

## GC/MS BATCH NUMBER: FE0100

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**ESSENTIAL OIL:** FRANKINCENSE FREREANA ORGANIC

**BOTANICAL NAME:** BOSWELIA FREREANA

**ORIGIN:** SOMALILAND

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FRANKINCENSE FREREANA OIL	%
$\alpha$ -THUJENE	54.8
p-CYMENE	9.5
SABINENE	8.3
TERPINEN-4-OL	3.9
$\alpha$ -PINENE	2.6
$\alpha$ -PHELLANDRENE	2.1
$\beta$ -PHELLANDRENE	1.6
1,8-CINEOLE	1.5
LIMONENE	1.1
MYRCENE	1.1

Comments from Robert Tisserand: This is an alpha-thujene chemotype. The  $\alpha$ -phellandrene dimers at the end of the lab report are characteristic of *Boswellia frereana*.

**Date :** June 13, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17F12-PTH5-1-DM

**Customer identification :** Frankincense Frereana Organic - Somaliland - FE010076R

**Type :** Essential oil

**Source :** *Boswellia frereana*

**Customer :** Plant Therapy

*ANALYSIS*

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

**Analyst :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2017-06-12

Checked and approved by :

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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.	
4-Methyl-2-pentanone	0.68	675	0.03				Aliphatic ketone
Toluene	1.31	758	0.02	58.16	962	1.16*	Simple phenolic
cis-Salvene	2.22	845	0.06	0.05	828	0.71	Normonoterpene
trans-Salvene	2.33	854	0.02	0.02	856	0.75	Normonoterpene
Unknown (m/z = 93, 91 (68), 121 (60), 77 (50), 79 (43), 105 (21), 41 (20)... 136 (17))	2.79	889	0.04	0.03	881	0.84	Monoterpene
Unknown (m/z = 93, 91 (77), 121 (62), 77 (55), 79 (44), 105 (23), 92 (21), 41 (21), 107 (20), 43 (17), 136 (17))	3.00	904	0.10	0.14	903	0.92	Monoterpene
Hashishene	3.21	917	0.51	[58.16]	962	1.16*	Monoterpene
α-Thujene	3.39	927	54.84	[58.16]	962	1.16*	Monoterpene
α-Pinene	3.45	931	2.55	[58.16]	962	1.16*	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.65	943	2.56	2.74	1064	1.88*	Monoterpene
Camphene	3.71	946	0.04	0.02	1012	1.39	Monoterpene
Thuja-2,4(10)-diene	3.80	951	0.02	8.15	1058	1.82*	Monoterpene
Sabinene	4.16	973	8.30	[8.15]	1058	1.82*	Monoterpene
β-Pinene	4.21	976	0.29	0.28	1038	1.64	Monoterpene
Myrcene	4.48	992	1.13	1.15	1111	2.34*	Monoterpene
2-Carene	4.55	996	0.03	0.04	1085	2.08	Monoterpene
2-p-Menthene	4.60	999	0.06	0.06	1046	1.71	Monoterpene
α-Phellandrene	4.75	1008	2.14	2.12	1104	2.26	Monoterpene
α-Terpinene	4.94	1018	0.62	0.61	1118	2.42	Monoterpene
meta-Cymene	5.03*	1023	0.47	[1.15]	1111	2.34*	Monoterpene
Carvomenthene	5.03*	1023	[0.47]	[2.74]	1064	1.88*	Monoterpene
para-Cymene	5.16	1030	9.49	9.99	1204	3.53*	Monoterpene
Limonene	5.18	1031	1.13	1.17	1135	2.65	Monoterpene
β-Phellandrene	5.20	1032	1.56	1.24	1140	2.71	Monoterpene
1,8-Cineole	5.24	1034	1.47	1.04	1141	2.72	Monoterp. ether
cis-β-Ocimene	5.34	1040	0.04	0.90	1182	3.25*	Monoterpene
trans-β-Ocimene	5.52	1050	0.02	[9.99]	1204	3.53*	Monoterpene
Unknown (m/z = 109, 43 (39), 91 (25), 95 (20)... 119 (15), 137 (19), 152 (1))	5.65	1056	0.33				Oxygenated monoterpene
γ-Terpinene	5.71	1060	0.86	[0.90]	1182	3.25*	Monoterpene
cis-Sabinene hydrate	6.03	1077	0.10	0.09	1397	6.40	Monoterp. alcohol
Terpinolene	6.18	1086	0.22	0.22	1217	3.71	Monoterpene

