

GC/MS BATCH NUMBER: BN0103

ESSENTIAL OIL: BALSAM FIR
BOTANICAL NAME: ABIES BALSAMEA
ORIGIN: CANADA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BALSAM FIR OIL	%
β-PINENE	33.5
α-PINENE	16.9
Δ3-CARENE	13.8
LIMONENE	8.3
BORNYL ACETATE	6.5
CAMPHENE	5.5
β-PHELLANDRENE	4.4
MYRCENE	1.8
SANTENE	1.6
TERPINOLENE	1.2

Comments from Robert Tisserand: Highly fragrant, green-coniferous odor quality. Constituents are in expected amounts.

Date : November 15, 2017

SAMPLE IDENTIFICATION

Internal code : 17K10-PTH1-1-CC

Customer identification : Balsam Fir - Canada - BN010377R

Type : Essential oil

Source : *Abies balsamea*

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 : 2017-11-14

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	1.32	759	0.01	17.07	949	1.16*	Simple phenolic
cis-Hex-3-en-1-ol	2.50	865	0.01	0.09	1316	5.39*	Aliphatic alcohol
Santene	2.62	874	1.55	1.45	885	0.91	Normonoterpene
Tricyclene	3.22	915	0.82	0.78	920	1.04	Monoterpene
α -Thujene	3.31	920	0.15	[17.07]	949	1.16*	Monoterpene
α -Pinene	3.45	928	16.94	[17.07]	949	1.16*	Monoterpene
Camphene	3.72*	944	5.57	5.52	999	1.43	Monoterpene
α -Fenchene	3.72*	944	[5.57]	0.11	991	1.36	Monoterpene
Thuja-2,4(10)-diene	3.80	949	0.05	33.42	1042	1.84*	Monoterpene
Sabinene	4.16	970	0.09	[33.42]	1042	1.84*	Monoterpene
β -Pinene	4.26	976	33.47	[33.42]	1042	1.84*	Monoterpene
Myrcene	4.48	989	1.82	2.04	1115	2.54*	Monoterpene
Δ 3-Carene	4.79*	1007	13.97	13.81	1095	2.29	Monoterpene
α -Phellandrene	4.79*	1007	[13.97]	[2.04]	1115	2.54*	Monoterpene
cis-Hex-3-en-1-yl acetate	4.87	1011	0.01	0.03	1264	4.60	Aliphatic ester
α -Terpinene	4.94	1015	0.18	[2.04]	1115	2.54*	Monoterpene
Limonene	5.20*	1029	8.32	5.31	1140	2.88	Monoterpene
para-Cymene	5.20*	1029	[8.32]	0.16	1207	3.75*	Monoterpene
β -Phellandrene	5.23	1031	4.37	7.19	1146	2.95	Monoterpene
cis- β -Ocimene	5.35	1037	0.01	0.27	1187	3.48*	Monoterpene
trans- β -Ocimene	5.52	1047	0.01	[0.16]	1207	3.75*	Monoterpene
γ -Terpinene	5.71	1057	0.29	[0.27]	1187	3.48*	Monoterpene
Isoterpinolene	6.11	1078	0.04	1.20	1222	3.98*	Monoterpene
Terpinolene	6.19	1083	1.17	[1.20]	1222	3.98*	Monoterpene
Fenchone	6.34	1091	0.08	[0.09]	1316	5.39*	Monoterp. ketone
para-Cymenene	6.41	1095	0.07	0.09	1363	6.13	Monoterpene
Linalool	6.69	1106	0.06	6.95	1505	9.19*	Monoterp. alcohol
endo-Fenchol	7.15	1122	0.09	0.39	1522	9.84*	Monoterp. alcohol
trans-Pinocarveol	7.61	1139	0.14	0.10	1561	11.26	Monoterp. alcohol
Camphor	7.75	1144	0.20	0.19	1418	7.13	Monoterp. ketone
Camphene hydrate	8.03	1155	0.06	[0.39]	1522	9.84*	Monoterp. alcohol
Pinocarvone	8.21	1161	0.03	0.04	1469	8.33	Monoterp. ketone
Borneol	8.63	1176	0.41	0.29	1614	13.33*	Monoterp. alcohol
Terpinen-4-ol	8.79	1182	0.26	[0.39]	1522	9.84*	Monoterp. alcohol
Myrtenol	9.31	1200	0.05	0.05	1698	17.73	Monoterp. alcohol
α -Terpineol	9.48	1204	0.96	1.08	1617	13.50*	Monoterp. alcohol
endo-Fenchyl acetate	9.84	1211	0.06	0.05	1404	6.79	Monoterp. ester
Thymol methyl ether	10.61	1228	0.02	[0.39]	1522	9.84*	Monoterp. ether
Piperitone	11.78	1254	0.10	[1.08]	1617	13.50*	Monoterp. ketone
Bornyl acetate	12.97	1280	6.52	[6.95]	1505	9.19*	Monoterp. ester
Thymol	15.42	1323	0.31	0.89	2116	40.35	Monoterp. alcohol

