



Healing Body, Mind, and Spirit
with Pure Essential Oils Since 1995

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Certificate of Analysis: Black Spruce Essential Oil, *Picea mariana*, Organic, Canada.

Batch No: CA-48479

Internal code: 14G22-A2

Customer identification: B-PIMACANo7oC

Method: PC-PA-001-14G14, "Analysis of the composition of a liquid essential oil by GC-FID" (in French)

Analysis date: July 28, 2014

IDENTIFIED COMPOUNDS

Identification	DB-5 Column			SolgelWax Column			Molecular Class
	R.T.	R.I.	%	%	R.T.	R.I.	
Santene	9.70	868	2.83	2.89	953	4.06	Normonoterpene
Tricyclene	11.56	904	1.59	1.57	988	4.48	Monoterpene
α -Thujene	11.93	911	0.24	0.39	1010	4.96	Monoterpene
α -Pinene	12.31	918	21.50	21.63	1006	4.84	Monoterpene
Camphene	13.08	933	13.87	13.89	1035	5.86	Monoterpene
Sabinene	14.63	963	0.03	0.03	1085	7.66	Monoterpene
β -Pinene	14.75	965	7.14	7.26	1068	7.07	Monoterpene
Myrcene	15.87	987	3.27	3.27	1137	9.52	Lin. monoterpene
2-Carene	16.30	995	0.01	0.01	1094	7.97	Monoterpene
α -Phellandrene	16.53	1000	0.46	0.45	1130	9.29	Monoterpene
Δ^3 -Carene	16.94	1006	10.34	10.44	1113	8.66	Monoterpene
α -Terpinene	17.33	1012	0.37	0.41	1147	9.89	Monoterpene
para-Cymene	17.83	1019	0.30	0.34	1242	14.12	Arom. monoterpene
Limonene	18.13*	1024	5.39	3.86	1171	10.73	Monoterpene
β -Phellandrene	18.13*	1024		1.62	1180	11.07*	Monoterpene
1,8-Cineole	18.13*	1024			1180	11.07*	Monoterp. ether
γ -Terpinene	20.15	1053	0.36	0.38	1221	12.95	Monoterpene
Terpinolene	22.12	1083	1.69	1.37	1254	14.77	Monoterpene
Linalool	23.07	1097	0.12	0.12	1531	30.44	Lin. monoterp. alcohol
cis-Pinene hydrate?	25.38	1131	0.08	0.07	1612	35.08	Monoterp. alcohol
Camphor	25.63	1135	0.22	0.20	1469	26.86	Monoterp. ketone
Camphene hydrate	25.99	1140	0.10	0.07	1560	32.14	Monoterp. alcohol
Borneol	27.31	1160	2.47	2.46	1663	37.83	Monoterp. alcohol
Terpinen-4-ol	28.09	1171	0.45	0.40	1569	32.68	Monoterp. alcohol
α -Terpineol	29.06	1185	1.22	1.36	1666	38.01*	Monoterp. alcohol
2-Decanol	30.00	1199	0.14	0.16	1614	35.20	Lin. alcohol
endo-Fenchyle acetate	31.01	1215	0.25	0.24	1438	25.07	Monoterp. ester
Citronellol	31.84	1228	0.08	0.04	1749	42.51	Lin. monoterp. alcohol
Piperitone	33.09	1247	0.12	0.15	1680	38.76	Monoterp. ketone
Linalyl acetate	33.56	1255	0.02	0.02	1538	30.86	Monoterp. ester lin.
Bornyl acetate	35.43*	1284	19.59	18.10	1546	31.31	Monoterp. ester
Isobornyl acetate	35.43*	1284	0.61		1548	31.43	Monoterp. ester
Lavandulyl acetate	36.10	1294	0.09	0.15	1592	34.01	Lin. monoterp. ester
trans-Pinocarvyl acetate	36.26	1296	0.08	0.07	1579	33.23	Monoterp. ester
δ -Elemene 38.57	1332	0.06	0.07		1456	26.14	Sesquiterpene

