

GC/MS BATCH NUMBER: F00104

ESSENTIAL OIL: FRANKINCENSE CARTERI ORGANIC

BOTANICAL NAME: BOSWELLIA CARTERI

ORIGIN: SOMALIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FRANKINCENSE CARTERI ORGANIC OIL	%
α-PINENE	50.8
METHYL DECYL ETHER	9.3
LIMONENE	6.5
β-PINENE	5.3
SABINENE	4.1
MYRCENE	2.2
p-CYMENE	1.8

Comments from Robert Tisserand: Intriguing and complex Frankincense oil with a grassy, winey odor quality. As well as alpha-pinene, constituents include octyl acetate, methyl decyl ether and incensole.

Date : December 19, 2017

SAMPLE IDENTIFICATION

Internal code : 17L18-PTH3-1-CC

Customer identification : Frankincense Carteri Organic - Somalia - F0010476R

Type : Essential oil

Source : *Boswellia carterii*

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 : Benoit Roger Ph. D.

Analysis date : 2017-12-19

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	1.32	759	0.12	52.57	958	1.17*	Simple phenolic
Tricyclene	3.22*	915	0.83	0.06	918	1.01	Monoterpene
Hashishene	3.22*	915	[0.83]	[52.57]	958	1.17*	Monoterpene
α-Thujene	3.32	921	0.98	[52.57]	958	1.17*	Monoterpene
α-Pinene	3.50	931	50.84	[52.57]	958	1.17*	Monoterpene
Camphene	3.72	944	0.79	1.52	1000	1.39	Monoterpene
Thuja-2,4(10)-diene	3.81	950	0.64	5.05	1053	1.91*	Monoterpene
Sabinene	4.16	970	4.07	[5.05]	1053	1.91*	Monoterpene
β-Pinene	4.23	974	5.31	4.97	1038	1.74	Monoterpene
Myrcene	4.49	990	2.17	5.23	1113	2.45*	Monoterpene
α-Phellandrene	4.76*	1005	0.19	[5.23]	1113	2.45*	Monoterpene
Δ3-Carene	4.76*	1005	[0.19]	0.16	1078	2.20	Monoterpene
Octanal	4.86	1010	0.07	0.08	1225	3.96	Aliphatic aldehyde
α-Terpinene	4.95	1015	0.07	[5.23]	1113	2.45*	Monoterpene
meta-Cymene	5.05	1021	0.04	[5.23]	1113	2.45*	Monoterpene
Limonene	5.19*	1028	8.27	3.83	1139	2.80*	Monoterpene
para-Cymene	5.19*	1028	[8.27]	1.82	1206	3.66	Monoterpene
β-Phellandrene	5.23	1030	0.08	[3.83]	1139	2.80*	Monoterpene
1,8-Cineole	5.25	1031	0.32	[3.83]	1139	2.80*	Monoterp. ether
cis-β-Ocimene	5.36	1038	0.21	0.38	1186	3.41*	Monoterpene
trans-β-Ocimene	5.54	1048	0.06	0.03	1200	3.59	Monoterpene
γ-Terpinene	5.73	1058	0.07	[0.38]	1186	3.41*	Monoterpene
cis-Sabinene hydrate	6.07	1076	0.17	0.26	1409	6.79*	Monoterp. alcohol
Terpinolene	6.22	1084	0.28	0.64	1215	3.80*	Monoterpene
trans-Linalool oxide (fur.)	6.36	1092	0.08	[0.26]	1409	6.79*	Monoterp. alcohol
para-Cymenene	6.44	1096	0.18	0.19	1361	6.02*	Monoterpene
Perillene	6.53*	1100	0.24	0.18	1348	5.81	Monoterp. ether
α-Pinene oxide	6.53*	1100	[0.24]	0.03	1301	5.06	Monoterp. ether
trans-Sabinene hydrate	6.73*	1107	0.12	0.13	1485	8.60*	Monoterp. alcohol
Linalool	6.73*	1107	[0.12]	[0.13]	1485	8.60*	Monoterp. alcohol
α-Thujone	6.83	1111	0.11	0.10	1351	5.86	Monoterp. ketone
cis-Verbenol?	6.89	1113	0.16	1.10	1521	9.60*	Monoterp. alcohol
β-Thujone	7.03	1118	0.04	[0.19]	1361	6.02*	Monoterp. ketone
Methyl nonyl ether	7.15	1123	0.53	[0.64]	1215	3.80*	Aliphatic ether
cis-para-Menth-2-en-1-ol	7.28*	1127	0.26	0.75	1495	8.82*	Monoterp. alcohol
α-Campholenal	7.28*	1127	[0.26]				Monoterp. aldehyde
trans-Pinocarveol	7.66	1141	0.67	0.73	1557	10.92*	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.73	1144	0.12	[0.73]	1557	10.92*	Monoterp. alcohol
trans-Verbenol	7.87	1149	0.58	1.09	1586	11.99*	Monoterp. alcohol
α-Phellandren-8-ol analog	8.03	1154	0.06				Monoterp. alcohol
Sabinaketone	8.16	1159	0.07	0.10	1577	11.66*	Normonoterp. ketone

