

**Date :** March 17, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17C03-NGA5-1-DM

**Customer identification :** Frankincense Somalian - SO-20585

**Type :** Essential oil

**Source :** *Boswellia carterii*

**Customer :** Nature's Gift Aromatherapy

*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 :** 2017-03-10

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	1.30	756	0.05	42.23	963	1.24*	Simple phenolic
Hashishene	3.20	916	0.06	[42.23]	963	1.24*	Monoterpene
Tricyclene	3.21	917	0.06	0.06	924	1.08	Monoterpene
$\alpha$ -Thujene	3.31	922	2.54	2.63	967	1.26	Monoterpene
$\alpha$ -Pinene	3.47	932	42.02	[42.23]	963	1.24*	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.63	941	0.08	0.07	1069	2.10	Monoterpene
Camphene	3.69*	945	0.87	0.85	1001	1.48	Monoterpene
$\alpha$ -Fenchene	3.69*	945	[0.87]	0.01	994	1.42	Monoterpene
Thuja-2,4(10)-diene	3.78	950	0.27	3.89	1061	2.03*	Monoterpene
Sabinene	4.12	971	3.70	[3.89]	1061	2.03*	Monoterpene
$\beta$ -Pinene	4.18	974	1.38	1.37	1042	1.85	Monoterpene
Myrcene	4.46	991	3.50	3.52	1119	2.61*	Monoterpene
Pseudolimonene	4.67	1003	0.04	[3.52]	1119	2.61*	Monoterpene
$\alpha$ -Phellandrene	4.73*	1007	3.11	2.43	1112	2.52	Monoterpene
$\Delta$ 3-Carene	4.73*	1007	[3.11]	0.65	1097	2.32	Monoterpene
Octanal	4.86	1014	0.06	0.04	1233	4.15	Aliphatic aldehyde
$\alpha$ -Terpinene	4.91	1016	0.09	0.10	1125	2.68	Monoterpene
Limonene	5.19*	1031	21.57	17.47	1148	2.98	Monoterpene
para-Cymene	5.19*	1031	[21.57]	3.83	1211	3.85*	Monoterpene
$\beta$ -Phellandrene	5.20	1032	0.44	0.90	1151	3.02*	Monoterpene
1,8-Cineole	5.23	1034	0.14	[0.90]	1151	3.02*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.32	1039	0.05	0.05	1189	3.52	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.50	1048	0.06	0.06	1204	3.73	Monoterpene
$\gamma$ -Terpinene	5.68	1058	0.17	0.17	1191	3.55	Monoterpene
<i>cis</i> -Sabinene hydrate	5.99	1075	0.04	0.03	1400	6.73	Monoterp. alcohol
Terpinolene	6.15	1084	0.07	0.07	1225	4.04	Monoterpene
para-Cymenene	6.34	1094	0.07	0.05	1370	6.23	Monoterpene
<i>trans</i> -Sabinene hydrate	6.54	1103	0.02	0.02	1484	8.69	Monoterp. alcohol
Linalool	6.59	1105	0.12	0.12	1498	9.04	Monoterp. alcohol
Nonanal	6.70	1109	0.06	0.06	1342	5.80	Aliphatic aldehyde
$\alpha$ -Thujone	6.76	1112	0.04	0.02	1351	5.94	Monoterp. ketone
$\beta$ -Thujone	6.95	1118	0.08	0.07	1367	6.19	Monoterp. ketone
Methyl nonyl ether	7.08	1123	0.07	[3.83]	1211	3.85*	Aliphatic ether
<i>cis</i> -para-Menth-2-en-1-ol	7.11	1125	0.03	0.02	1505	9.21	Monoterp. alcohol
$\alpha$ -Campholenal	7.18	1127	0.20				Monoterp. aldehyde
<i>trans</i> -Pinocarveol	7.48	1138	0.52	0.46	1571	11.63	Monoterp. alcohol
<i>trans</i> -para-Menth-2-en-1-ol	7.56	1141	0.17	0.34	1560	11.21*	Monoterp. alcohol
<i>trans</i> -Verbenol	7.68	1145	0.73	0.75	1605	12.86	Monoterp. alcohol
$\alpha$ -Phellandren-8-ol analog	7.82	1150	0.12				Monoterp. alcohol
Pinocarvone	8.06	1159	0.07	0.04	1470	8.36	Monoterp. ketone

