

## GC/MS BATCH NUMBER: F80104

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**ESSENTIAL OIL:** FRANKINCENSE FREREANA  
**BOTANICAL NAME:** BOSWELLIA FREREANA  
**ORIGIN:** SOMALIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FRANKINCENSE FREREANA OIL	%
$\alpha$ -THUJENE	48.5
$\alpha$ -PINENE	15.3
p-CYMENE	9.3
SABINENE	7.7
LIMONENE	2.5
$\alpha$ -PHELLANDRENE	2.3
TERPINEN-4-OL	2.0
$\beta$ -PINENE	2.0
1,8-CINEOLE	1.5
MYRCENE	1.1

Comments from Robert Tisserand: A beautiful incense-y odor quality with hints of Lemon and Tea Tree. Constituents are in expected amounts.

**Date :** November 17, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17K14-PTH3-1-CC

**Customer identification :** Frankincense Frereana - Somalia - F80104612R

**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).

Identifications double-checked by GC-MS

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

**Analysis date :** 2017-11-17

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.	
Toluene	1.32	759	0.08	64.14	973	1.26*	Simple phenolic
2-Isopropylfuran?	1.40	770	0.01				Furan
Unknown (m/z = 93, 91 (68), 121 (60), 77 (50), 79 (43), 105 (21), 41 (20)... 136 (17))	2.79	887	0.05				
Tricyclene	3.22*	915	0.10	0.02	922	1.05	Monoterpene
Hashishene	3.22*	915	[0.10]	[64.14]	973	1.26*	Monoterpene
$\alpha$ -Thujene	3.38	924	48.47	[64.14]	973	1.26*	Monoterpene
$\alpha$ -Pinene	3.47	929	15.26	[64.14]	973	1.26*	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.65	940	0.27	8.22	1054	1.97*	Monoterpene
Camphene	3.71	944	0.14	0.42	999	1.43	Monoterpene
Thuja-2,4(10)-diene	3.80	949	0.05	[8.22]	1054	1.97*	Monoterpene
Sabinene	4.16	970	7.71	[8.22]	1054	1.97*	Monoterpene
$\beta$ -Pinene	4.21	973	1.97	1.82	1037	1.79	Monoterpene
Myrcene	4.48	989	1.11	1.72	1114	2.53*	Monoterpene
$\alpha$ -Phellandrene	4.76*	1005	2.80	2.31	1108	2.45	Monoterpene
$\Delta$ 3-Carene	4.76*	1005	[2.80]	0.12	1077	2.26	Monoterpene
$\alpha$ -Terpinene	4.94	1015	0.19	[1.72]	1114	2.53*	Monoterpene
meta-Cymene	5.04	1020	0.11	[1.72]	1114	2.53*	Monoterpene
para-Cymene	5.17	1027	9.28	8.41	1208	3.77*	Monoterpene
Limonene	5.20	1029	2.47	5.13	1140	2.88*	Monoterpene
$\beta$ -Phellandrene	5.22	1030	0.19	[5.13]	1140	2.88*	Monoterpene
1,8-Cineole	5.24	1031	1.50	[5.13]	1140	2.88*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.35	1037	0.08	0.84	1187	3.49*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.53	1047	0.05	[8.41]	1208	3.77*	Monoterpene
Unknown (m/z = 109, 43 (39), 91 (25), 95 (20)... 119 (15), 137 (19), 152 (1))	5.68	1055	0.05				Oxygenated monoterpene
$\gamma$ -Terpinene	5.72	1057	0.80	[0.84]	1187	3.49*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.06	1076	0.02	0.02	1406	6.83	Monoterp. alcohol
Terpinolene	6.19	1083	0.08	0.06	1222	3.98	Monoterpene
para-Cymenene	6.42	1095	0.02	0.15	1360	6.08*	Monoterpene
Linalool	6.70	1106	0.04	0.03	1490	8.81	Monoterp. alcohol
$\alpha$ -Thujone	6.74	1108	0.01	[0.15]	1360	6.08*	Monoterp. ketone
$\beta$ -Thujone	7.01	1117	0.13	[0.15]	1360	6.08*	Monoterp. ketone
$\alpha$ -Campholenal	7.26	1127	0.03				Monoterp. aldehyde
<i>trans</i> -Pinocarveol	7.62	1140	0.06	0.13	1560	11.24	Monoterp. alcohol
<i>trans</i> -Sabinol	7.67	1141	0.05				Monoterp. alcohol
<i>trans</i> -Verbenol	7.83	1147	0.05	0.07	1592	12.39*	Monoterp. alcohol

