

GC/MS BATCH NUMBER: F20101

ESSENTIAL OIL: FIR NEEDLE
BOTANICAL NAME: ABIES SIBIRICA
ORIGIN: RUSSIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FIR NEEDLE OIL	%
BORNYL ACETATE	25.7
CAMPHENE	22.9
α -PINENE	14.5
Δ 3-CARENE	12.1
LIMONENE	5.0
β -PINENE	2.7
β -PHELLANDRENE	2.5
SANTENE	2.2
TRICYCLENENE	2.2
BORNEOL	2.1
α -PHELLANDRENE	1.2
β -CARYOPHYLLENE	0.9
α -HUMULENE	0.5

Comments from Robert Tisserand: Smells great, and conforms to all 13 key ISO constituents.

Date : May 30, 2016

SAMPLE IDENTIFICATION

Internal code : 16E10-PTH8-1-SM

Customer identification : Fir needle - Russia - F2010159

Type : Essential oil

Source : *Abies sibirica*

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 : 2016-05-30

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.	
Santene	2.56	874	2.22	2.17	907	0.73	Normonoterpene
Tricyclene	3.15	917	2.21	2.18	931	0.83	Monoterpene
α -Pinene	3.37	930	14.51	14.33	956	0.93	Monoterpene
Camphene	3.66*	948	23.25	22.88	1010	1.18	Monoterpene
α -Fenchene	3.66*	948	[23.25]	0.09	997	1.10	Monoterpene
β -Pinene	4.11	975	2.68	2.57	1044	1.44	Monoterpene
Myrcene	4.38	992	0.90	0.93	1119	2.08	Monoterpene
Δ^3 -Carene	4.69*	1009	13.54	12.14	1099	1.88	Monoterpene
α -Phellandrene	4.69*	1009	[13.54]	1.19	1112	2.01	Monoterpene
α -Terpinene	4.84	1018	0.11	0.10	1125	2.16	Monoterpene
para-Cymene	5.02	1028	0.30	0.32	1212	3.17	Monoterpene
Limonene	5.08	1031	5.00	4.48	1145	2.39	Monoterpene
β -Phellandrene	5.11	1033	2.45	3.19	1150	2.45*	Monoterpene
1,8-Cineole	5.14	1034	0.38	[3.19]	1150	2.45*	Monoterp. ether
γ -Terpinene	5.60	1060	0.14	0.14	1191	2.93	Monoterpene
Isoterpinolene	6.00	1082	0.04	0.02	1222	3.32	Monoterpene
Terpinolene	6.08	1086	0.94	0.88	1227	3.39	Monoterpene
para-Cymenene	6.26	1096	0.03	0.02	1372	5.44	Monoterpene
Linalool	6.50	1107	0.01	0.04	1499	7.68	Monoterp. alcohol
trans-Pinocarveol	7.37	1140	0.02	0.03	1575	9.80	Monoterp. alcohol
Camphor	7.56	1147	0.23	0.22	1425	6.28	Monoterp. ketone
Camphene hydrate	7.77	1155	0.06	1.03	1527	8.34*	Monoterp. alcohol
Pinocarvone	8.02	1164	0.02	0.03	1491	7.52	Monoterp. ketone
Borneol	8.32	1175	2.05	2.18	1624	11.38	Monoterp. alcohol
Terpinen-4-ol	8.51	1183	0.12	0.10	1533	8.53	Monoterp. alcohol
Cryptone	8.91	1197	0.02	0.02	1571	9.67	Monoterp. ketone
α -Terpineol	9.11	1204	0.16	0.14	1628	11.60	Monoterp. alcohol
Bornyl acetate	12.77*	1286	25.66	26.98	1516	8.04*	Monoterp. ester
Geranyl acetate	18.86	1386	0.18	0.17	1692	14.48	Monoterp. ester
β -Caryophyllene	20.05	1404	0.94	[1.03]	1527	8.34*	Sesquiterpene
cis-Muurola-3,5-diene	22.15	1429	0.03	0.02	1557	9.26	Sesquiterpene
α -Humulene	22.76	1437	0.47	0.50	1587	10.17	Sesquiterpene
β -Bisabolene	28.16	1502	0.07	0.09	1662	13.08	Sesquiterpene
α -Bisabolol	39.05	1688	0.10	0.11	2135	38.84	Sesquiterp. alcohol
Total identified			98.84%	99.29%			

*: 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 : 1.4693 ± 0.0003 (20 °C)

CONCLUSION

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



