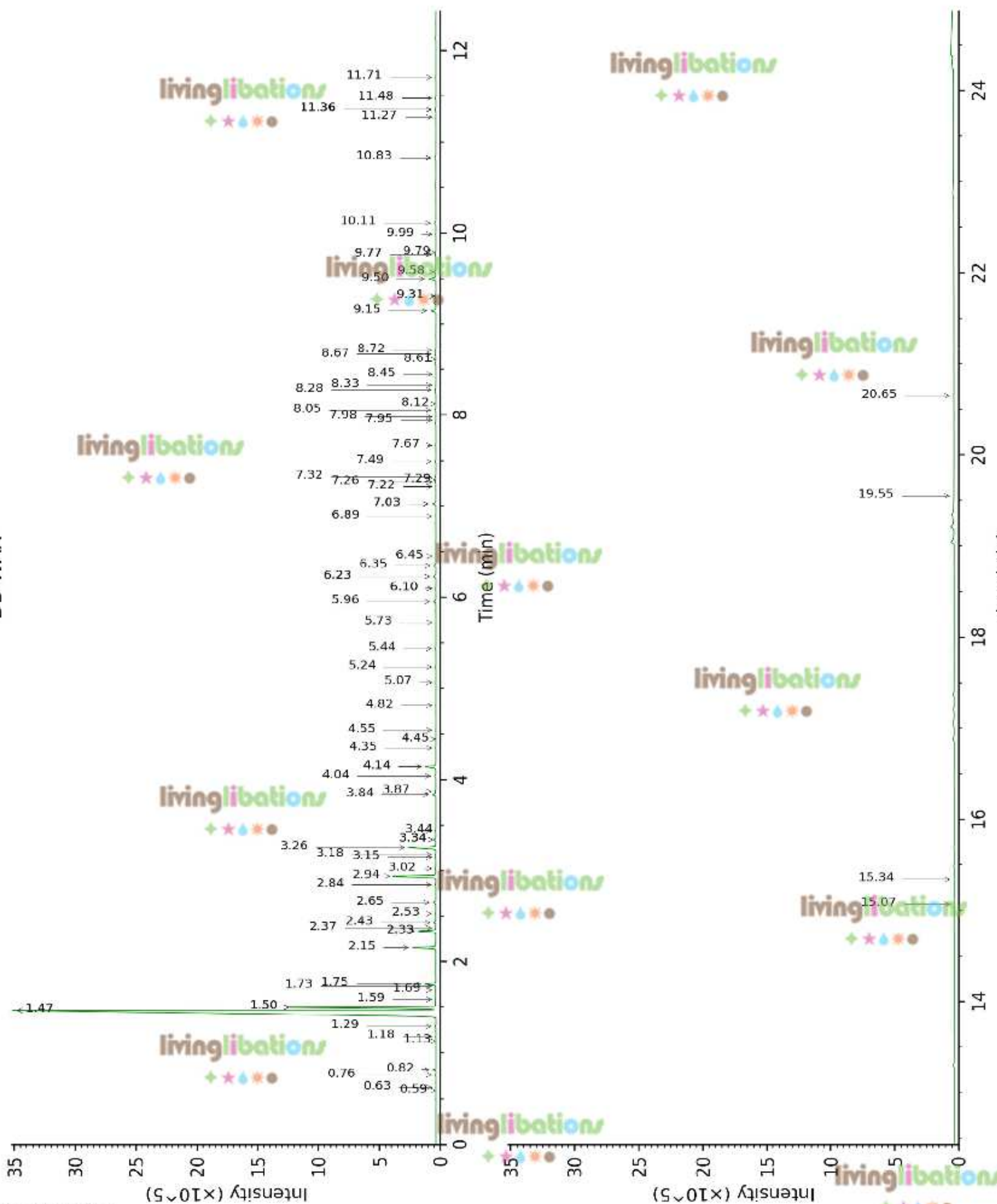
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DB-5



