

Date : October 26, 2016

SAMPLE IDENTIFICATION

Internal code : 16J20-TOB23-1-DM

Customer identification : Frankincense - Somalia

Type : Essential oil

Source : *Boswellia carterii*

Customer : TruIQ Global, LLC

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 : 2016-10-26

Checked and approved by :

Sylvain Mercier, M. Sc., chimiste 2014-005

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Toluene	1.28	747	0.05	38.31	952	0.89*	Simple phenolic
Tricyclene	3.15*	912	0.28	0.05	923	0.77	Monoterpene
Hashishene	3.15*	912	[0.28]	[38.31]	952	0.89*	Monoterpene
α -Thujene	3.29	920	18.37	18.00	958	0.91	Monoterpene
α -Pinene	3.42	928	36.61	[38.31]	952	0.89*	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.59	939	0.56	1.01	1059	1.52	Monoterpene
Camphene	3.64	942	0.41	0.47	992	1.05	Monoterpene
Thuja-2,4(10)-diene	3.74	947	0.14	5.66	1053	1.48*	Monoterpene
Sabinene	4.09	969	5.86	[5.66]	1053	1.48*	Monoterpene
β -Pinene	4.14	972	2.71	2.63	1036	1.33	Monoterpene
Myrcene	4.42	989	2.55	2.78	1111	1.94	Monoterpene
Pseudolimonene	4.63	1001	0.04	0.04	1122	2.07	Monoterpene
α -Phellandrene	4.68*	1004	1.35	0.67	1102	1.87	Monoterpene
Δ^3 -Carene	4.68*	1004	[1.35]	0.54	1083	1.71	Monoterpene
Octanal	4.77	1009	0.01	0.02	1229	3.34	Aliphatic aldehyde
α -Terpinene	4.87	1014	0.26	0.30	1118	2.01	Monoterpene
Limonene	5.13*	1029	11.62	7.46	1137	2.24	Monoterpene
para-Cymene	5.13*	1029	[11.62]	3.31	1201	2.99	Monoterpene
β -Phellandrene	5.15	1030	0.25	0.99	1139	2.26*	Monoterpene
1,8-Cineole	5.16	1031	0.39	[0.99]	1139	2.26*	Monoterp. ether
cis- β -Ocimene	5.28	1037	0.23	0.62	1182	2.76*	Monoterpene
trans- β -Ocimene	5.46	1047	0.09	0.06	1196	2.93	Monoterpene
γ -Terpinene	5.64	1057	0.50	[0.62]	1182	2.76*	Monoterpene
cis-Sabinene hydrate	5.99	1076	0.03	0.03	1401	5.77	Monoterp. alcohol
Terpinolene	6.11	1082	0.10	0.11	1218	3.19	Monoterpene
para-Cymenene	6.33	1095	0.07	0.08	1362	5.21	Monoterpene
Perillene	6.45	1100	0.05	0.03	1339	4.88	Monoterp. ether
Linalool	6.63	1106	0.14	0.09	1485	7.26	Monoterp. alcohol
α -Thujone	6.73	1110	0.03	0.02	1365	5.24	Monoterp. ketone
β -Thujone	6.91	1117	0.39	0.29	1359	5.16	Monoterp. ketone
cis-para-Menth-2-en-1-ol	7.11	1124	0.04	0.05	1504	7.61	Monoterp. alcohol
α -Campholenal	7.16	1126	0.13				Monoterp. aldehyde
trans-Pinocarveol	7.53	1140	0.20	0.31	1589	9.94	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.61	1143	0.13	0.29	1558	9.04	Monoterp. alcohol
trans-Verbenol	7.74	1148	0.14	0.15	1616	10.76	Monoterp. alcohol
α -Phellandren-8-ol analog	7.87	1153	0.09				Monoterp. alcohol
Pinocarvone	8.10	1161	0.06	0.05	1472	7.03	Monoterp. ketone
α -Phellandren-8-ol	8.37	1171	0.06				Monoterp. alcohol
Borneol	8.60	1180	0.16	0.22	1628	11.17*	Monoterp. alcohol
Terpinen-4-ol	8.67	1183	0.95	2.04	1524	8.05*	Monoterp. alcohol

