

Date : September 19, 2017

SAMPLE IDENTIFICATION

Internal code : 17I07-ORA14-1-DM

Customer identification : Frankincense

Type : Essential oil

Source : *Boswellia carterii*

Customer : Organic Aromas

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-09-19

Checked and approved by :

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

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Toluene	1.31	758	0.02	49.46	949	1.23*†	Simple phenolic
Tricyclene	3.21*	914	0.19	0.05	913	1.09	Monoterpene
Hashishene	3.21*	914	[0.19]	[49.46]	949	1.23*†	Monoterpene
α-Thujene	3.33	921	7.65	[49.46]	957	1.27†	Monoterpene
α-Pinene	3.48	930	41.44	[49.46]	949	1.23*†	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.65	940	0.28	4.37	1056	2.04*	Monoterpene
Camphene	3.71	944	0.97	1.15	989	1.49	Monoterpene
Thuja-2,4(10)-diene	3.80	949	0.44	[4.37]	1056	2.04*	Monoterpene
Sabinene	4.14	969	3.60	[4.37]	1056	2.04*	Monoterpene
β-Pinene	4.20	973	1.88	1.75	1035	1.86	Monoterpene
Myrcene	4.48	989	2.71	3.46	1112	2.63*	Monoterpene
Δ3-Carene	4.76*	1005	2.14	1.00	1089	2.35	Monoterpene
α-Phellandrene	4.76*	1005	[2.14]	0.91	1105	2.55	Monoterpene
α-Terpinene	4.94	1015	0.32	[3.46]	1112	2.63*	Monoterpene
para-Cymene	5.18	1028	8.05	6.07	1209	3.90*	Monoterpene
Limonene	5.21	1030	12.32	15.01	1140	2.99*	Monoterpene
β-Phellandrene	5.23	1031	0.28	[15.01]	1140	2.99*	Monoterpene
1,8-Cineole	5.25	1032	0.17	[15.01]	1140	2.99*	Monoterp. ether
cis-β-Ocimene	5.35	1037	0.04	0.56	1184	3.60*	Monoterpene
trans-β-Ocimene	5.53	1047	0.03	[6.07]	1209	3.90*	Monoterpene
γ-Terpinene	5.72	1057	0.50	[0.56]	1184	3.60*	Monoterpene
cis-Sabinene hydrate	6.06	1075	0.04	0.21	1403	6.99	Monoterp. alcohol
Terpinolene	6.19	1083	0.21	0.23	1223	4.11	Monoterpene
para-Cymenene	6.41	1095	0.21	0.48	1365	6.28*	Monoterpene
Perillene	6.52	1100	0.15	0.10	1353	6.09	Monoterp. ether
Linalool	6.69	1106	0.10	0.10	1492	9.12	Monoterp. alcohol
β-Thujone	7.01	1117	0.24	[0.48]	1365	6.28*	Monoterp. ketone
α-Campholenal	7.26	1127	0.12				Monoterp. aldehyde
trans-Pinocarveol	7.61	1139	0.49	0.49	1563	11.72	Monoterp. alcohol
trans-Verbenol	7.81	1147	0.26	0.94	1617	14.05*	Monoterp. alcohol
α-Phellandren-8-ol analog	7.96	1152	0.13				Monoterp. alcohol
Pinocarvone	8.22	1162	0.11	0.11	1472	8.63	Monoterp. ketone
Borneol	8.63	1176	0.14	[0.94]	1617	14.05*	Monoterp. alcohol
α-Phellandren-8-ol	8.73	1180	0.09				Monoterp. alcohol
Terpinen-4-ol	8.81	1183	1.04	1.94	1522	10.18*	Monoterp. alcohol
para-Cymen-8-ol	9.18	1196	0.09	0.07	1774	23.47	Monoterp. alcohol
Myrtenol	9.33	1200	0.13	0.12	1701	18.52	Monoterp. alcohol
α-Terpineol	9.36	1201	0.29	[0.94]	1617	14.05*	Monoterp. alcohol
Methylchavicol	9.47	1203	0.45	0.36	1591	12.75	Phenylpropanoid
α-Phellandrene epoxide	9.73	1209	0.12	0.13	1713	19.34	Monoterpene

