

GC/MS BATCH NUMBER: L70102

ESSENTIAL OIL: PINE
BOTANICAL NAME: PINUS SYLVESTRIS
ORIGIN: AUSTRIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PINE OIL	%
α -PINENE	58.0
Δ^3 -CARENE	8.5
β -PINENE	8.3
LIMONENE	8.2
MYRCENE	3.7
β -CARYOPHYLLENE	2.2
BORNYL ACETATE	1.6
CAMPHENE	1.4
β -PHELLANDRENE	1.2
p-CYMENE	1.2

Comments from Robert Tisserand: A classic Scotch Pine oil from Austria with hints of camphor.

Date : August 26, 2016

SAMPLE IDENTIFICATION

Internal code : 16H10-PTH14-1-DM

Customer identification : Pine - Austria - L7010259R

Type : Essential oil

Source : *Pinus sylvestris*

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 : 2016-08-25

Checked and approved by :

Sylvain Mercier, M. Sc., chimiste 2014-005

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Santene	2.57	870	0.03	0.04	904	0.70	Normonoterpene
Tricyclene	3.17	913	0.13	0.12	930	0.80	Monoterpene
α -Thujene	3.26	919	0.03	58.73	961	0.92*	Monoterpene
α -Pinene	3.43	929	58.02	[58.73]	961	0.92*	Monoterpene
Camphene	3.65*	942	1.35	1.44	1002	1.10	Monoterpene
α -Fenchene	3.65*	942	[1.35]	0.20	991	1.05	Monoterpene
Thuja-2,4(10)-diene	3.74	948	0.05	0.05	1061	1.54*	Monoterpene
Sabinene	4.08	968	0.03	[0.05]	1061	1.54*	Monoterpene
β -Pinene	4.16	973	8.32	8.27	1044	1.40	Monoterpene
Myrcene	4.43	990	3.73	3.58	1118	2.01	Monoterpene
2-Carene	4.54	996	0.03	0.05	1083	1.71	Monoterpene
Pseudolimonene	4.64	1002	0.10	0.14	1112	1.95	Monoterpene
Δ 3-Carene	4.71*	1006	8.88	8.54	1094	1.80	Monoterpene
α -Phellandrene	4.71*	1006	[8.88]	0.13	1110	1.93	Monoterpene
α -Terpinene	4.87	1015	0.16	0.32	1123	2.08	Monoterpene
Limonene	5.13*	1029	10.38	8.22	1144	2.32	Monoterpene
para-Cymene	5.13*	1029	[10.38]	1.21	1209	3.07	Monoterpene
β -Phellandrene	5.15	1030	1.22	2.09	1148	2.37*	Monoterpene
1,8-Cineole	5.17	1031	0.10	[2.09]	1148	2.37*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.29	1038	0.01	0.05	1188	2.84*	Monoterpene
<i>trans</i> - β -Ocimene	5.47	1048	0.01	0.01	1203	3.00	Monoterpene
γ -Terpinene	5.65	1058	0.05	[0.05]	1188	2.84*	Monoterpene
<i>cis</i> -Sabinene hydrate	5.94	1073	0.01	0.02	1401	5.77	Monoterp. alcohol
Terpinolene	6.12	1083	0.43	0.41	1224	3.28	Monoterpene
para-Cymenene	6.34	1095	0.02	0.01	1369	5.31	Monoterpene
α -Pinene oxide	6.44	1099	0.05	0.04	1299	4.31	Monoterp. ether
Linalool	6.65	1107	0.01	0.67	1491	7.40*	Monoterp. alcohol
endo-Fenchol	7.10	1124	0.05	0.07	1516	7.86	Monoterp. alcohol
<i>trans</i> -Pinocarveol	7.56	1141	0.06	0.07	1566	9.28	Monoterp. alcohol
Camphor	7.77	1149	0.03	0.01	1431	6.26	Monoterp. ketone
Camphene hydrate	7.89	1153	0.02	0.01	1522	7.98	Monoterp. alcohol
Borneol	8.58	1179	0.07	0.08	1620	10.88	Monoterp. alcohol
Terpinen-4-ol	8.69	1183	0.04	2.12	1528	8.15*	Monoterp. alcohol
Cryptone	9.04	1196	0.02	0.01	1576	9.58	Monoterp. ketone
para-Cymen-8-ol	9.20	1200	0.02	0.04	1768	17.84	Monoterp. alcohol
α -Terpineol	9.37	1204	0.54	0.42	1628	11.17	Monoterp. alcohol
β -Phellandren-8-ol	9.42	1205	0.03	0.03	1704	14.52	Monoterp. alcohol
Thymol methyl ether	10.47	1228	0.04	[2.12]	1528	8.15*	Monoterp. ether
Bornyl acetate	12.74	1279	1.58	1.65	1505	7.65	Monoterp. ester
α -Cubebene	15.71	1329	0.07	0.07	1416	5.98	Sesquiterpene
α -Ylangene	16.94	1348	0.02	0.04	1412	5.94	Sesquiterpene

α -Copaene	17.40	1355	0.08	0.06	1438	6.40	Sesquiterpene
Longifolene	19.33	1385	0.73	[0.67]	1491	7.40*	Sesquiterpene
β -Caryophyllene	20.31	1399	2.17	[2.12]	1528	8.15*	Sesquiterpene
α -Humulene	23.03	1432	0.16	0.15	1587	9.91	Sesquiterpene
δ -Cadinene	28.94	1503	0.08	0.06	1680	13.44	Sesquiterpene
Caryophyllene oxide	33.51*	1566	0.21	0.14	1855	23.08	Sesquiterp. ether
Spathulenol	33.51*	1566	[0.21]	0.02	2015	33.29	Sesquiterp. alcohol
Bulnesol	38.20	1658	0.04	0.03	2121	37.60	Sesquiterp. alcohol
Total identified			99.21%	99.42%			

*: 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 : 1.4700 \pm 0.0003 (20 °C)

CONCLUSION

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