Pinocarvone	8.24*	1162	0.17	0.07	1471	8.26	Monoterp. ketone
Pinocamphone	8.24*	1162	[0.17]	2.46	1421	7.07*	Monoterp. ketone
α -Phellandren-8-ol	8.47	1170	0.01				Monoterp. alcohol
Borneol	8.72	1180	0.03	0.19	1615	13.11*	Monoterp. alcohol
Terpinen-4-ol	8.86	1185	0.38	[1.10]	1521	9.60*	Monoterp. alcohol
Myrtenal	9.36*	1201	0.25	[1.10]	1521	9.60*	Monoterp. aldehyde
para-Cymen-8-ol	9.36*	1201	[0.25]	0.21	1753	20.88*	Monoterp. alcohol
α -Terpineol	9.50	1204	0.23	0.23	1624	13.60*	Monoterp. alcohol
Methylchavicol	9.56	1205	0.37	[1.09]	1586	11.99*	Phenylpropanoid
α -Phellandrene epoxide	9.87*	1212	0.52	0.16	1714	18.33	Monoterpene
Decanal	9.87*	1212	[0.52]	0.47	1431	7.31*	Aliphatic aldehyde
Verbenone	9.87*	1212	[0.52]	[1.09]	1586	11.99*	Monoterp. ketone
Octyl acetate	9.98	1214	2.18	[2.46]	1421	7.07*	Aliphatic ester
trans-Piperitol	10.09	1217	0.16	0.15	1669	15.98*	Monoterp. alcohol
Methyl decyl ether	10.50	1226	9.31	9.86	1323	5.42	Aliphatic ether
trans-Carveol	10.56	1227	0.10	[0.21]	1753	20.88*	Monoterp. alcohol
Neral	11.15	1240	0.19	[0.19]	1615	13.11*	Monoterp. aldehyde
Carvone	11.46*	1247	0.05	[0.23]	1624	13.60*	Monoterp. ketone
Methyl (E)-2-decenyl ether	11.46*	1247	[0.05]				Aliphatic eter
3,5-Dimethoxytoluene	12.66	1273	0.05				Phenolic
Bornyl acetate	12.95	1280	0.29	[0.75]	1495	8.82*	Monoterp. ester
Decanol	13.12	1283	0.27	0.30	1700	17.58	Aliphatic alcohol
Cuminol	14.66	1311	0.16	0.18	2005	36.52	Monoterp. alcohol
Bicycloelemene	14.93	1315	0.04	[2.46]	1421	7.07*	Sesquiterpene
Methyl undecyl ether	15.58	1325	0.12	[2.46]	1421	7.07*	Aliphatic ether
α -Cubebene	16.02	1332	0.11	[0.26]	1409	6.79*	Sesquiterpene
α -Copaene	17.76	1358	0.40	[0.47]	1431	7.31*	Sesquiterpene
β -Bourbonene	18.20	1365	0.66	0.76	1451	7.79	Sesquiterpene
β -Elemene	19.00	1377	0.13	[1.10]	1521	9.60*	Sesquiterpene
Geranyl acetate	19.41	1383	0.06	0.05	1684	16.72	Monoterp. ester
α -Gurjunene	19.66	1387	0.01	0.14	1462	8.04	Sesquiterpene
β -Caryophyllene	20.67	1401	0.35	[1.10]	1521	9.60*	Sesquiterpene
Dodecanal	21.59	1412	0.08	0.06	1641	14.46*	Aliphatic aldehyde
Aromadendrene	21.87	1415	0.11	[1.10]	1521	9.60*	Sesquiterpene
trans- α -Bergamotene	22.23	1420	0.03	[1.10]	1521	9.60*	Sesquiterpene
6,9-Guaiadiene	22.64	1425	0.18	0.15	1535	10.12	Sesquiterpene
α -Humulene	23.49	1435	0.08	[0.10]	1577	11.66*	Sesquiterpene
allo-Aromadendrene	23.74	1438	0.06	[0.73]	1557	10.92*	Sesquiterpene
trans-Cadina-1(6),4-diene	25.16	1455	0.02	[0.10]	1577	11.66*	Sesquiterpene
γ -Muuroolene	25.56	1459	0.14	0.11	1609	12.84	Sesquiterpene
Germacrene D	25.71	1461	0.06	[0.23]	1624	13.60*	Sesquiterpene
β -Selinene	26.34	1469	0.05	[0.19]	1615	13.11*	Sesquiterpene
α -Selinene	26.99	1476	0.04	[0.23]	1624	13.60*	Sesquiterpene
α -Muuroolene	27.68	1485	0.03	[0.06]	1641	14.46*	Sesquiterpene

