PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: BN0100

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BALSAM FIR WOOD OIL	%
α-PINENE	31.0
β-PINENE	22.4
LIMONENE	13.1
β-PHELLANDRENE	9.8
LONGIFOLENE	2.4
Δ3-CARENE	2.1
α-TERPINEOL	2.0
MYRCENE	1.7
CAMPHENE	1.2
p-CYMENE	1.0

Comments from Robert Tisserand: This oil has an intensely sweet-green pinewood odor, due to a number of minor constituents such as longifolene, neral, cuminal and others. Note this is from the wood, not the leaves (needles).

Date : April 5, 2016

SAMPLE IDENTIFICATION

Internal code : 16C24-PTH6-1-DM
Customer identification : Balsam Fir - Canada - BN0100511R
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).
Analyst : Sylvain Mercier, M. Sc., chimiste
Analysis date : 2016-04-02

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.	
Hexanal	1.54	800	0.08	0.06	1020	1.26	Aliphatic aldehyde
cis-Hex-3-en-1-ol	2.39	871	0.02	0.01	1341	4.98	Aliphatic alcohol
Santene	2.41	872	0.06	0.08	909	0.74	Normonoterpene
Heptanal	2.91	910	0.01	0.01	1135	2.27	Aliphatic aldehyde
Tricyclene	3.00	915	0.14	0.13	934	0.84	Monoterpene
α-Thujene	3.09	921	0.15	0.25	966	0.97	Monoterpene
α-Pinene	3.24	930	31.00	31.29	963	0.96	Monoterpene
Camphene	3.46*	944	1.51	1.19	1008	1.16	Monoterpene
α-Fenchene	3.46*	944	[1.51]	0.27	1000	1.11	Monoterpene
Thuja-2,4(10)-diene	3.54	949	0.19	0.25	1063	1.60*	Monoterpene
Sabinene	3.88	970	0.11	[0.25]	1063	1.60*	Monoterpene
β-Pinene	3.99	976	22.41	22.55	1052	1.51	Monoterpene
Myrcene	4.23	991	1.74	1.76	1121	2.11	Monoterpene
Δ3-Carene	4.49*	1007	3.06	2.06	1098	1.87	Monoterpene
α-Phellandrene	4.49*	1007	[3.06]	0.97	1113	2.03	Monoterpene
cis-Hex-3-en-1-yl acetate	4.56	1010	0.02	0.01	1275	4.05	Aliphatic ester
α-Terpinene	4.67	1016	0.44	0.41	1127	2.18	Monoterpene
Limonene	4.94*	1032	23.76	13.13	1150	2.45	Monoterpene
β-Phellandrene	4.94*	1032	[23.76]	9.80	1155	2.52	Monoterpene
para-Cymene	4.94*	1032	[23.76]	1.02	1215	3.22	Monoterpene
γ-Terpinene	5.43	1059	0.28	0.28	1194	2.97	Monoterpene
Terpinolene	5.90	1086	0.97	0.90	1229	3.42	Monoterpene
Fenchone	6.03	1093	0.17	0.18	1327	4.78	Monoterp. ketone
para-Cymenene	6.07	1095	0.40	0.36	1375	5.49	Monoterpene
Linalool	6.32	1107	0.02	0.23	1513	7.95*	Monoterp. alcohol
Nonanal	6.43	1111	0.03	0.03	1345	5.03	Aliphatic aldehyde
endo-Fenchol	6.68	1121	0.25	0.26	1525	8.28	Monoterp. alcohol
trans-Pinocarveol	7.12	1139	0.45	0.49	1577	9.86	Monoterp. alcohol
Camphor	7.30	1146	0.21	0.30	1430	6.36	Monoterp. ketone
cis-β-Terpineol	7.50	1154	0.07	0.13	1572	9.72	Monoterp. alcohol
Citronellal	7.64	1159	0.19	0.11	1421	6.20	Monoterp. aldehyde
trans-β-Terpineol	8.01	1174	0.22	0.47	1623	11.37	Monoterp. alcohol
Borneol	8.08	1176	0.30	0.26	1628	11.57	Monoterp. alcohol
Terpinen-4-ol	8.21	1182	0.51	0.82	1537	8.65*	Monoterp. alcohol
β-Phellandren-8-ol	8.70	1201	0.36	0.23	1716	15.51	Monoterp. alcohol
α-Terpineol	8.81	1204	1.95	1.70	1634	11.87	Monoterp. alcohol
γ-Terpineol	9.22	1214	0.12	0.10	1638	12.05	Monoterp. alcohol
Thymol methyl ether	9.89	1229	0.39	[0.82]	1537	8.65*	Monoterp. ether
Pulegone	10.17	1236	0.02	0.04	1557	9.29	Monoterp. ketone
Neral	10.48	1243	0.10	0.11	1613	10.95	Monoterp. aldehyde
Cuminal	10.58	1246	0.11	0.17	1678	13.83	Monoterp. aldehyde

