

# Analysis Frankincense Essential Oil

Laboratoire  
**Phyto**Chemia





SAMPLE IDENTIFICATION

**Internal code :** 16L05-FSE16-1-DM

**Customer identification :** Frankincense, Carterii - Lot#113016

**Type :** Essential oil

**Source :** *Boswellia carterii*

**Customer :** Flowers Shining Everywhere Inc.



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 :** 2016-12-14

Checked and approved by :



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



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$\alpha$ -Terpineol	9.45*	1205	[0.49]	0.22	1618	10.84	Monoterp. alcohol
Myrtenol	9.45*	1205	[0.49]	0.13	1692	13.97	Monoterp. alcohol
Verbenone	9.75	1212	0.38	[0.95]	1587*	9.90*	Monoterp. ketone
Octyl acetate	9.86	1215	1.38	1.55	1426	6.15*	Aliphatic ester
<i>trans</i> -Carveol	10.51	1229	0.10	0.12	1756	17.12	Monoterp. alcohol
Carvone	11.31	1247	0.09	0.37	1644	11.87*	Monoterp. ketone
Bornyl acetate	12.79	1280	0.26	0.23	1492	7.41	Monoterp. ester
$\alpha$ -Cubebene	15.80	1331	0.05	[1.55]	1426	6.15*	Sesquiterpene
$\alpha$ -Copaene	17.51	1357	0.34	[1.55]	1426	6.15*	Sesquiterpene
$\beta$ -Bourbonene	17.93	1364	0.23	0.31	1448	6.57	Sesquiterpene
$\beta$ -Elemene	18.76*	1376	0.19	1.28	1533	8.30*	Sesquiterpene
$\alpha$ -Gurjunene	19.24	1384	0.07	0.07	1463	6.86	Sesquiterpene
$\beta$ -Caryophyllene	20.40	1400	1.10	[1.28]	1533	8.30*	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	21.94	1419	0.06	0.07	1539	8.47	Sesquiterpene
6,9-Guaiadiene	22.36	1424	0.15	0.15	1548	8.76	Sesquiterpene
$\alpha$ -Humulene	23.18	1434	0.30	[0.95]	1587	9.90*	Sesquiterpene
allo-Aromadendrene	23.42	1437	0.07	0.13	1565	9.26	Sesquiterpene
$\gamma$ -Muurolene	25.24	1459	0.06	0.06	1621	10.93	Sesquiterpene
Germacrene D	25.39	1460	0.11	0.06	1628	11.18	Sesquiterpene
$\beta$ -Selinene	25.99	1468	0.08	0.08	1633	11.38	Sesquiterpene
$\alpha$ -Selinene	26.63	1474	0.08	0.08	1638	11.56	Sesquiterpene
$\alpha$ -Muurolene	27.38	1484	0.09	[0.37]	1644	11.87*	Sesquiterpene
$\gamma$ -Cadinene	28.45	1497	0.13	0.10	1677	13.34	Sesquiterpene
$\delta$ -Cadinene	29.11	1506	0.32	0.27	1682	13.57	Sesquiterpene
Caryophyllene oxide	33.66	1568	0.18	0.15	1851	22.84	Sesquiterp. ether
Viridiflorol	34.76	1583	0.17	0.14	1980	31.27	Sesquiterp. alcohol
$\tau$ -Cadinol	37.47	1640	0.09	0.08	2072	35.97	Sesquiterp. alcohol
(3E)-Cembrene A	46.57	1930	0.04	0.04	2151	38.59	Diterpene
Incensole	51.36	2134	0.23	0.21	2603	48.44	Diterp. alcohol
<b>Total identified</b>				<b>98.48%</b>	<b>97.92%</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** : Clear liquid