γ -Cadinene	28.82	1498	0.11	0.09	1664	15.69	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.45*	1507	0.23	0.19	1693	17.18	Sesquiterpene
δ -Cadinene	29.45*	1507	[0.23]	[0.15]	1669	15.98*	Sesquiterpene
<i>trans</i> -Calamenene	29.56	1509	0.02	0.04	1730	19.35	Sesquiterpene
β -Calacorene	32.36*	1548	0.12	0.22	1841	26.88*	Sesquiterpene
α -Elemol	32.36*	1548	[0.12]	0.05	1986	35.64	Sesquiterp. alcohol
Caryophyllene oxide	33.92	1570	0.16	[0.22]	1841	26.88*	Sesquiterp. ether
Viridiflorol	34.96	1584	0.04	0.05	1970	34.90	Sesquiterp. alcohol
Humulene epoxide II	35.33	1590	0.01	0.02	1891	30.57	Sesquiterp. ether
τ -Cadinol	37.55	1638	0.01	0.02	2077	38.96	Sesquiterp. alcohol
τ -Muurolol	37.63	1640	0.04	0.06	2087	39.27	Sesquiterp. alcohol
α -Muurolol	37.89	1646	0.03	0.03	2100	39.70	Sesquiterp. alcohol
β -Eudesmol	37.98	1649	0.02	0.05	2113	40.08*	Sesquiterp. alcohol
α -Cadinol	38.17	1653	0.05	[0.05]	2113	40.08*	Sesquiterp. alcohol
Dimer of α -phellandrene II	42.36	1773	0.02	[0.22]	1841	26.88*	Diterpene
(3 <i>E</i>)-Cembrene A	46.71	1930	0.09	0.09	2126	40.48	Diterpene
Cembrene C	48.06	1984	0.04				Diterpene
Serratol	51.50*	2133	0.26	0.17	2567	50.28	Diterpene
Incensole	51.50*	2133	[0.26]				Diterpene
Total identified			97.53%	97.63%			