para-Cymenene	6.39	1097	0.06	0.57	1357	5.78	Monoterpene
Linalool	6.65	1108	0.47	0.55	1483	8.24	Monoterp. alcohol
cis-Verbenol?	6.91	1117	0.17	0.11	1494	8.49	Monoterp. alcohol
β-Thujone	6.98	1120	0.81	0.83	1349	5.65	Monoterp. ketone
trans-para-Mentha-2,8-dien-1-ol	7.17	1127	0.19	0.23	1549	10.09*	Monoterp. alcohol
α-Campholenal	7.21	1128	0.14				Monoterp. aldehyde
trans-Pinocarveol	7.50	1139	0.06	0.04	1558	10.44	Monoterp. alcohol
trans-Sabinol	7.59	1142	0.22				Monoterp. alcohol
trans-Verbenol	7.68	1145	0.09	0.05	1601	11.99	Monoterp. alcohol
α-Phellandren-8-ol analog	7.99	1157	0.05				Monoterp. alcohol
Pinocarvone	8.16	1163	0.05	0.05	1471	7.94	Monoterp. ketone
α-Phellandren-8-ol	8.41	1172	0.03				Monoterp. alcohol
Umbellulone	8.46	1174	0.11	[0.23]	1549	10.09*	Monoterp. ketone
cis-Sabinol	8.57	1178	0.38				Monoterp. alcohol
Terpinen-4-ol	8.78	1186	3.89	4.21	1525	9.23*	Monoterp. alcohol
para-Cymen-8-ol	9.12	1198	0.05	0.15	1758	20.02	Monoterp. alcohol
Myrtenal	9.24	1201	0.25	[4.21]	1525	9.23*	Monoterp. aldehyde
α-Terpineol	9.37	1204	0.41	0.62	1617	12.56*	Monoterp. alcohol
cis-Piperitol	9.63	1210	0.15				Monoterp. alcohol
Methyl decyl ether	10.36	1226	0.57	0.57	1316	5.13	Aliphatic ether
Cuminal	11.28	1247	0.13	0.07	1666	14.90	Monoterp. aldehyde
Piperitone	11.70	1256	0.04	[0.62]	1617	12.56*	Monoterp. ketone
Bornyl acetate	12.86*	1282	0.14	0.04	1502	8.70	Monoterp. ester
3,5-Dimethoxytoluene	12.86*	1282	[0.14]				Simple phenolic
Thymol	14.60	1314	0.11	0.12	2117	39.43	Monoterp. alcohol
Carvacrol	14.97	1320	0.11	0.11	2099	38.88	Monoterp. alcohol
α-Copaene	17.61	1360	0.05	0.03	1420	6.75	Sesquiterpene
β-Bourbonene	18.03	1366	0.09	0.08	1452	7.50	Sesquiterpene
β-Caryophyllene	20.49	1403	0.02	0.02	1515	8.97	Sesquiterpene
β-Copaene	21.40	1414	0.01	[4.21]	1525	9.23*	Sesquiterpene
δ-Cadinene	29.17	1508	0.03				Sesquiterpene
Dimer of α-phellandrene I	40.39	1717	0.02				Diterpene
Dimer of α-phellandrene II	42.27	1776	0.51	0.54	1846	25.77	Diterpene
Dimer of α-phellandrene III	42.59	1786	0.07				Diterpene
Dimer of α-phellandrene IV	43.23	1808	0.06				Diterpene
Serratol	51.33	2135	0.07	0.04	2691	51.97	Diterp. alcohol
<b>Total identified</b>			<b>95.63%</b>	<b>94.34%</b>			