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
2-Methyl-3-buten-2-ol	0.49	603	tr	1.59	1015	0.02
3-Methyl-2-butanone	0.60	643	tr	0.82	902	0.13
Unknown [m/z 93, 91 (70), 77 (48), 108 (42)]	0.86	716	tr	0.59	822	tr
Toluene	1.12	754	0.02	1.50*	1007	9.97
Unknown [m/z 109, 67 (33), 41 (16), 81 (13)... 124 (8)]	1.46	802	0.01	0.63	835	0.01
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.75	826	0.03	0.76	884	0.03
Unknown [m/z 79, 78 (45), 91 (28), 77 (28), 41 (13), 80 (12), 107 (11)... 122 (1)]	2.26	870	0.02	1.18	960	0.02
Unknown [m/z 93, 91 (75), 121 (61), 77 (58), 79 (38), 92 (26), 43 (24), 41 (23), 105 (22), 107 (19), 136 (16)]	2.46	887	tr	1.13	952	tr
Unknown [m/z 93, 91 (72), 121 (58), 77 (49), 79 (41), 43 (22), 105 (20), 107 (20), 41 (18), 136 (17), 92 (17)]	2.64	901	0.01			
Hashishene	2.79	911	0.76	1.46*	1003	71.98
Tricyclene	2.83	914	0.08	1.29	978	0.08
α-Thujene	2.96	922	9.75	1.50*	1007	9.97
α-Pinene	3.08	930	71.50	1.46*	1003	71.98
Unknown [m/z 93, 91 (50), 92 (37), 79 (36), 77 (35), 121 (19)... 136 (t)]	3.10	932	0.03	1.73	1029	0.02
Unknown [m/z 91, 92 (47), 65 (11)... 134 (1)]	3.19	938	0.13	2.43	1098	0.16
α-Fenchene	3.22*	940	0.81	1.69	1025	0.01
Camphene	3.22*	940	[0.81]	1.76	1032	0.78
Thuja-2,4(10)-diene	3.31	946	0.30	2.33*	1088	1.35

Sabinene	3.64*	968	2.93	2.33*	1088	[1.35]
β-Pinene	3.64*	968	[2.93]	2.16	1071	1.83
Pseudolimonene isomer	3.78	977	0.02	2.53	1106	0.03
Menthatriene isomer 0	3.89*	984	0.05	3.18	1156	0.04
Dehydro-1,8-cineole	3.89*	984	[0.05]	3.15	1154	0.03
Myrcene	3.96	989	3.50	2.94	1138	3.58
3-para-Menthene?	3.99	991	0.03	2.37	1092	0.01
α-Phellandrene	4.10*	998	0.10	2.84	1130	0.06
Menthatriene isomer I	4.10*	998	[0.10]	3.44	1177	0.05
ortho-Methylanisole	4.18	1004	0.22	5.96	1359	0.21
Δ3-Carene	4.19	1004	0.19	2.65	1115	0.21
α-Terpinene	4.29	1011	0.03	3.02	1144	0.05
Unknown [m/z 117, 132 (96), 115 (65), 91 (44), 131 (19), 116 (18)]	4.38*	1016	0.03	4.45	1250	0.02
ortho-Cymene	4.38*	1016	[0.03]	4.14*	1229	0.97
para-Cymene	4.42	1019	0.92	4.14*	1229	[0.97]
Unknown [m/z 109, 43 (58), 95 (26)... 137 (15)...]	4.46†	1021	2.69	6.23*	1378	0.24
β-Phellandrene	4.49*†	1023	[2.69]	3.34*	1169	0.22
Limonene	4.49*†	1023	[2.69]	3.26	1162	2.39
1,8-Cineole	4.49*†	1023	[2.69]	3.34*	1169	[0.22]
Unknown [m/z 95, 123 (60), 67 (50), 41 (27)... 138 (20)]	4.49*†	1023	[2.69]	5.24	1307	0.03
Cymene analog	4.62	1031	0.01	4.55	1257	0.02
Unknown [m/z 43, 55 (65), 41 (34), 67 (32), 107 (30), 122 (26)... 125 (10)]	4.70*	1036	0.28	5.73	1342	0.01
(Z)-β-Ocimene	4.70*	1036	[0.28]	3.84	1207	0.29
Unknown (m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...) (E)-β-Ocimene	4.82	1044	0.04			
γ-Terpinene	4.86	1046	0.10	4.04	1221	0.11
cis-Sabinene hydrate	4.98	1054	0.06	3.87	1209	0.07
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152	5.12	1062	0.01	6.89	1427	0.02
	5.15	1064	0.01	4.82	1277	0.02