Verbenone	9.83	1211	0.35	0.31	1594	12.88	Monoterp. ketone
Octyl acetate	9.93	1213	0.23	0.26	1420	7.37	Aliphatic ester
Methyl decyl ether	10.39	1224	0.78	0.83	1316	5.51	Aliphatic ether
<i>trans</i> -Carveol	10.46	1225	0.17	0.17	1747	21.62	Monoterp. alcohol
Methyl (<i>E</i>)-2-decenyl ether	11.39	1246	0.22				Aliphatic ether
Bornyl acetate	12.91	1279	0.30	0.37	1501	9.42	Monoterp. ester
α -Cubebene	15.97	1331	0.19	0.13	1410	7.14	Sesquiterpene
α -Copaene	17.70	1357	0.45	0.52	1428	7.55	Sesquiterpene
β -Bourbonene	18.12	1363	0.20	0.23	1448	8.05	Sesquiterpene
β -Elemene	18.94	1376	0.67	[1.94]	1522	10.18*	Sesquiterpene
β -Caryophyllene	20.62	1400	1.52	1.73	1516	9.95	Sesquiterpene
<i>trans</i> - α -Bergamotene	22.15	1419	0.13	[1.94]	1522	10.18*	Sesquiterpene
6,9-Guaiadiene	22.57	1424	0.03	0.02	1541	10.88	Sesquiterpene
α -Humulene	23.39	1434	0.26	0.29	1578	12.28	Sesquiterpene
allo-Aromadendrene	23.64	1437	0.12	0.15	1556	11.46	Sesquiterpene
γ -Muurolene	25.46	1458	0.26	0.34	1607	13.49	Sesquiterpene
Germacrene D	25.60	1460	0.08	[0.94]	1617	14.05*	Sesquiterpene
β -Selinene	26.23	1467	0.31	[0.94]	1617	14.05*	Sesquiterpene
α -Selinene	26.87	1475	0.22	0.26	1627	14.55	Sesquiterpene
α -Muurolene	27.64	1484	0.11	0.10	1645	15.54	Sesquiterpene
γ -Cadinene	28.69	1497	0.38	0.42	1664	16.52	Sesquiterpene
δ -Cadinene	29.35	1506	0.64	0.53	1670	16.84	Sesquiterpene
Caryophyllene oxide	33.82	1568	0.63	0.69	1840	28.12*	Sesquiterp. ether
Viridiflorol	34.82	1583	0.16	0.17	1970	35.78	Sesquiterp. alcohol
τ -Cadinol	37.52	1637	0.30	0.46	2063	39.15	Sesquiterp. alcohol
α -Muurolol	37.77	1643	0.04	0.06	2100	40.35	Sesquiterp. alcohol
Dimer of α -phellandrene II	42.33	1772	0.06	[0.69]	1840	28.12*	Diterpene
(3 <i>E</i>)-Cembrene A	46.68	1929	0.08	0.11	2125	41.01	Diterpene
Serratol	51.45*	2131	0.38	0.26	2569	50.80	Diterp. alcohol
Incensole	51.45*	2131	[0.38]	0.16	2691	53.09	Diterp. alcohol
Total identified			96.43%	97.64%			

*: Two or more compounds are coeluting on this column

†: The peak apexes were resolved, but the peaks overlapped and were summed for analysis.