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Piperitone	10.98	1255	0.04	0.04	1630	11.68	Monoterp. ketone
trans-Myrtanol	11.36	1264	0.05	0.04	1779	19.23	Monoterp. alcohol
cis-β-Terpinyl acetate	11.91	1277	0.48	0.42	1531	8.46	Monoterp. ester
Bornyl acetate	12.09	1281	0.20	[0.23]	1513	7.95*	Monoterp. ester
α-Longipinene	14.43	1326	0.02	0.01	1403	5.89	Sesquiterpene
α-Cubebene	14.78	1332	0.31	0.30	1413	6.05	Sesquiterpene
Citronellyl acetate	16.08	1353	0.15	0.11	1606	10.77	Monoterp. ester
β-Cubebene	17.37	1373	0.16	0.11	1480	7.31	Sesquiterpene
Longifolene	18.38	1389	2.37	2.48	1495	7.60	Sesquiterpene
β-Caryophyllene	19.23	1403	0.12	0.13	1527	8.35	Sesquiterpene
α-Humulene	21.87	1435	0.05	0.07	1587	10.19	Sesquiterpene
Germacrene D	24.08	1462	0.08	0.06	1619	11.17	Sesquiterpene
β-Bisabolene	27.21	1501	0.53	0.62	1664	13.17	Sesquiterpene
δ-Cadinene	27.60	1505	0.08	0.06	1672	13.57	Sesquiterpene
α-Cadinol	37.00	1649	0.03	0.03	2131	38.72	Sesquiterp. alcohol
Manool	48.57	2037	0.29	0.34	2558	48.37	Diterp. alcohol
cis-Abienol	50.78	2133	0.25	0.26	2679	50.64	Diterp. alcohol
Total identified			**97.03%**	**97.5%**			

*: 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 : Light yellow liquid

Refractive index : 1.4745 ± 0.0003 (20 °C)

Conclusion

No adulterant, contaminant or diluent were detected using this method. This sample was distilled from wood or bark of the tree.

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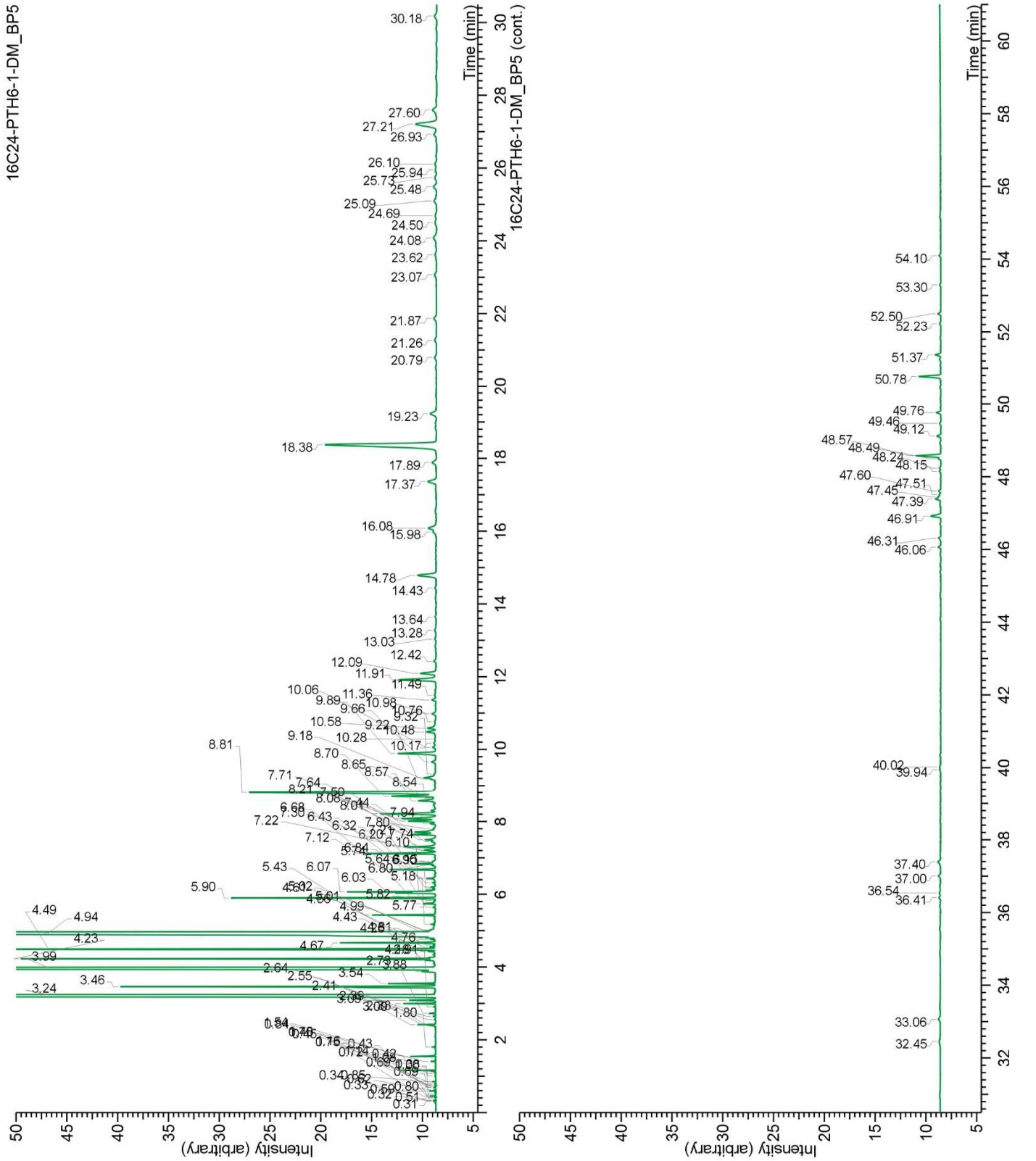