Sabinaketone	8.13	1162	0.10	0.80	1582	12.02*	Normonoterp. ketone
Borneol	8.43	1173	0.09	0.07	1619	13.55	Monoterp. alcohol
$\alpha$ -Phellandren-8-ol	8.53	1176	0.27				Monoterp. alcohol
Terpinen-4-ol	8.65	1181	0.40	0.40	1531	10.11	Monoterp. alcohol
para-Cymen-8-ol	9.09	1197	0.15	0.11	1771	22.30	Monoterp. alcohol
$\alpha$ -Terpineol	9.25*	1202	0.59	0.95	1627	13.93*	Monoterp. alcohol
Myrtenol	9.25*	1202	[0.59]	0.12	1711	18.34	Monoterp. alcohol
$\alpha$ -Phellandrene epoxide	9.50	1207	0.15	0.14	1724	19.19	Monoterpene
Verbenone	9.70	1212	0.28	0.30	1602	12.75	Monoterp. ketone
Octyl acetate	9.79	1214	0.02	0.02	1426	7.31	Aliphatic ester
<i>trans</i> -Carveol	10.18	1222	0.22	0.20	1759	21.46	Monoterp. alcohol
Carvone	11.20	1245	0.19	0.71	1634	14.27*	Monoterp. ketone
<i>cis</i> -Carveol	11.59	1253	0.06	0.06	1787	23.32	Monoterp. alcohol
3,5-Dimethoxytoluene	12.29	1269	0.05				Simple phenolic
Bornyl acetate	12.80	1280	0.35	0.41	1508	9.29	Monoterp. ester
Carvacrol	15.83	1333	0.13	0.17	2133	40.72*	Monoterp. alcohol
$\alpha$ -Copaene	17.52	1358	0.62	0.67	1430	7.41	Sesquiterpene
$\beta$ -Bourbonene	17.92	1364	0.07	0.06	1448	7.83	Sesquiterpene
$\beta$ -Cubebene	18.48	1373	0.08	0.07	1477	8.51	Sesquiterpene
$\beta$ -Elemene	18.73	1377	1.34	1.42	1525	9.88	Sesquiterpene
Geranyl acetate	19.36	1386	0.02	0.02	1691	17.31	Monoterp. ester
$\alpha$ -Gurjunene	19.48	1388	0.07	0.08	1474	8.46	Sesquiterpene
$\beta$ -Caryophyllene	20.41	1402	2.89	2.97	1522	9.78	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	21.93	1420	0.11	0.15	1533	10.19	Sesquiterpene
$\alpha$ -Humulene	23.09	1434	0.55	[0.80]	1582	12.02*	Sesquiterpene
allo-Aromadendrene	23.35	1437	0.18	[0.34]	1560	11.21*	Sesquiterpene
<i>trans</i> -Cadinane-1(6),4-diene	24.82	1455	0.12	0.12	1592	12.37	Sesquiterpene
$\gamma$ -Murolene	25.16	1459	0.26	0.27	1612	13.17	Sesquiterpene
Germacrene D	25.28	1460	0.32	0.48	1621	13.68	Sesquiterpene
$\beta$ -Selinene	25.88	1467	0.61	[0.95]	1627	13.93*	Sesquiterpene
<i>cis</i> -Muurole-4(14),5-diene	26.06	1470	0.13	[0.95]	1627	13.93*	Sesquiterpene
$\alpha$ -Selinene	26.52	1475	0.54	[0.71]	1634	14.27*	Sesquiterpene
Valencene	27.00	1481	0.14	0.15	1664	15.86	Sesquiterpene
$\alpha$ -Murolene	27.28	1484	0.16	0.22	1655	15.44	Sesquiterpene
$\delta$ -Guaiane	27.42	1486	0.15	0.16	1645	14.90	Sesquiterpene
$\gamma$ -Cadinene	28.30	1497	0.53	0.57	1669	16.12	Sesquiterpene
Cubebol	28.72	1502	0.34	0.37	1856	28.11	Sesquiterp. alcohol
$\delta$ -Cadinene	28.99	1506	0.70	0.72	1675	16.44	Sesquiterpene
$\alpha$ -Cadinene	30.40	1525	0.05	0.04	1703	17.90	Sesquiterpene
$\alpha$ -Elemol	32.08	1549	0.06	0.06	1999	36.31	Sesquiterp. alcohol
Caryophyllene oxide	33.49*	1568	0.70	0.60	1850	27.78	Sesquiterp. ether
Spathulenol	33.49*	1568	[0.70]	0.14	2018	37.12	Sesquiterp. alcohol
Viridiflorol	34.40	1581	0.07	0.06	1960	34.58	Sesquiterp. alcohol
Humulene epoxide II	35.18	1592	0.09	0.08	1904	31.65	Sesquiterp. ether

10-epi- $\gamma$ -Eudesmol	35.70*	1599	0.20	0.07	1983	35.56	Sesquiterp. alcohol
Copaborneol	35.70*	1599	[0.20]				Sesquiterp. alcohol
1,10-diepi-Cubenol	36.33	1614	0.03	0.03	1951	34.15	Sesquiterp. alcohol
$\tau$ -Cadinol	37.17	1634	0.40	0.44	2077	39.00	Sesquiterp. alcohol
$\tau$ -Muurolol	37.29	1637	0.02	0.02	2092	39.48	Sesquiterp. alcohol
$\alpha$ -Muurolol	37.43	1641	0.05	0.05	2114	40.14	Sesquiterp. alcohol
$\beta$ -Eudesmol	37.51	1643	0.06	0.05	2117	40.24	Sesquiterp. alcohol
Dimer of $\alpha$ -phellandrene II	42.17	1773	0.10	0.15	1845	27.43	Diterpene
(3E)-Cembrene A	46.51	1930	0.09	[0.17]	2133	40.72*	Diterpene
Incensole	51.20	2129	0.35	0.23	2586	50.66	Diterp. alcohol
<b>Total identified</b>			<b>97.84%</b>	<b>97.29%</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 :** 1.4730  $\pm$  0.0003 (20 °C)

#### CONCLUSION

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



