



PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: F20103

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FIR NEEDLE OIL	%
BORNYL ACETATE	25.9
CAMPHENE	22.7
Δ^3 -CARENE	12.5
α -PINENE	12.4
LIMONENE	5.4
β -PHELLANDRENE	3.8
β -PINENE	2.3
TRICYCLENE	2.3
SANTENE	2.5
BORNEOL	2.4
TERPINOLENE	1.2
β -CARYOPHYLLENE	1.1

Comments from Robert Tisserand: Fresh, green coniferous odor profile. All thirteen key ISO constituents are within range.

Date : October 31, 2017

SAMPLE IDENTIFICATION

Internal code : 17J26-PTH2-1-CC

Customer identification : Fir Needle - Russia - F20103610R

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).

Identifications double-checked by GC-MS

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-10-31

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	2.64	875	2.45	2.32	892	0.94*	Normonoterpene
Bornylene	2.98	900	0.03	[2.32]	892	0.94*	Monoterpene
Tricyclene	3.24	916	2.27	2.17	929	1.07	Monoterpene
α -Thujene	3.33	921	0.08	12.61	958	1.19*	Monoterpene
α -Pinene	3.46	929	12.40	[12.61]	958	1.19*	Monoterpene
Camphene	3.77	947	22.74	22.71	1007	1.50	Monoterpene
Thuja-2,4(10)-diene	3.82	950	0.01				Monoterpene
Sabinene	4.15	970	0.06				Monoterpene
β -Pinene	4.22	974	2.33	2.35	1042	1.84	Monoterpene
Myrcene	4.50	990	0.59	0.64	1119	2.59	Monoterpene
Δ^3 -Carene	4.81*	1008	13.21	12.50	1099	2.34	Monoterpene
α -Phellandrene	4.81*	1008	[13.21]	0.46	1112	2.50	Monoterpene
α -Terpinene	4.96	1016	0.15	0.21	1124	2.66	Monoterpene
Limonene	5.21*	1030	5.20	5.35	1151	3.01	Monoterpene
para-Cymene	5.21*	1030	[5.20]	0.10	1211	3.82	Monoterpene
β -Phellandrene	5.24	1031	3.84	3.47	1144	2.93	Monoterpene
γ -Terpinene	5.74	1058	0.18	0.17	1191	3.55	Monoterpene
Isoterpinolene	6.14	1080	0.05	1.24	1226	4.05*	Monoterpene
Terpinolene	6.22	1085	1.24	[1.24]	1226	4.05*	Monoterpene
para-Cymenene	6.44	1096	0.04	0.04	1368	6.20	Monoterpene
Linalool	6.72	1107	0.02	0.14	1494	8.90*	Monoterp. alcohol
endo-Fenchol	7.19	1124	0.03	26.92	1513	9.49*	Monoterp. alcohol
trans-Pinocarveol	7.65	1141	0.04	0.02	1572	11.69*	Monoterp. alcohol
Camphor	7.79	1146	0.24	0.23	1423	7.23	Monoterp. ketone
Camphene hydrate	8.08	1156	0.10	[26.92]	1513	9.49*	Monoterp. alcohol
Borneol	8.72	1180	2.35	2.73	1617	13.53*	Monoterp. alcohol
Terpinen-4-ol	8.86	1184	0.14	1.36	1522	9.85*	Monoterp. alcohol
Cryptone	9.38	1201	0.02	[0.02]	1572	11.69*	Monoterp. ketone
α -Terpineol	9.55	1205	0.27	[2.73]	1617	13.53*	Monoterp. alcohol
Bornyl acetate	13.18	1285	25.87	[26.92]	1513	9.49*	Monoterp. ester
Geranyl acetate	19.43	1383	0.19	0.19	1693	17.47	Monoterp. ester
Longifolene	19.74	1388	0.09	[0.14]	1494	8.90*	Sesquiterpene
β -Caryophyllene	20.70	1401	1.08	[1.36]	1522	9.85*	Sesquiterpene
cis-Muurola-3,5-diene	22.85	1427	0.04	0.03	1554	11.01	Sesquiterpene
α -Humulene	23.50	1435	0.62	0.63	1585	12.12	Sesquiterpene
Germacrene D	25.80	1462	0.03	[2.73]	1617	13.53*	Sesquiterpene
α -Muurolene	27.76	1486	0.07	0.14	1647	15.06	Sesquiterpene
γ -Cadinene	28.76	1498	0.03	0.02	1676	16.53	Sesquiterpene
β -Bisabolene	28.95	1500	0.11	0.18	1660	15.73	Sesquiterpene
trans- γ -Bisabolene	30.33	1520	0.08	0.06	1686	17.09	Sesquiterpene
Caryophyllene oxide	33.93	1570	0.05				Sesquiterp. ether

α -Bisabolol	39.63	1689	0.18	0.23	2133	40.79	Sesquiterp. alcohol
Manoyl oxide	47.77	1973	0.06	0.06	2203	42.61	Diterp. ether
Manool	49.46	2043	0.05	0.06	2549	50.02	Diterp. alcohol
Total identified	98.63%			99.34%			

*: 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 : Clear liquid

Refractive index : 1.4715 ± 0.0003 (20 °C)

CONCLUSION

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

17J26-PTH2-1-CC_WAX