\*: Two or more compounds are coeluting on this column

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

Note: no correction factor was applied

*OTHER DATA*

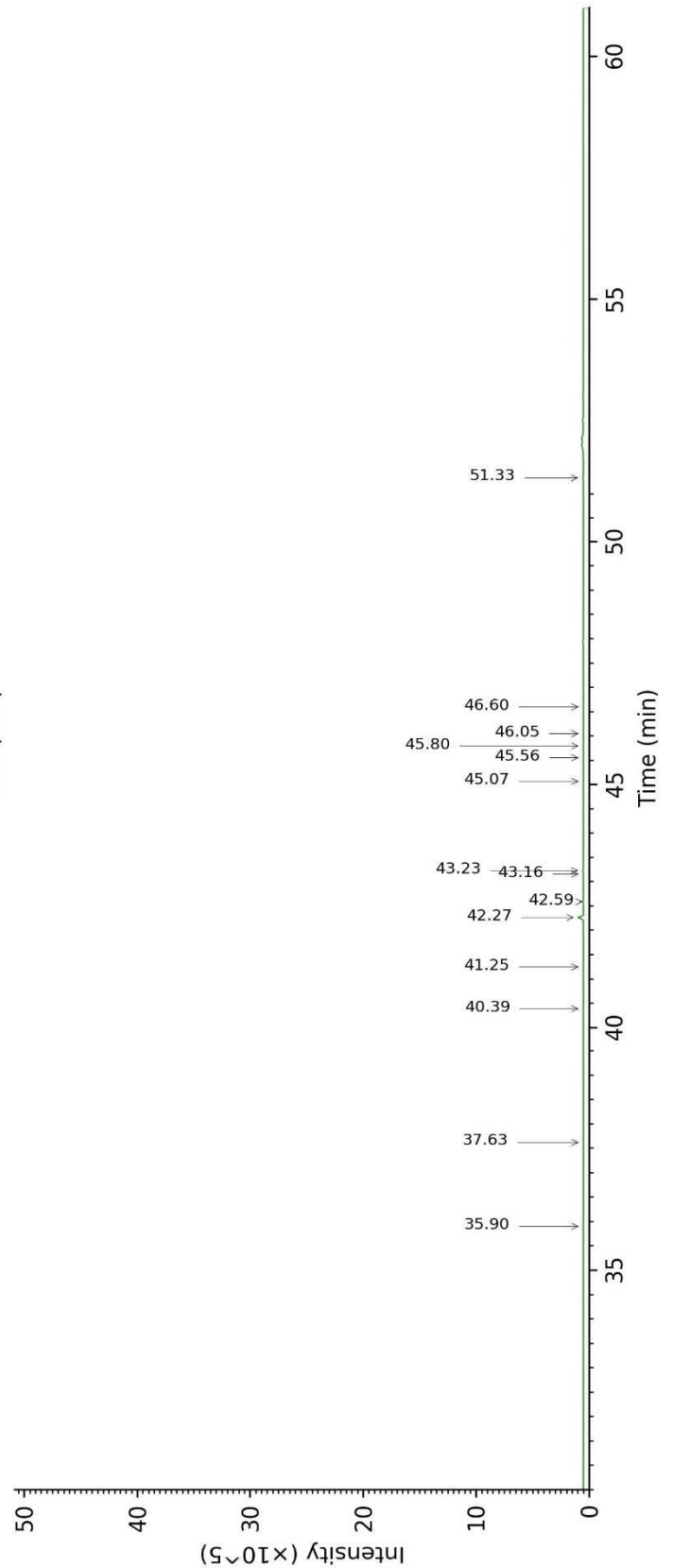
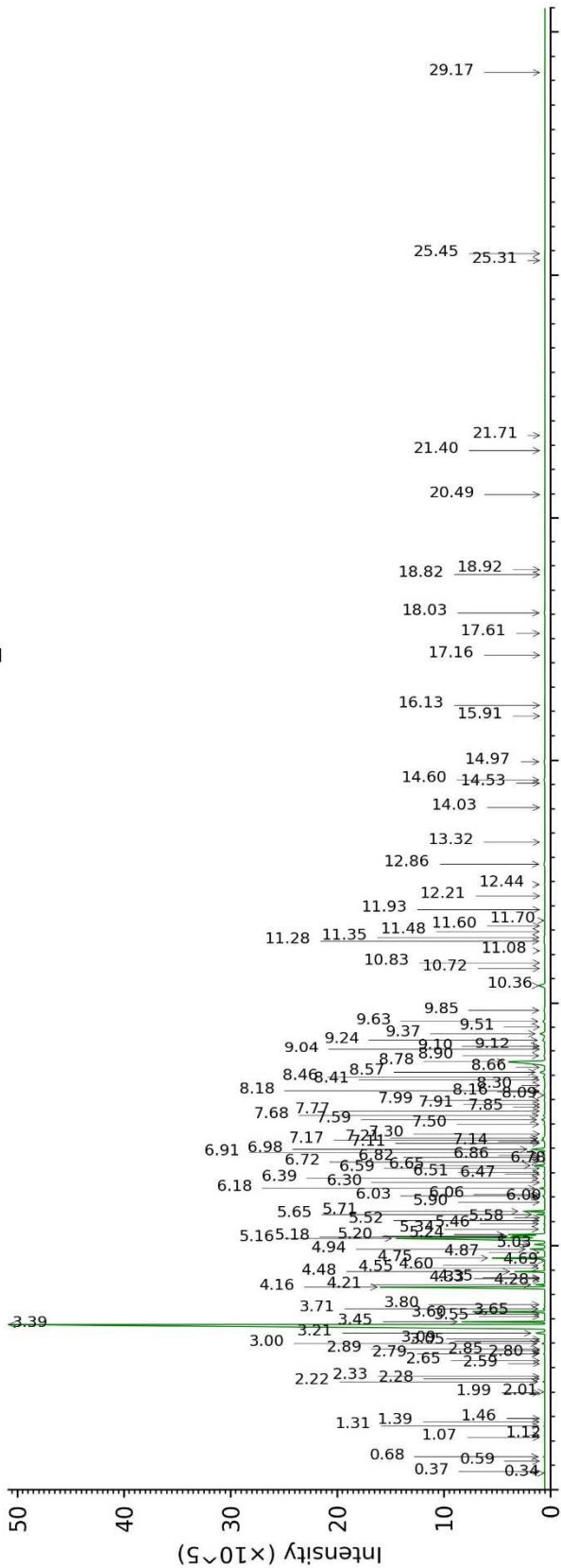
**Physical aspect :** Light yellow liquid

**Refractive index :**  $1.4605 \pm 0.0003$  (20 °C)

*CONCLUSION*

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

17F12-PTH5-1-DM\_BP5



17F12-PTH5-1-DM\_WAX