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Identification	DB-5 Column			SolgelWax Column			Molecular Class
	R.T.	R.I.	%	%	R.T.	R.I.	
trans-Piperityl acetate	39.13	1341	0.03	0.03	1696	39.66	Monoterp. ester
α-Terpinyl acetate	39.46	1346	0.15	0.13	1673	38.41	Monoterp. ester
Citronellyl acetate	39.88	1352	0.07	0.07	1652	37.28	Lin. monoterp. ester
α-Copaene	41.03	1370	0.04	0.04	1461	26.40	Sesquiterpene
Isolongifolene	41.77	1382	0.08	0.06	1485	27.82	Sesquiterpene
β-Elemene	42.10	1387	0.07	0.05	1563	32.33	Sesquiterpene
Longifolene	42.67	1396	0.13	0.13	1523	30.03	Sesquiterpene
β-Caryophyllene	43.62	1411	0.40	0.39	1556	31.88	Sesquiterpene
α-Humulene	45.67	1447	0.18	0.17	1624	35.75	Sesquiterpene
trans-Cadina-1(6),4-diene	46.97	1469	0.06	0.08	1621	35.58	Sesquiterpene
Selina-4,11-diene	47.17	1472	0.12		1666	38.01*	Sesquiterpene
Germacrene D	47.35	1475	0.06		1666	38.01*	Sesquiterpene
α-Murolene 4	8.60	1497	0.15	0.19	1688	39.18	Sesquiterpene
γ-Cadinene	49.34	1509	0.48	0.29	1715	40.68	Sesquiterpene
δ-Cadinene	49.95	1520	1.04	0.96	1718	40.81	Sesquiterpene
Total identified			97.99	97.12			

*Two or more compounds are coeluting on this column.

Note: No correction factor was applied.

OTHER DATA

Physical aspect: Clear liquid

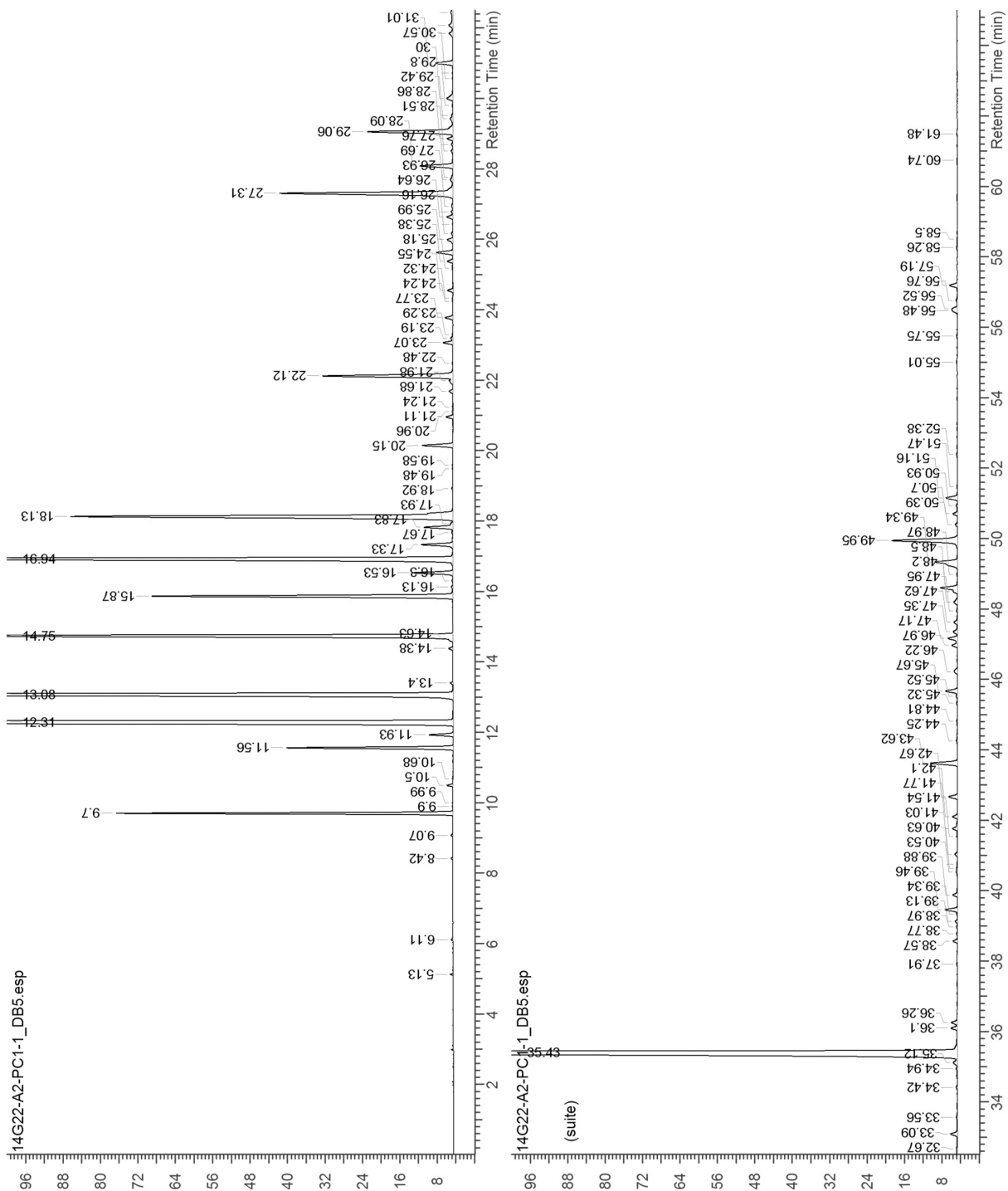
Refractive index: 1.4708 ± 0.0003 (20 °C)