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

Note: no correction factor was applied

OTHER DATA

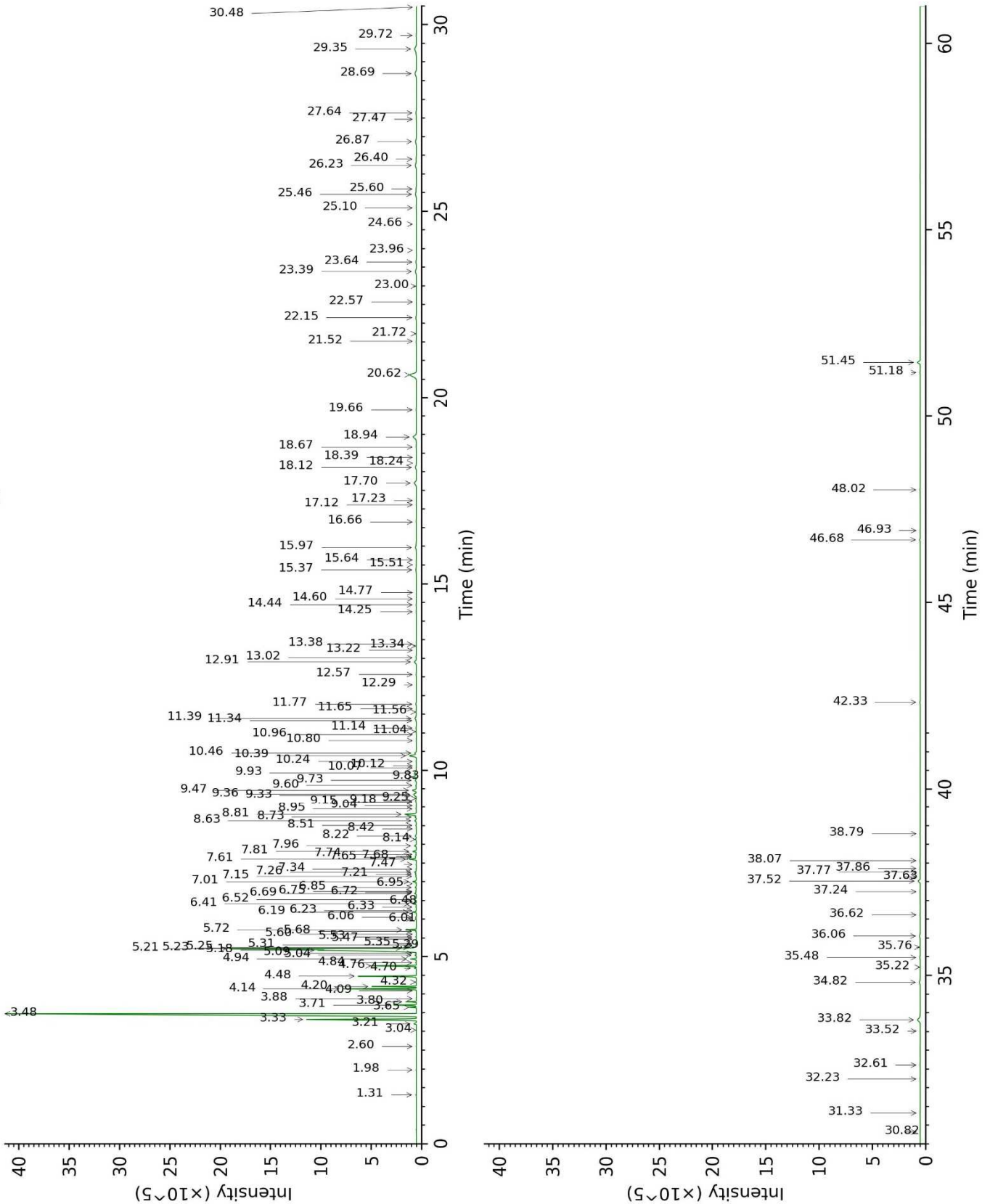
Physical aspect : Clear liquid

Refractive index : 1.4710 \pm 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method.

17107-ORA14-1-DM_BP5



17107-ORA14-1-DM_WAX