α-Phellandren-8-ol analog	7.98	1153	0.03				Monoterp. alcohol
Pinocarvone	8.22	1162	0.02	0.02	1461	8.14	Monoterp. ketone
Umbellulone	8.51	1172	0.02	0.03	1549	10.81	Monoterp. ketone
α-Phellandren-8-ol	8.66	1177	0.08				Monoterp. alcohol
Terpinen-4-ol	8.83	1184	2.03	2.41	1522	9.85*	Monoterp. alcohol
Myrtenal	9.39	1201	0.03	[2.41]	1522	9.85*	Monoterp. aldehyde
α-Terpineol	9.49*	1204	0.48	0.65	1617	13.53*	Monoterp. alcohol
β-Phellandren-8-ol	9.49*	1204	[0.48]	0.06	1704	18.05	Monoterp. alcohol
Verbenone	9.85	1212	0.04	[0.07]	1592	12.39*	Monoterp. ketone
Octyl acetate	9.92	1213	0.15	0.15	1420	7.18	Aliphatic ester
Methyl decyl ether	10.37	1223	0.33	0.35	1317	5.40	Aliphatic ether
Bornyl acetate	12.90	1279	0.04	0.05	1502	9.11	Monoterp. ester
α-Cubebene	15.96	1331	0.05	0.03	1410	6.92	Sesquiterpene
α-Copaene	17.70	1357	0.89	0.94	1429	7.39	Sesquiterpene
β-Bourbonene	18.11	1363	0.06	0.06	1450	7.87	Sesquiterpene
β-Cubebene	18.66	1372	0.05	0.04	1474	8.44	Sesquiterpene
β-Elemene	18.92	1375	0.04	[2.41]	1522	9.85*	Sesquiterpene
β-Caryophyllene	20.59	1400	0.62	0.38	1517	9.66	Sesquiterpene
α-Humulene	23.39	1434	0.11	0.11	1579	11.93	Sesquiterpene
γ-Muurolene	25.46	1458	0.07	0.08	1609	13.10	Sesquiterpene
Germacrene D	25.61	1460	0.11	[0.65]	1617	13.53*	Sesquiterpene
β-Selinene	26.22	1467	0.03	[0.65]	1617	13.53*	Sesquiterpene
Bicyclgermacrene	26.87	1475	0.05	0.05	1645	14.94	Sesquiterpene
γ-Cadinene	28.69	1497	0.07	0.08	1664	15.98	Sesquiterpene
δ-Cadinene	29.34	1506	0.27	0.26	1671	16.31	Sesquiterpene
Caryophyllene oxide	33.82	1569	0.08	0.12	1842	27.33*	Sesquiterp. ether
Viridiflorol	34.84	1583	0.05	0.04	1973	35.24	Sesquiterp. alcohol
τ-Cadinol	37.54	1638	0.05	0.05	2065	38.74	Sesquiterp. alcohol
Dimer of α-phellandrene II	42.30	1771	tr	[0.12]	1842	27.33*	Diterpene
Serratol	51.41	2129	0.04	0.02	2573	50.48	Diterp. alcohol
<b>Total identified</b>			<b>99.02%</b>	<b>99.59%</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