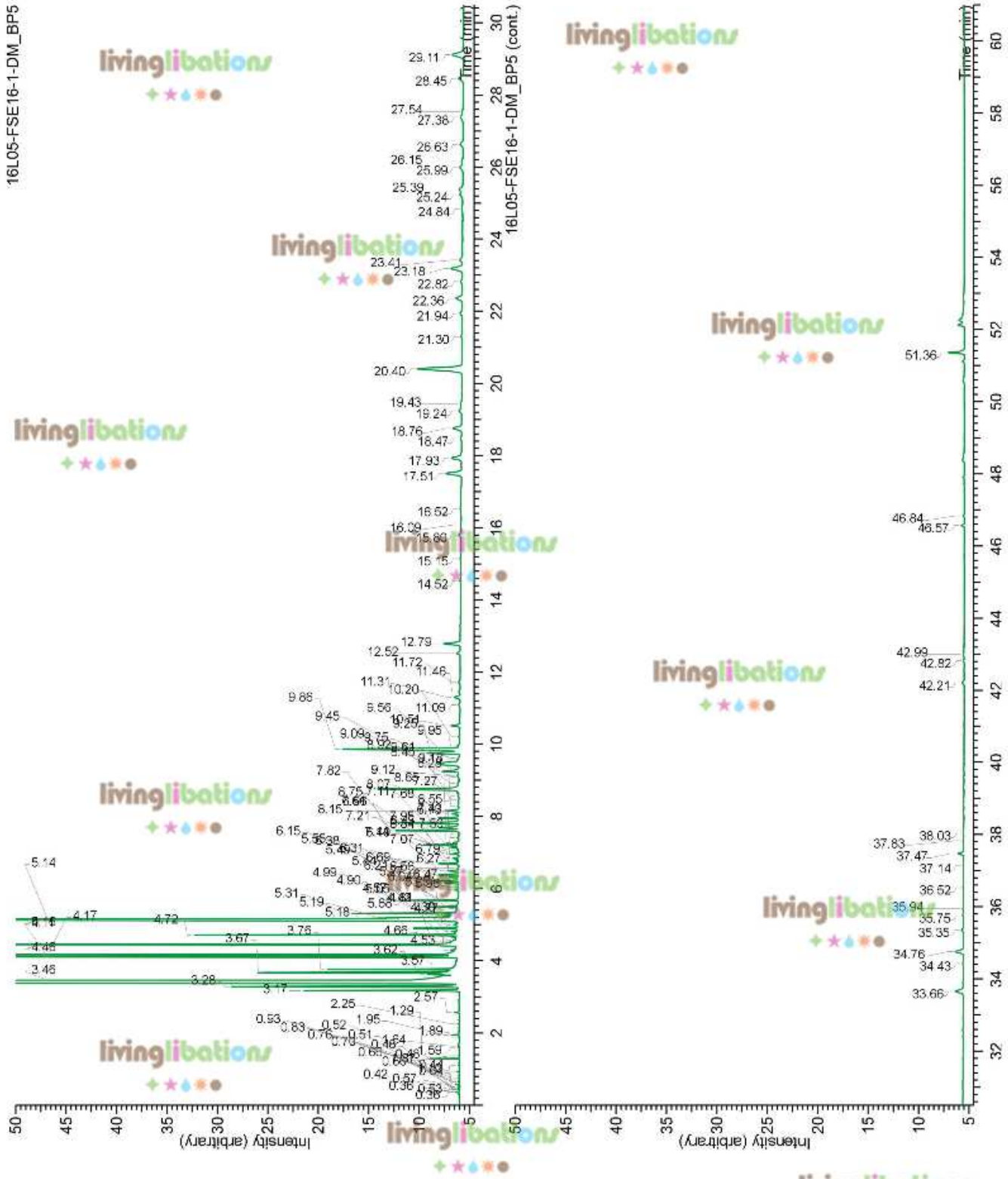
**Refractive index** : 1.4695  $\pm$  0.0003 (20 °C)

