

ANALYSIS Forest Amber Essential Oil

Laboratoire
PhytoChemia



Plus que des analyses... des conseils



Date : August 11, 2017

SAMPLE IDENTIFICATION

Internal code : 17G28-FSE8-1-CC
Customer identification : Forest Amber - USA - HOA-17517
Type : Essential oil
Source : *Pinus edulis* and Pynion pine
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).
Identifications double-checked by GC-MS
Analyst : Alexis St-Gelais, M. Sc., chimiste
Analysis date : 2017-07-31

Checked and approved by :



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

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IDENTIFIED COMPOUNDS

Identification	Column: BPS			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Toluene	1.33	760	0.02	50.24	960	1.07*	Simple phenolic
Ethyl 2-methylbutyrate	2.28	850	0.02	0.38	991	1.21*	Aliphatic ester
Tricyclene	3.25	919	0.39	0.37	925	0.93	Monoterpene
α -Thujene	3.34	924	0.09	[50.24]	960	1.07*	Monoterpene
α -Pinene	3.52	935	49.83	[50.24]	960	1.07*	Monoterpene
α -Fenchene	3.72	947	0.37	[0.38]	991	1.21*	Monoterpene
Camphene	3.74	948	1.65	1.75	1002	1.26	Monoterpene
Thuja-2,4(10)-diene	3.83	953	0.10	0.08	1053	1.70	Monoterpene
Sabinene	4.17	974	0.27	0.23	1055	1.72	Monoterpene
β -Pinene	4.25	978	6.49	6.43	1042	1.59	Monoterpene
Myrcene	4.53	995	5.14	5.08	1104	2.27	Monoterpene
Hexyl acetate	4.73	1007	0.02	0.01	1218	3.53	Aliphatic ester
α -Carene	4.80*	1010	2.92	2.48	1083	2.02	Monoterpene
α -Phellandrene	4.80*	1010	[2.92]	0.35	1097	2.18	Monoterpene
α -Terpinene	4.97	1020	0.33	0.37	1124	2.34	Monoterpene
β -Phellandrene	5.27*	1036	15.11	13.21	1151	2.68	Monoterpene
Limonene	5.27*	1036	[15.11]	1.73	1143	2.57	Monoterpene
para-Cymene	5.27*	1036	[15.11]	0.26	1204	3.36	Monoterpene
cis- β -Ocimene	5.39	1042	0.49	0.47	1186	3.13	Monoterpene
trans- β -Ocimene	5.56	1052	0.06	0.05	1200	3.30	Monoterpene
γ -Terpinene	5.75	1062	0.35	0.35	1184	3.11	Monoterpene
Terpinolene	6.24	1089	0.93	0.89	1222	3.60	Monoterpene
Methyl 6-methylheptanoate	6.36	1096	0.47	0.49	1288	4.52*	Aliphatic ester
para-Cymenene	6.46	1100	0.12	0.10	1365	5.66	Monoterpene
Linalool	6.56	1104	0.02	0.01	1481	7.77	Monoterp. alcohol
Ethyl heptanoate	6.60	1106	0.04				Aliphatic ester
endo-Fenchol	7.21*	1128	0.14	0.09	1507	8.37*	Monoterp. alcohol
α -Campholenal	7.21*	1128	[0.14]				Monoterp. aldehyde
Methyl octanoate	7.30	1131	0.11	[0.49]	1288	4.52*	Aliphatic ester
trans-Pinocarveol	7.66	1145	0.10	0.09	1565	9.98	Monoterp. alcohol
Ethyl 6-methylheptanoate?	8.18	1164	1.65	1.72	1341	5.29	Aliphatic ester
α -Phellandrien-8-ol	8.57	1178	0.09				Monoterp. alcohol
Borneol	8.69	1182	0.12	0.13	1611	11.60	Monoterp. alcohol
Terpinen-4-ol	8.86	1189	0.36	0.56	1526	8.81*	Monoterp. alcohol
para-Cymen-8-ol	9.10	1197	0.04				Monoterp. alcohol
Cryptone	9.23	1201	0.09	0.12	1563	9.90	Monoterp. ketone
Ethyl octanoate	9.43	1206	1.01	0.96	1386	5.97	Aliphatic ester
α -Terpineol	9.54	1208	0.52	0.55	1615	11.77*	Monoterp. alcohol
Thymol methyl ether	10.71	1234	1.08	1.08	1521	8.68	Monoterp. ether
Bornyl acetate	13.03	1285	3.08	3.20	1500	8.22	Monoterp. ester