(continued)



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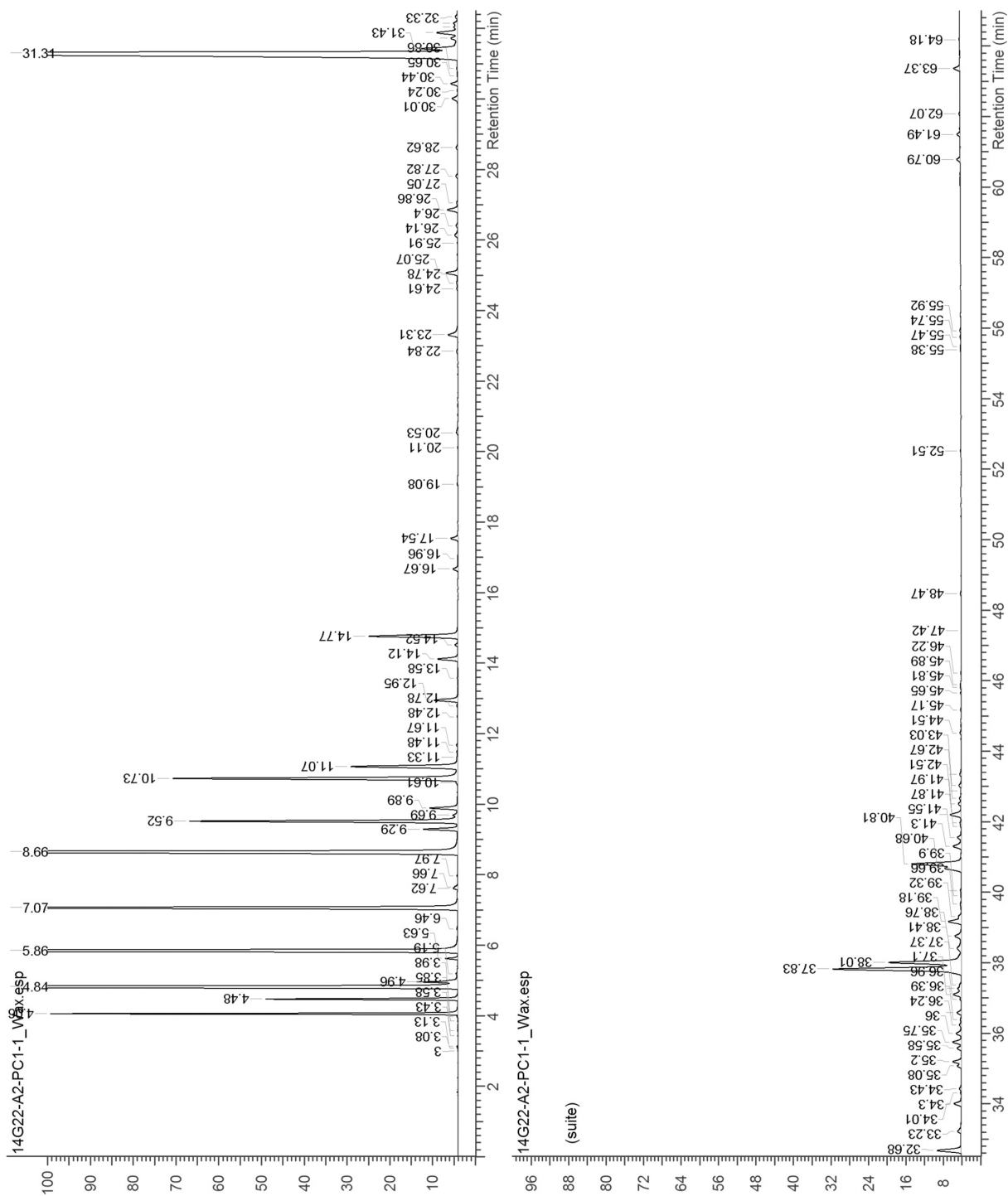


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