#### CONCLUSION

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

IDENTIFIED COMPOUNDS

livinglibation Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Toluene	1.29	749	0.08	58.25	964	0.94*	Simple phenolic
Tricyclene + Hashishene	3.17	913	0.92	[58.25]	964	0.94*	Monoterpene
α-Thujene	3.28	920	1.86	1.29	966	0.95	Monoterpene
α-Pinene	3.46	930	56.51	[58.25]	964	0.94*	Monoterpene
α-Fenchene	3.67*	944	0.84	0.01	993	1.06	Monoterpene
Camphene	3.67*	944	[0.84]	0.90	1004	1.10	Monoterpene
Thuja-2,4(10)-diene	3.76	949	0.58	3.96	1059	1.52*	Monoterpene
Sabinene	4.11	970	3.52	[3.96]	1059	1.52*	Monoterpene
β-Pinene	4.17	974	4.26	4.19	1043	1.39	Monoterpene
Myrcene	4.46	991	5.65	5.98	1118	2.01*	Monoterpene
Pseudolimonene	4.66	1003	0.03	[5.98]	1118	2.01*	Monoterpene
α-Phellandrene	4.72*	1006	1.30	0.77	1111	1.95	Monoterpene
Δ <sup>3</sup> -Carene	4.72*	1006	[1.30]	0.30	1092	1.79	Monoterpene
+ Octanal	4.81	1011	0.02	0.03	1233	3.40	Aliphatic aldehyde
α-Terpinene	4.90	1016	0.23	0.27	1124	2.08	Monoterpene
para-Cymene	5.14	1029	3.64	2.30	1206	3.04	Monoterpene
Limonene	5.16	1030	6.74	8.29	1144	2.32	Monoterpene
β-Phellandrene	5.18	1031	0.31	0.49	1147	2.36	Monoterpene
1,8-Cineole	5.19	1032	0.37	0.27	1150	2.39	Monoterp. ether
cis-β-Ocimene	5.31	1039	0.53	0.47	1186	2.81	Monoterpene
trans-β-Ocimene	5.49	1049	0.16	0.11	1203	2.99	Monoterpene
γ-Terpinene	5.68	1059	0.26	0.26	1188	2.83	Monoterpene
cis-Sabinene hydrate	6.04	1078	0.01	0.01	1397	5.72	Monoterp. alcohol
Terpinolene	6.21	1088	0.18	0.10	1224	3.28	Monoterpene
para-Cymenene	6.38	1097	0.14	0.10	1353	5.07	Monoterpene
Perillene	6.49	1101	0.07	0.05	1348	5.02	Monoterp. ether
Linalool	6.69	1108	0.15	0.14	1483	7.23	Monoterp. alcohol
α-Thujone	6.79	1112	0.03	0.02	1361	5.19	Monoterp. ketone
β-Thujone	6.96	1118	0.06	0.10	1364	5.24	Monoterp. ketone
cis-para-Menth-2-en-1-ol	7.14	1125	0.06	0.04	1488	7.33	Monoterp. alcohol
α-Campholenal	7.21	1128	0.28				Monoterp. aldehyde
trans-Pinocarveol	7.61	1143	0.53	0.55	1556	8.99	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.68	1146	0.21	0.19	1576	9.57	Monoterp. alcohol
trans-Verbenol	7.82*	1151	0.58	0.33	1592	10.05	Monoterp. alcohol
α-Phellandren-8-ol analog	7.82*	1151	[0.58]				Monoterp. alcohol
Pinocarvone	7.95	1156	0.19	0.19	1467	6.93	Monoterp. ketone
α-Phellandren-8-ol	8.15	1163	0.14				Monoterp. alcohol
Borneol	8.65	1182	0.02	0.02	1607	10.52	Monoterp. alcohol
Terpinen-4-ol	8.75	1186	0.97	0.83	1525	8.06	Monoterp. alcohol
Myrtenal	9.25	1201	0.21	0.26	1499	7.54	Monoterp. aldehyde
Methylchavicol	9.45*	1205	0.49	0.95	1587	9.90*	Phenylpropanoid



16L05-FSE16-1-DM\_WAX