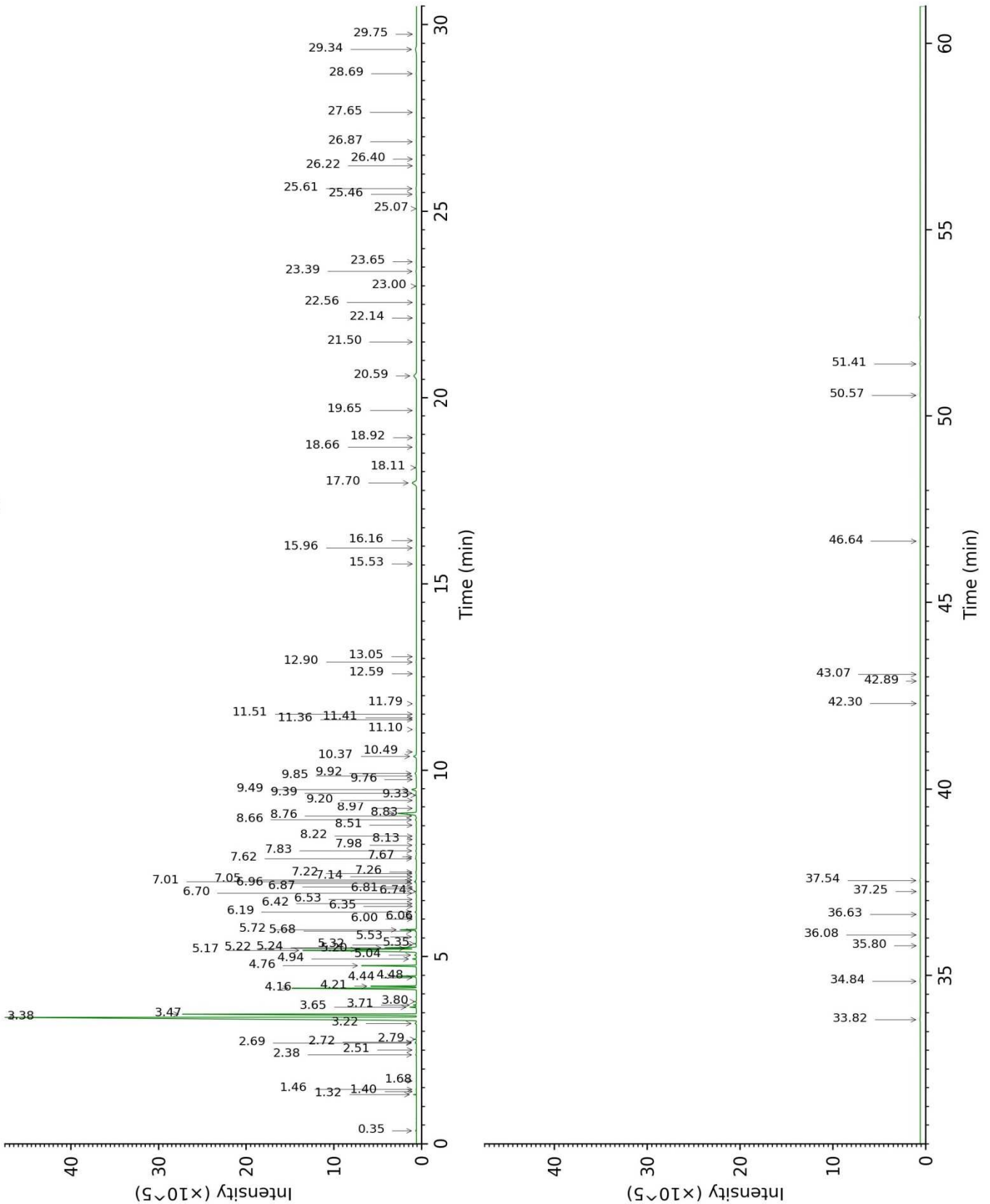
**Physical aspect :** Faintly yellow liquid

**Refractive index :** 1.4630 ± 0.0003 (20 °C)

#### CONCLUSION

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

17K14-PTH3-1-CC\_BP5



17K14-PTH3-1-CC\_WAX