para-Cymen-8-ol	9.03	1196	0.03	0.02	1774	18.22	Monoterp. alcohol
Myrtenal	9.17	1199	0.07	0.12	1533	8.30	Monoterp. aldehyde
α -Terpineol	9.34*	1203	0.32	0.20	1646	11.94	Monoterp. alcohol
Myrtenol	9.34*	1203	[0.32]	0.16	1700	14.34	Monoterp. alcohol
Methylchavicol	9.38	1204	0.05	0.04	1593	10.10	Phenylpropanoid
Verbenone	9.66	1210	0.18	0.23	1610	10.58	Monoterp. ketone
Octyl acetate	9.81	1213	2.89	2.83	1423	6.11	Aliphatic ester
Methyl decyl ether	10.22	1223	0.88	0.84	1322	4.63	Aliphatic ether
<i>trans</i> -Carveol	10.38	1226	0.06	0.05	1748	16.69	Monoterp. alcohol
Methyl (<i>E</i>)-2-decenyl ether	11.20	1245	0.08				Aliphatic ether
Bornyl acetate	12.70	1278	0.15	[2.04]	1524	8.05*	Monoterp. ester
δ -Elemene	15.04	1319	0.03	0.02	1420	6.04	Sesquiterpene
α -Cubebene	15.69	1329	0.10	0.15	1409	5.89	Sesquiterpene
α -Copaene	17.38	1355	0.44	0.47	1433	6.30	Sesquiterpene
β -Bourbonene	17.79	1361	0.22	0.25	1452	6.66	Sesquiterpene
β -Elemene	18.61	1374	0.23	[2.04]	1524	8.05*	Sesquiterpene
Geranyl acetate	19.32	1385	0.06	0.05	1694	14.08	Monoterp. ester
β -Caryophyllene	20.28	1399	2.72	1.91	1522	7.98	Sesquiterpene
<i>cis</i> - α -Bergamotene	21.79	1417	0.17	[2.04]	1524	8.05*	Sesquiterpene
6,9-Guaiadiene	22.59	1427	0.04	0.03	1549	8.79	Sesquiterpene
α -Humulene	23.00	1432	0.40	0.49	1579	9.69	Sesquiterpene
γ -Muurolene	25.07	1457	0.25	0.19	1619	10.87	Sesquiterpene
Germacrene D	25.20	1458	0.43	0.41	1623	11.00	Sesquiterpene
β -Selinene	25.97	1467	0.12	[0.22]	1628	11.17*	Sesquiterpene
α -Selinene	26.43	1472	0.14	0.14	1635	11.45	Sesquiterpene
Valencene	27.21	1481	0.11	0.08	1661	12.59	Sesquiterpene
γ -Cadinene	28.25	1494	0.30	0.27	1668	12.89	Sesquiterpene
δ -Cadinene	28.90	1503	0.62	0.52	1672	13.11	Sesquiterpene
<i>trans</i> -Calamenene	29.28	1508	0.03	0.04	1735	15.88	Sesquiterpene
Caryophyllene oxide	33.47	1565	0.36	0.28	1847	22.51	Sesquiterp. ether
Viridiflorol	34.55	1580	0.19	0.15	1978	31.12	Sesquiterp. alcohol
τ -Cadinol	37.31	1636	0.25	0.25	2070	35.88	Sesquiterp. alcohol
τ -Muurolol	37.43	1639	0.03	0.02	2087	36.46	Sesquiterp. alcohol
α -Muurolol	37.56	1642	0.04	0.05	2104	37.04	Sesquiterp. alcohol
β -Eudesmol	37.66	1645	0.04	0.03	2123	37.69	Sesquiterp. alcohol
α -Eudesmol	37.87	1650	0.05	0.05	2126	37.79	Sesquiterp. alcohol
(3 <i>E</i>)-Cembrene A	46.48	1927	0.06	0.06	2135	38.07	Diterpene
Incensole	51.25	2128	0.42	0.27	2597	48.31	Diterp. alcohol
Total identified			97.05%	96.34%			

*: 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 : 1.4675 ± 0.0003 (20 °C)

CONCLUSION

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