Longifolene	19.62	1386	0.18	0.29	1486	8.73	Sesquiterpene
β -Caryophyllene	20.55	1400	0.20	0.24	1517	9.64	Sesquiterpene
α -Humulene	23.36	1433	0.10	0.14	1578	11.91	Sesquiterpene
<i>trans</i> - β -Farnesene	24.44	1446	0.02	[0.29]	1614	13.33*	Sesquiterpene
β -Bisabolene	28.80	1498	0.22	0.22	1655	15.47	Sesquiterpene
<i>trans</i> - α -Bisabolene	31.81	1540	0.08	0.06	1704	18.04	Sesquiterpene
(<i>E</i>)-Nerolidol	33.81	1568	0.02	0.03	1984	35.77	Sesquiterp. alcohol
<i>cis</i> -Abienol	51.54	2135	0.02	0.02	2662	52.16	Diterp. alcohol
Total identified			99.11%	99.57%			

*: 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

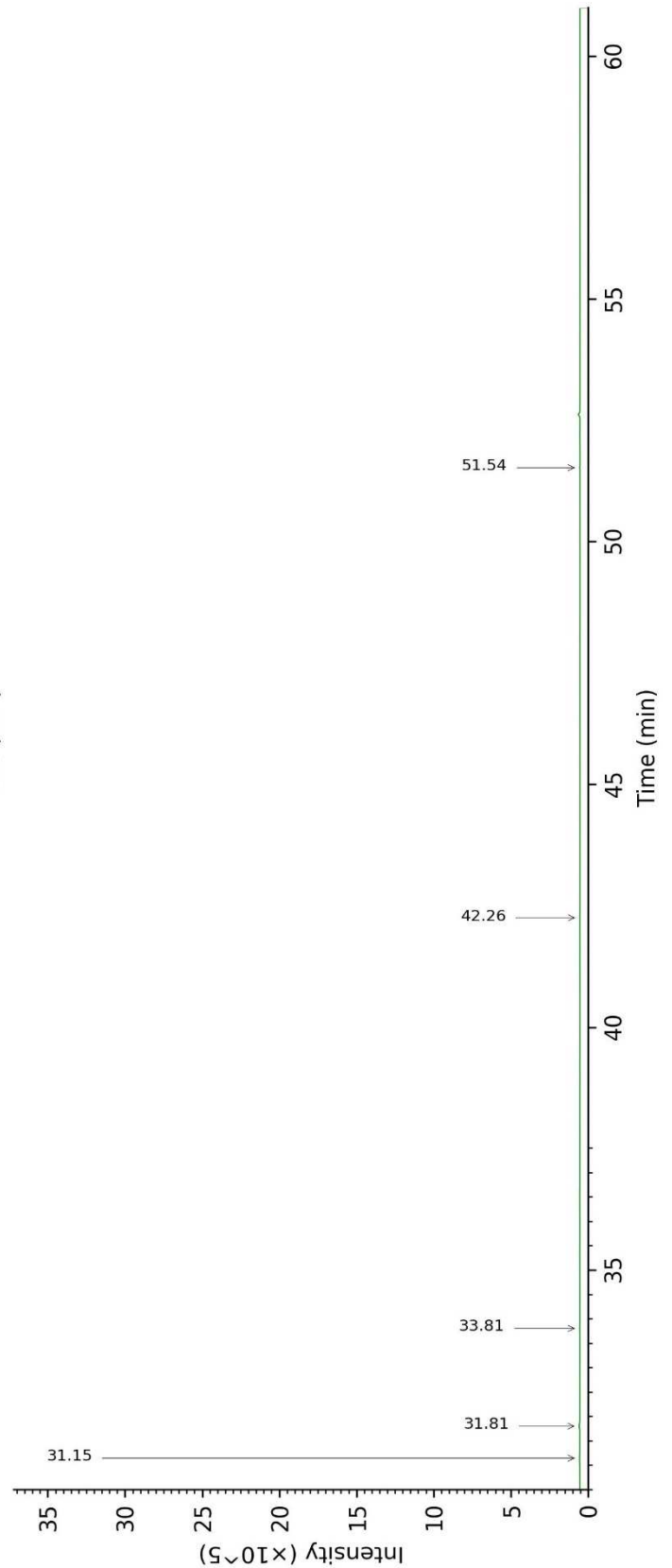
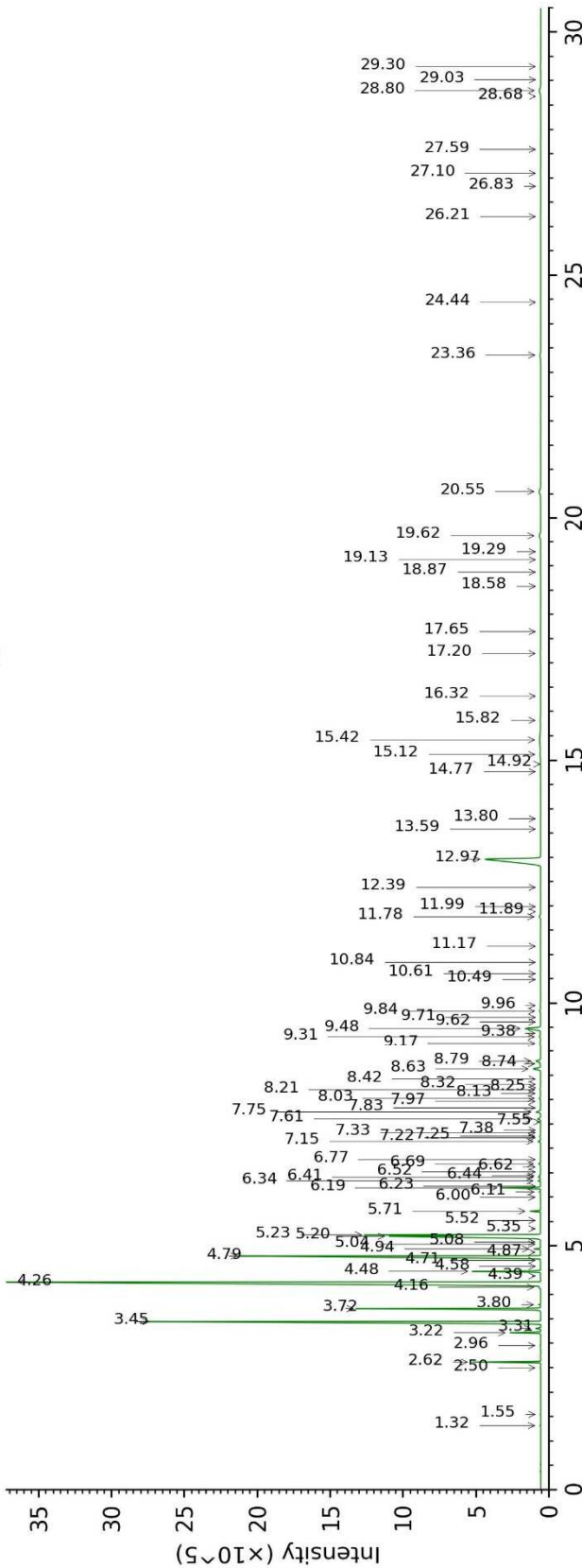
Physical aspect : Clear liquid

Refractive index : 1.4723 \pm 0.0003 (20 °C)

CONCLUSION

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

17K10-PTH1-1-CC_BP5



17K10-PTH1-1-CC_WAX