Methyl decanoate	16.08	1336	0.05				Aliphatic ester
α -Terpinyl acetate	16.76	1347	0.27	0.13	1605	11.40	Monoterp. ester
Neryl acetate	17.35	1356	0.05	0.30	1656*	13.95*	Monoterp. ester
α -Copaene	17.81	1363	0.34	0.34	1443	6.90	Sesquiterpene
β -Bourbonene	18.24	1369	0.14	0.17	1461	7.31	Sesquiterpene
Longifolene	19.04	1381	0.14	0.21	1491	8.01	Sesquiterpene
Geranyl acetate	19.40	1387	0.09	0.85	1682	14.62*	Monoterp. ester
Ethyl decanoate	20.10	1397	0.08				Aliphatic ester
β -Caryophyllene	20.73	1406	0.18	[0.56]	1526	8.81*	Sesquiterpene
β -Copaene	21.64	1416	0.05	[0.09]	1507	8.37*	Sesquiterpene
α -Humulene	23.52*	1439	0.02	0.02	1581	10.56	Sesquiterpene
trans- β -Farnesene	24.21	1447	0.02	0.93	1620	11.96	Sesquiterpene
trans-Cadina-1(6),4-diene	25.19	1459	0.06	0.06	1588	10.82	Sesquiterpene
γ -Murolene	25.63	1464	0.26	[0.55]	1615	11.77*	Sesquiterpene
Germacrene D	25.77	1466	0.87	0.89	1629	12.26	Sesquiterpene
α -Murolene	27.80	1491	0.30	[0.30]	1656	13.35*	Sesquiterpene
γ -Cadinene	28.85	1504	0.25	0.27	1676	14.36	Sesquiterpene
δ -Cadinene	29.52	1513	0.81	[0.85]	1682	14.62*	Sesquiterpene
trans-Cadina-1,4-diene	29.69	1515	0.03	0.02	1691	15.08	Sesquiterpene
α -Cadinene	29.89	1518	0.02	0.04	1709	16.03	Sesquiterpene
τ -Cadinol	37.63	1646	0.08	0.09	2073	37.24	Sesquiterp. alcohol
τ -Murolol	37.74	1648	0.09	0.11	2090	37.75	Sesquiterp. alcohol
α -Murolol	37.86	1651	0.03	0.04	2105	38.21	Sesquiterp. alcohol
α -Cadinol	38.18	1659	0.19	0.19	2130	38.98	Sesquiterp. alcohol
Total identified			98.04%	98.49%			

*: 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 ± 0.0003 (20 °C)

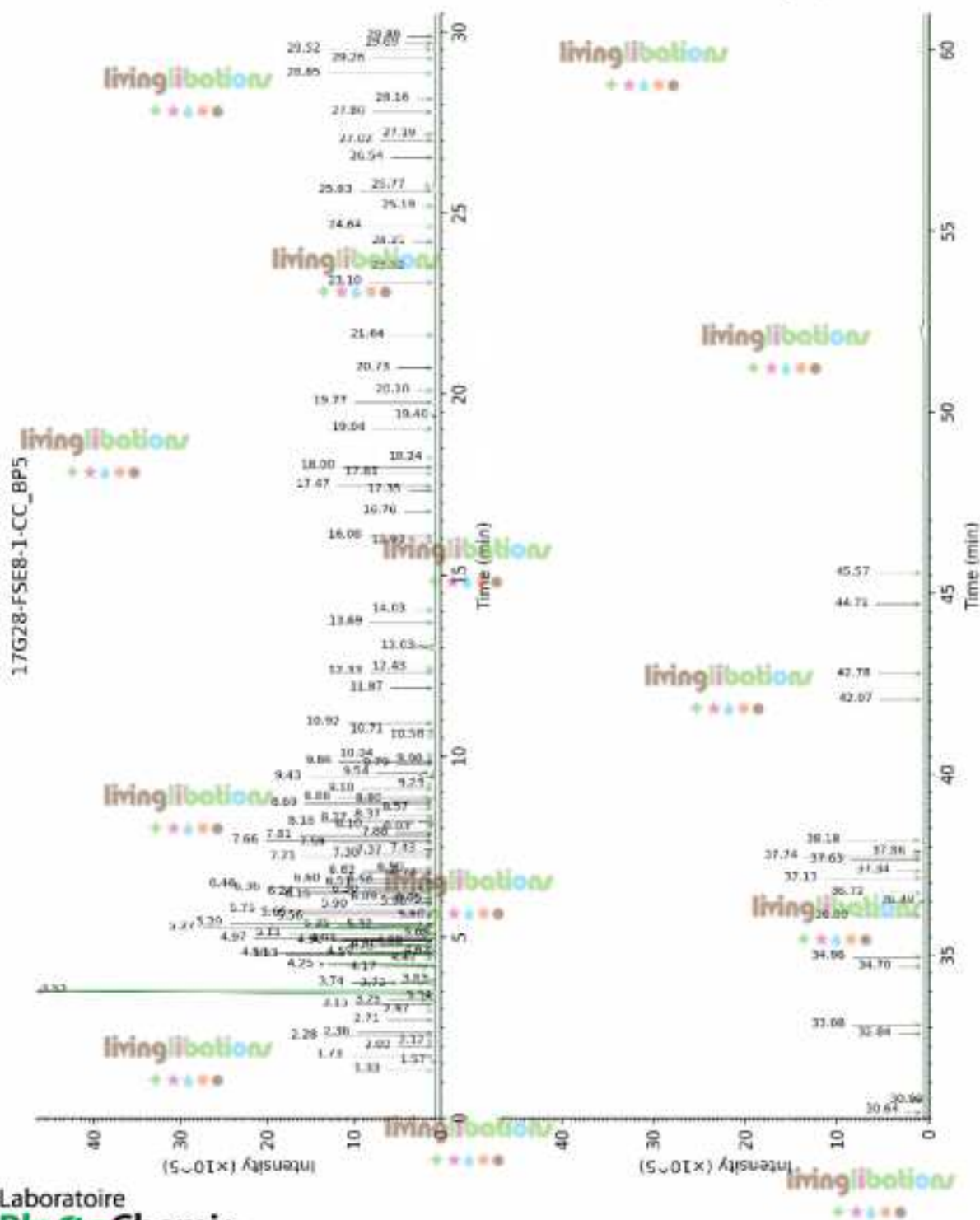
CONCLUSION

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

Essential oil, *Pinus edulis* and *Pinus pine*
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