(18)]						
Unknown [m/z 43, 94 (63), 109 (61), 59 (55), 79 (51)...152 (2)]						
	5.33	1076	0.06	7.26	1455	0.05
Isoperillene	5.43	1082	0.04			
γ-Campholenal	5.46*	1084	0.10	5.07	1295	0.01
para-Cymenene	5.46*	1084	[0.10]	6.45	1394	0.01
Terpinolene	5.46*	1084	[0.10]	4.35	1243	0.03
α-Pinene oxide	5.53	1088	0.05	5.44	1322	0.04
trans-Sabinene hydrate	5.60	1093	0.01	7.98	1509	0.01
Perillene	5.66*	1097	0.05	6.10*	1369	0.03
Filifolone?	5.66*	1097	[0.05]	6.23*	1378	[0.24]
Linalool	5.70*	1099	0.14	8.05	1514	0.11
α-Thujone	5.70*	1099	[0.14]	6.10*	1369	[0.03]
endo-Fenchol	5.84*	1108	0.20	8.45	1545	tr
β-Thujone	5.84*	1108	[0.20]	6.35	1387	0.19
Verbenol analog?	5.84*	1108	[0.20]	8.33	1536	0.02
cis-para-Menth-2-en-1-ol	5.98*	1117	0.03	8.12	1520	0.01
Chrysanthenone	5.98*	1117	[0.03]	7.22	1451	0.02
α-Campholenal	6.00	1118	0.36	7.02*	1437	0.35
trans-Pinocarveol	6.20	1131	0.50	9.15	1600	0.51
trans-Sabinol	6.27*	1136	0.19	9.77*†	1650	0.13
cis-Verbenol	6.27*	1136	[0.19]	9.31*	1613	0.11
Camphor	6.27*	1136	[0.19]	7.32	1459	0.06
trans-Verbenol	6.34	1140	0.71	9.50	1628	0.74
meta-Mentha-4,6-dien-8-ol	6.39	1143	0.08	9.31*	1613	[0.11]
Citronellal	6.50*	1150	0.05	7.02*	1437	[0.35]
Sabinaketone	6.50*	1150	[0.05]	8.72	1566	0.05
Unknown [m/z 97, 81 (96), 109 (80), 43 (53), 53 (40), 41 (36), 56 (29), 95 (25)... 152 (1)]						
	6.53	1152	0.05	7.49	1472	0.07
Pinocarpone	6.62	1158	0.02	7.94	1506	0.01
Borneol	6.66	1160	0.02	9.79†	1652	[0.13]
α-Phellandren-8-ol	6.71	1164	0.13	10.11	1678	0.15
Isopinocampone	6.74*	1165	0.07	7.67	1485	0.03
cis-Sabinol	6.74*	1165	[0.07]	10.83*	1738	0.16
Terpinen-4-ol	6.83	1171	0.06	8.61	1558	0.01
para-Cymen-8-ol	7.01	1183	0.05	11.48	1794	0.06
α-Terpineol	7.05	1185	0.09	9.77*†	1650	[0.13]
Myrtenal	7.07	1186	0.04	8.67	1562	0.10
Myrtenol	7.14	1191	0.09	10.83*	1738	[0.16]
Verbenone	7.25	1198	0.18	9.58	1634	0.21
trans-Carveol	7.52	1216	0.05	11.36*	1783	0.10
cis-Carveol	7.70	1228	tr	11.71	1814	0.03
Carvone	7.82	1236	0.01	9.99	1668	0.03
Unknown [m/z	7.96	1246	0.02	11.36*	1783	[0.10]

109, 119 (84), 91 (81), 134 (55)... 137 (27)...						
3,5-						
Dimethoxytoluene	8.20	1261	0.04	11.36*	1783	[0.10]
Isopiperitenone	8.26	1265	0.02	11.27	1776	0.01
Bornyl acetate	8.44	1278	0.08	8.28	1532	0.09
Thymol	8.72	1296	0.01	15.07	2129	0.03
Carvacrol	8.94	1311	0.03	15.34	2157	0.01
α-Copaene	9.74	1367	0.03	7.29	1456	0.02
β-Caryophyllene	10.31	1408	0.02			
trans-α-						
Bergamotene	10.60	1430	0.02			
α-Phellandrene						
dimer II	15.01	1784	0.01			
(3E)-Cembrene A	16.78	1946	0.05			
Cembrenol	18.59	2125	0.01			
Incensole	18.71*	2137	0.05	20.65	2755	0.03
Serratol	18.71*	2137	[0.05]	19.55	2621	0.03
Total identified		98.00%			98.32%	
Total reported		98.54%			98.74%	

*: 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