*: 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

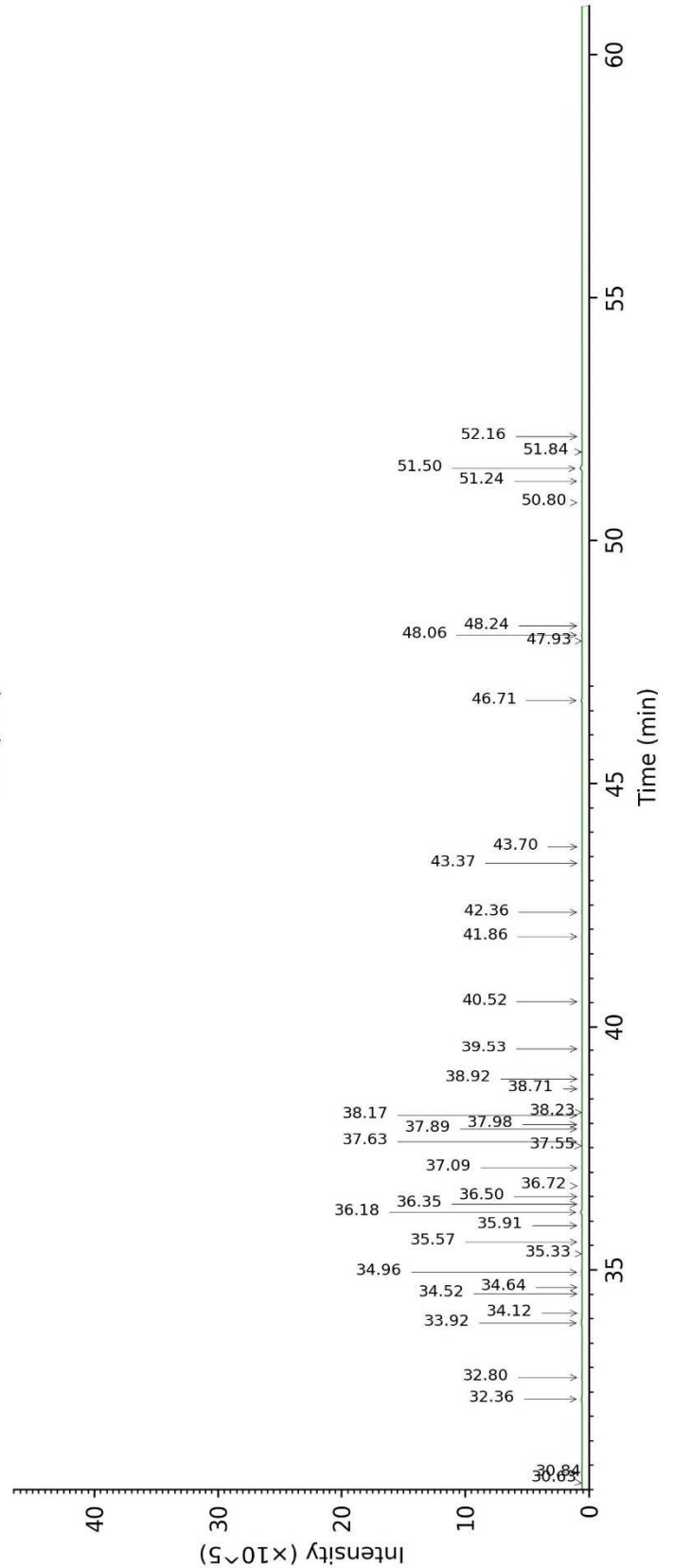
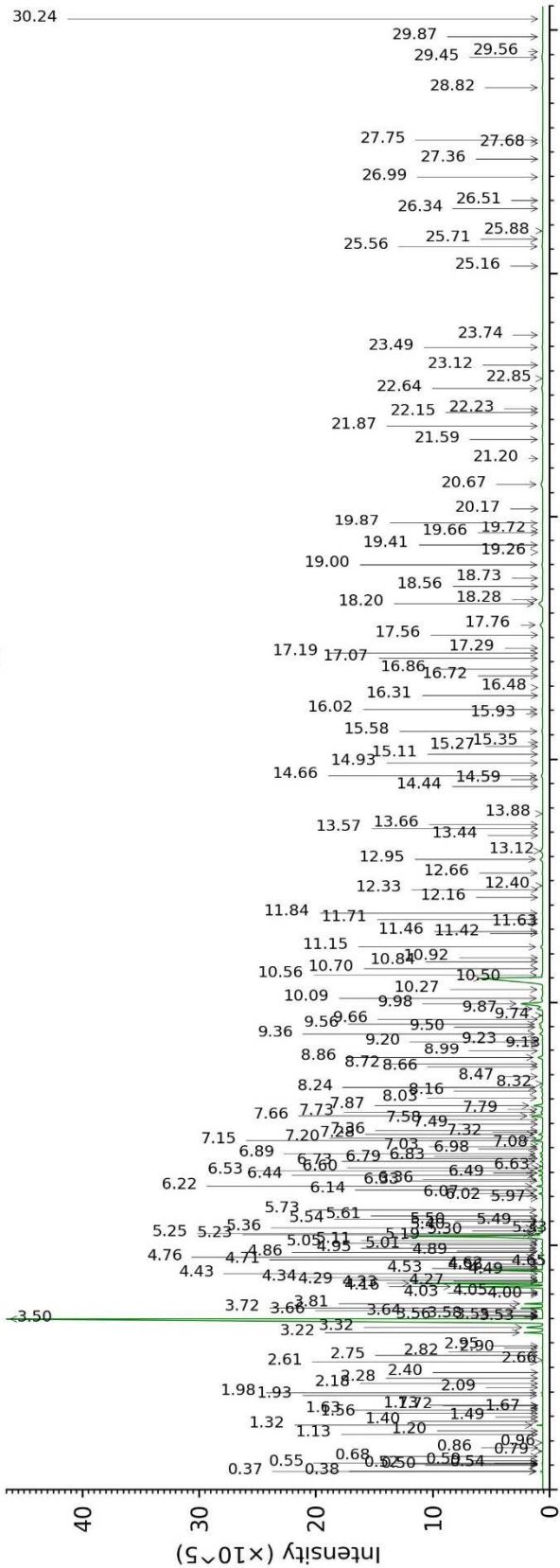
Physical aspect : Faintly yellow liquid

Refractive index : 1.4630 \pm 0.0003 (20 °C)

CONCLUSION

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

17L18-PTH3-1-CC_BP5



17L18-PTH3-1-CC_WAX

