

GC/MS BATCH NUMBER: F50100

ESSENTIAL OIL: FRANKINCENSE SERRATA ORGANIC

BOTANICAL NAME: BOSWELLIA SERRATA

ORIGIN: INDIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FRANKINCENSE SERRATA ORGANIC OIL	%
α -THUJENE	63.5
para-CYMENE	6.5
α -PINENE	5.6
METHYL CHAVICOL (ESTRAGOLE)	4.3
β -PINENE	4.0
LIMONENE	3.7
SABINENE	2.4
β -PHELLANDRENE	2.2
Δ^3 -CARENE	1.2

Comments from Robert Tisserand: This type of Frankincense oil comes only from India and is dominated by α -thujene.

Date : February 11, 2016

SAMPLE IDENTIFICATION

Internal code : 16B01-PTH8-1-LC

Customer identification : Organic Frankincense serrata - India – F5010055R

Type : Essential oil

Source : *Boswellia serrata*

Customer : Plant Therapy

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 : 2016-02-09

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	1.08	754	0.07	68.82	974	1.15*	Simple phenolic
Furfural	1.85	840	0.02	0.01	1413	6.48	Furan
Hashishene	2.77	913	0.10	[68.82]	974	1.15*	Monoterpene
α -Thujene	2.96	925	63.49	[68.82]	974	1.15*	Monoterpene
α -Pinene	3.01	928	5.56	[68.82]	974	1.15*	Monoterpene
Camphene	3.23	942	0.10	0.14	1005	1.30	Monoterpene
Thuja-2,4(10)-diene	3.43	954	0.03	2.45	1068	1.78*	Monoterpene
Sabinene	3.66†	969	6.43	[2.45]	1068	1.78*	Monoterpene
β -Pinene	3.71†	972	[6.43]	4.04	1052	1.63	Monoterpene
Myrcene	4.02	991	3.81	3.85	1125	2.32	Monoterpene
2-Carene	4.08	995	0.03	0.04	1082	1.90	Monoterpene
Pseudolimonene	4.19	1002	0.19	0.20	1119	2.25	Monoterpene
Δ 3-Carene	4.24*	1005	1.35	1.20	1098	2.05	Monoterpene
α -Phellandrene	4.24*	1005	[1.35]	0.15	1117	2.22	Monoterpene
α -Terpinene	4.43	1014	0.10	0.11	1130	2.38	Monoterpene
para-Cymene	4.68*	1028	10.05	6.45	1217	3.50	Monoterpene
Limonene	4.68*	1028	[10.05]	5.89	1149	2.63*	Monoterpene
β -Phellandrene	4.69	1029	2.15	[5.89]	1149	2.63*	Monoterpene
1,8-Cineole	4.71	1030	0.20	0.09	1153	2.68	Monoterp. ether
<i>cis</i> - β -Ocimene	4.86	1038	0.01	0.11	1193	3.19*	Monoterpene
<i>trans</i> - β -Ocimene	5.03	1048	0.02	0.07	1207	3.37	Monoterpene
Lavender lactone	5.15	1055	0.05	0.04	1609	11.70*	Lactone
γ -Terpinene	5.19	1058	0.10	[0.11]	1193	3.19*	Monoterpene
Isoterpinolene	5.59	1081	0.02	0.01	1223	3.58	Monoterpene
Terpinolene	5.65	1085	0.02	0.03	1228	3.66	Monoterpene
para-Cymenene	5.80	1093	0.05				Monoterpene
Linalool	6.15	1109	0.18	0.18	1506	8.38	Monoterp. alcohol
β -Thujone	6.35	1118	0.04	0.04	1369	5.77	Monoterp. ketone
endo-Fenchol	6.42	1121	0.02	0.01	1519	8.78	Monoterp. alcohol
<i>trans</i> -Pinocarveol	6.88	1140	0.02	0.02	1580	10.71	Monoterp. alcohol
Camphor	6.96	1144	0.01	0.02	1427	6.77	Monoterp. ketone
Terpinen-4-ol	7.90	1183	0.03	0.05	1536	9.32	Monoterp. alcohol
Methylchavicol	8.56*	1203	4.38	4.33	1595	11.16	Phenylpropanoid
α -Terpineol	8.56*	1203	[4.38]	0.02	1633	12.86	Monoterp. alcohol
Neral	9.90	1236	0.04	[0.04]	1609	11.70*	Monoterp. aldehyde
Bornyl acetate	11.23	1278	0.03				Monoterp. ester
β -Bourbonene	15.91	1362	0.05	0.05	1449	7.20	Sesquiterpene

meta-Camphorene	45.79	1937	0.24	0.24	2128	39.56	Diterpene
para-Camphorene	46.68	1971	0.09	0.10	2172	40.76	Diterpene
Total identified			99.08%	98.76%			

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

Note: no correction factor was applied

OTHER DATA

Physical aspect : Clear liquid

Refractive index : 1.4625 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The observed profile corresponds to the stated incense species, with high α -thujene content. It also features marker compounds from *Boswellia serrata*, such as methylchavicol and β -thujone^{1,2}.

REFERENCES

- (1) Hamm, S.; Bleton, J.; Connan, J.; Tchaplal, A. A Chemical Investigation by Headspace SPME and GC-MS of Volatile and Semi-Volatile Terpenes in Various Olibanum Samples. *Phytochemistry* **2005**, *66*, 1499–1514.
- (2) Camarda, L.; Dayton, T.; Di Stefano, V.; Pitonzo, R.; Schillaci, D. Chemical Composition and Antimicrobial Activity of Some Oleogum Resin Essential Oils from *Boswellia* Spp. (Burseraceae). *Ann. Chim.* **2007**, *97*, 837–844.



