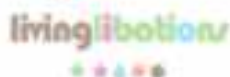


ANALYSIS Fir, Balsam Esssential Oil

Laboratoire
PhytoChemia



Plus que des analyses... des conseils



SAMPLE IDENTIFICATION

Internal code : 17B16-FSE28-1-DM

Customer identification : Balsam Fir - Lot #ABBACAN02D

Type : Essential oil

Source : Abies balsamea

Customer : Flowers Shining Everywhere Inc.



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 : 2017-03-06

Checked and approved by :

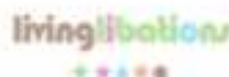


Alexis St-Gelais, M. Sc., chimiste 2013-174



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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
cis-Hex-3-en-1-ol	2.48	865	0.01	0.01	1320	5.60	Aliphatic alcohol
Santone	2.61	875	1.15	1.13	889	0.96	Monoterpene
Tricyclene	3.21	916	0.96	0.97	921	1.09	Monoterpene
α -Thujene	3.30	922	0.13	0.30	957	1.24	Monoterpene
α -Pinene	3.43	929	13.23	13.09	951	1.22	Monoterpene
Camphene	3.70*	945	5.91	5.83	996	1.50	Monoterpene
α -Fenchene	3.70*	945	[5.91]	0.05	987	1.43	Monoterpene
Thuja-2,4(10)-diene	3.77	950	0.03	0.11	1056	2.03*	Monoterpene
Sabinene	4.12*	970	0.12	[0.11]	1056	2.03*	Monoterpene
Benzaldehyde	4.12*	970	[0.12]	0.05	1443	8.01	Simple phenolic
β -Pinene	4.23	977	31.58	31.50	1044	1.93	Monoterpene
Myrcene	4.45	990	1.61	1.63	1114	2.61	Monoterpene
Pseudolimonene	4.67	1003	0.02	0.01	1109	2.55	Monoterpene
Δ^3 -Carene	4.77*	1008	14.48	14.36	1097	2.39	Monoterpene
α -Phellandrene	4.77*	1008	[14.48]	0.13	1107	2.52	Monoterpene
α -Terpinene	4.91	1016	0.10	0.09	1120	2.70	Monoterpene
para-Cymene	5.09	1026	0.27	0.29	1204	3.85*	Monoterpene
Limonene	5.16	1030	7.95	6.67	1140	2.97	Monoterpene
β -Phellandrene	5.19	1031	4.36	5.63	1146	3.05*	Monoterpene
1,8-Cineole	5.22	1033	0.04	[5.63]	1146	3.05*	Monoterp. ether
cis- β -Ocimene	5.31	1038	tr	0.01	1198	3.74	Monoterpene
trans- β -Ocimene	5.49	1048	0.01	[0.29]	1204	3.85*	Monoterpene
γ -Terpinene	5.67	1058	0.21	0.21	1185	3.56	Monoterpene
Isoterpinolene	6.07	1080	0.04	0.03	1214	4.00	Monoterpene
Terpinolene	6.15	1084	0.89	0.86	1219	4.06	Monoterpene
Fenchone	6.29	1092	0.12	0.13	1315	5.52	Monoterp. ketone
para-Cymenene	6.33	1094	0.06	0.05	1360	6.26	Monoterpene
Linalool	6.57	1105	0.07	0.09	1490	9.13	Monoterp. alcohol
endo-Fenchol	6.98	1120	0.08	0.06	1522	10.26	Monoterp. alcohol
trans-Pinocarveol	7.46	1137	0.16	0.18	1560	11.72	Monoterp. alcohol
Camphor	7.67	1145	0.25	0.23	1417	7.35	Monoterp. ketone
Camphene hydrate	7.87	1152	0.08	0.09	1511	9.87	Monoterp. alcohol
Pinocarpone	8.04	1158	0.02	0.02	1466	8.56	Monoterp. ketone
Borneol	8.41	1172	0.45	0.47	1610	13.80	Monoterp. alcohol
Terpinen-4-ol	8.62	1180	0.25	0.22	1519	10.18	Monoterp. alcohol
Myrtenol	9.06	1196	0.12	0.10	1698	18.48	Monoterp. alcohol
α -Terpineol	9.23	1201	1.07	0.93	1615	14.06	Monoterp. alcohol
endo-Fenchyl acetate	9.67	1211	0.01	0.01	1407	7.12	Monoterp. ester
Thymol methyl ether	10.45	1228	0.01	0.01	1526	10.43	Monoterp. ether
Piperitone	11.57	1253	0.23	0.20	1613	13.99	Monoterp. ketone
Bornyl acetate	12.89	1282	10.51	11.02	1501	9.48	Monoterp. ester

Essential oil, *Abies balsamea*
Internal Code: 17B16-FSE28-1-DM

Customer Identification:
Balsam Fir - Lot #ABBACAN02D

Report prepared for
Flowers Shining Everywhere Inc.

Thymol	13.98	1304	0.07	0.08	2095	40.26	Monoterp. alcohol
α -Cubebene	15.66	1330	0.05	0.06	1390	6.72	Sesquiterpene
Citronellyl acetate	17.07	1351	0.05	0.06	1594	13.00	Monoterp. ester
Longifolene	19.40	1387	0.20	0.20	1476	8.81	Sesquiterpene
β -Caryophyllene	20.32	1401	0.41	0.50	1509	9.78	Sesquiterpene
α -Humulene	23.06	1434	0.25	0.25	1569	12.06	Sesquiterpene
trans- β -Farnesene	24.24	1448	0.03	0.02	1606	13.62	Sesquiterpene
cis-Muurola-4(14),5-diene	25.83	1467	0.03	0.02	1627	14.73	Sesquiterpene
γ -Cadinene	28.24	1496	0.02	0.02	1662	16.61	Sesquiterpene
β -Bisabolene	28.51	1499	0.39	0.41	1644	15.63	Sesquiterpene
δ -Cadinene	28.92	1505	0.04	0.03	1679	17.54	Sesquiterpene
trans- α -Bisabolene	31.53	1541	0.06	0.10	1693	18.25	Sesquiterpene
Caryophyllene oxide	33.45	1568	0.11	0.07	1834	27.91	Sesquiterp. ether
cis-Abienol	51.27	2132	0.03				Diterp. alcohol
Total Identified			98.42%	98.59%			

(*) 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 : 1.4730 \pm 0.0003 (20 °C)

CONCLUSION

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

