



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: F20102

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FIR NEEDLE OIL	%
BORNYL ACETATE	29.1
CAMPHENE	21.1
$\alpha$ -PINENE	14.9
$\Delta$ 3-CARENE	13.0
LIMONENE	5.7
$\beta$ -PINENE	2.5
TRICYCLENE	2.3
$\beta$ -PHELLANDRENE	2.2
1,8-CINEOLE	1.9
BORNEOL	1.6
$\beta$ -CARYOPHYLLENE	1.4
TERPINOLENE	1.3
SANTENE	1.3

Comments from Robert Tisserand: Clear bright, pine needle type odor quality, and good bornyl acetate content.

**Date :** February 3, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17A23-PTH16-1-DM

**Customer identification :** Fir Needle - Russia - F2010266R

**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 :** 2017-01-30

Checked and approved by :

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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.	
Cyclofenchene	2.53	873	0.07	0.08	843	0.81	Monoterpene
Santene	2.56	875	1.29	1.36	888	1.00	Normoterpene
Bornylene	2.88	899	0.04	0.03	884	0.98	Monoterpene
Tricyclene	3.16	916	2.25	2.27	921	1.14	Monoterpene
$\alpha$ -Thujene	3.25	921	0.04	15.22	952	1.28*	Monoterpene
$\alpha$ -Pinene	3.38	930	14.94	[15.22]	952	1.28*	Monoterpene
$\beta$ -Fenchene	3.46	935	0.17	0.12	972	1.40	Monoterpene
Camphene	3.68*	948	21.53	21.06	999	1.60	Monoterpene
$\alpha$ -Fenchene	3.68*	948	[21.53]	0.48	986	1.50	Monoterpene
Sabinene	4.06	972	0.04	0.03	1066	2.11	Monoterpene
$\beta$ -Pinene	4.13	977	2.48	2.46	1045	1.95	Monoterpene
Myrcene	4.41	994	0.73	0.73	1119	2.71	Monoterpene
Pseudolimonene	4.51	1000	0.05	0.04	1114	2.65	Monoterpene
$\Delta^3$ -Carene	4.71*	1009	13.02	12.96	1101	2.48	Monoterpene
$\alpha$ -Phellandrene	4.71*	1009	[13.02]	0.15	1112	2.62	Monoterpene
$\alpha$ -Terpinene	4.87	1017	0.17	0.18	1126	2.80	Monoterpene
Limonene	5.11*	1030	6.20	5.69	1146	3.07	Monoterpene
$\beta$ -Phellandrene	5.11*	1030	[6.20]	2.15	1151	3.15*	Monoterpene
para-Cymene	5.11*	1030	[6.20]	0.38	1211	3.98	Monoterpene
1,8-Cineole	5.14	1031	1.86	[2.15]	1151	3.15*	Monoterp. ether
<i>trans</i> - $\beta$ -Ocimene	5.46	1048	0.01	tr	1204	3.87	Monoterpene
$\gamma$ -Terpinene	5.64	1057	0.13	0.13	1192	3.69	Monoterpene
Terpinolene	6.12	1082	1.34	1.28	1226	4.20	Monoterpene
para-Cymenene	6.33	1094	0.03	0.03	1369	6.44	Monoterpene
Linalool	6.64	1106	tr				Monoterp. alcohol
endo-Fenchol	7.09	1122	0.01	0.01	1522	10.41	Monoterp. alcohol
Camphor	7.65	1143	0.11	0.12	1424	7.61	Monoterp. ketone
Borneol	8.58	1178	1.56	1.70	1618	14.45	Monoterp. alcohol
$\alpha$ -Terpineol	9.38	1203	0.22	0.19	1622	14.66	Monoterp. alcohol
Bornyl acetate	12.91	1282	29.14	28.76	1510	9.93	Monoterp. ester
$\beta$ -Caryophyllene	20.24	1396	1.44	1.34	1517	10.19	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	22.70	1426	0.02	0.02	1562	11.93	Sesquiterpene
$\alpha$ -Humulene	23.00	1430	0.71	0.67	1578	12.53	Sesquiterpene
$\alpha$ -Bisabolol	39.28	1682	0.05	0.04	2126	41.27	Sesquiterp. alcohol
<b>Total identified</b>			<b>99.65%</b>	<b>99.68%</b>			

\*: 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 :**  $1.4693 \pm 0.0003$  (20 °C)

*CONCLUSION*

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