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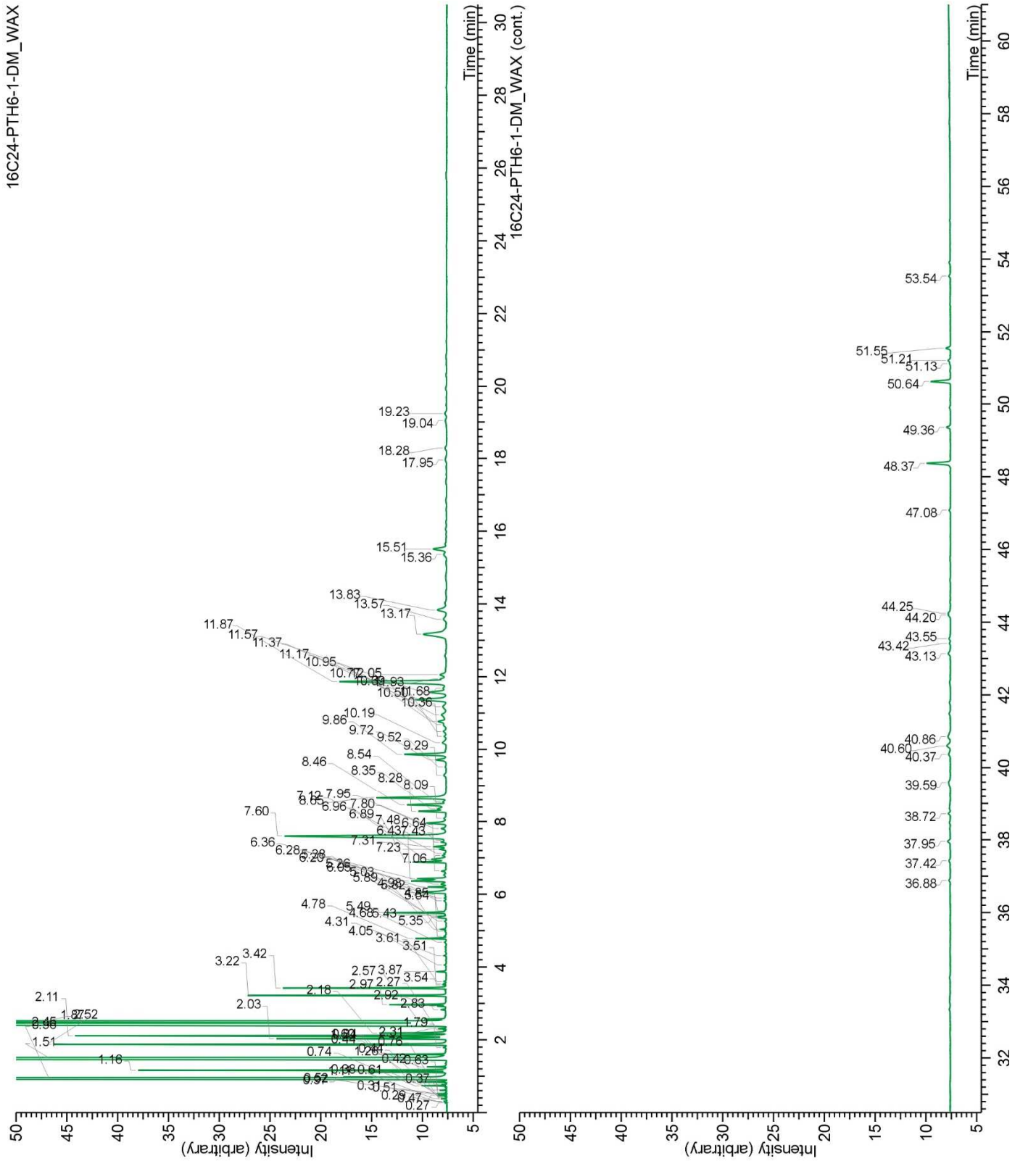

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