

Analysis Pine, Grand White Essential Oil

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Date : May 10, 2017

SAMPLE IDENTIFICATION

Internal code : 17E05-FSE17-1-DM

Customer identification : Grande White Pine Twigs + Needles - Lot #HEBPISTCAN05QC

Type : Essential oil

Source : *Pinus strobus*

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 : 2017-05-10

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.	
Santene	2.62	876	0.21	0.22	890	0.89	Normonoterpene
Tricyclene	3.23	917	0.39	0.40	921	1.01	Monoterpene
α -Thujene	3.32	923	0.08	0.42	960	1.17	Monoterpene
α -Pinene	3.47	932	26.68	26.47	956	1.15	Monoterpene
Camphene	3.71	946	4.40	4.35	1002	1.40	Monoterpene
Thuja-2,4(10)-diene	3.79	951	0.02	0.33	1056	1.90*	Monoterpene
Sabinene	4.15	972	0.26	[0.33]	1056	1.90*	Monoterpene
β -Pinene	4.25	978	27.95	27.95	1046	1.80	Monoterpene
Myrcene	4.50	993	9.63	9.51	1120	2.50	Monoterpene
Δ^3 -Carene	4.78*	1009	9.44	8.89	1085	2.23	Monoterpene
α -Phellandrene	4.78*	1009	[9.44]	0.55	1111	2.38	Monoterpene
α -Terpinene	4.93	1017	0.18	0.22	1125	2.55	Monoterpene
para-Cymene	5.13	1028	0.07	0.11	1208	3.64	Monoterpene
Limone	5.19*	1032	8.57	7.53	1144	2.81	Monoterpene
β -Phellandrene	5.19*	1032	[8.57]	4.40	1149	2.88*	Monoterpene
1,8-Cineole	5.22	1033	3.38	[4.40]	1149	2.88*	Monoterp. ether
cis- β -Ocimene	5.34	1040	0.01	0.31	1188	3.38*	Monoterpene
trans- β -Ocimene	5.52	1049	0.01	0.01	1202	3.56	Monoterpene
γ -Terpinene	5.70	1060	0.29	[0.31]	1188	3.38*	Monoterpene
Isoterpinolene	6.10	1081	0.05	0.04	1219	3.80	Monoterpene
Terpinolene	6.18	1086	1.59	1.56	1224	3.87	Monoterpene
Fenchone	6.33	1094	0.01	0.01	1320	5.27	Monoterp. ketone
para-Cymenene	6.37	1096	0.03	0.03	1366	6.01	Monoterpene
γ -Campholenal	6.44	1100	0.03				Monoterp. aldehyde
endo-Fenchol	7.04	1122	0.05	0.05	1515	9.16	Monoterp. alcohol
α -Campholenal	7.21	1128	0.02				Monoterp. aldehyde
trans-Pinocarveol	7.52	1139	0.03	0.02	1566	10.97	Monoterp. alcohol
Camphor	7.71	1146	0.05	0.06	1427	7.07	Monoterp. ketone
Camphene hydrate	7.93	1154	0.03	0.02	1537	9.90	Monoterp. alcohol
Pinocamphone	8.07	1160	0.06	0.05	1430	7.14	Monoterp. ketone
Borneol	8.49	1175	0.15	0.25	1621	13.01*	Monoterp. alcohol
Terpinen-4-ol	8.69	1182	0.22	0.24	1528	9.60	Monoterp. alcohol
α -Terpineol	9.31	1203	0.56	0.56	1626	13.20	Monoterp. alcohol
endo-Fenchyl acetate	9.82	1214	0.02	0.02	1406	6.63	Monoterp. ester
Thymol methyl ether	10.52	1230	0.09	0.12	1524	9.44	Monoterp. ether
Bornyl acetate	12.84	1281	1.28	1.33	1503	8.86	Monoterp. ester
trans-Pinocarvyl acetate	13.72	1301	0.02	0.02	1547	10.28	Monoterp. ester
para-Mentha-1(7),8(10)-dien-7-yl acetate	15.36	1325	0.05	0.13	1608	12.52*	Monoterp. ester
α -Copaene	17.58	1359	0.03	0.05	1424	6.98	Sesquiterpene
β -Caryophyllene	20.45	1402	0.83	0.86	1520	9.30	Sesquiterpene

α -Humulene	23.21	1435	0.47	0.50	1579	11.45	Sesquiterpene
γ -Murolene	25.27	1460	0.06	[0.13]	1608	12.52*	Sesquiterpene
Germacrene D	25.39	1462	0.27	0.20	1618	12.91	Sesquiterpene
Viridiflorene	26.17	1471	0.04	[0.25]	1621	13.01*	Sesquiterpene
Bicyclogermacrene	26.63*	1476	0.08	0.06	1640	13.98	Sesquiterpene
α -Selinene	26.63*	1476	[0.08]	0.03	1632	13.57	Sesquiterpene
α -Murolene	27.41	1486	0.09	0.09	1644	14.19	Sesquiterpene
γ -Cadinene	28.44	1498	0.14	0.16	1666	15.32	Sesquiterpene
δ -Cadinene	29.11	1507	0.41	0.41	1672	15.62	Sesquiterpene
Caryophyllene oxide	33.58*	1570	0.09	0.04	1847	26.52	Sesquiterp. ether
(E)-Nerolidol	33.58*	1570	[0.09]	0.03	1995	35.50	Sesquiterp. alcohol
Humulene epoxide II	35.26	1593	0.06	0.05	1900	30.35	Sesquiterp. ether
τ -Cadinol	37.27	1637	0.04	0.04	2071	38.35	Sesquiterp. alcohol
τ -Murolol	37.38	1640	0.04	0.04	2086	38.85	Sesquiterp. alcohol
α -Cadinol	37.82	1650	0.07	0.07	2134	40.30	Sesquiterp. alcohol
Manoyl oxide	47.55	1972	0.10	0.08	2199	42.00	Diterp. ether
Total identified			98.73%	98.89%			

*: 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.



