

**Date :** December 1, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16K24-TOB7-1-DM

**Customer identification :** Pine needle - Hungary - Lot 162087293

**Type :** Essential oil

**Source :** *Pinus sylvestris*

**Customer :** TruIQ Global, LLC

*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 :** 2016-12-01

Checked and approved by :

---

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

*This report is digitally signed, it is only considered valid if the digital signature is intact.*

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Santene	2.57	871	0.03	0.03	889	0.67	Normonoterpene
Tricyclene	3.17	913	0.12	0.10	923	0.77	Monoterpene
$\alpha$ -Thujene	3.27	919	0.03	54.19	959	0.91*	Monoterpene
$\alpha$ -Pinene	3.47	931	54.05	[54.19]	959	0.91*	Monoterpene
Camphene	3.67*	943	1.55	2.54	995	1.06	Monoterpene
$\alpha$ -Fenchene	3.67*	943	[1.55]	0.28	983	1.02	Monoterpene
Thuja-2,4(10)-diene	3.75	948	0.05	0.41	1049	1.45*	Monoterpene
Sabinene	4.09	969	0.02	[0.41]	1049	1.45*	Monoterpene
$\beta$ -Pinene	4.18	974	9.13	9.03	1040	1.37	Monoterpene
Myrcene	4.45	991	4.33	4.22	1114	1.97*	Monoterpene
2-Carene	4.55	997	0.05	0.08	1079	1.68	Monoterpene
Pseudolimonene	4.65	1002	0.11	[4.22]	1114	1.97*	Monoterpene
$\Delta$ 3-Carene	4.75*	1008	10.39	9.65	1090	1.77	Monoterpene
$\alpha$ -Phellandrene	4.75*	1008	[10.39]	0.38	1104	1.88	Monoterpene
$\alpha$ -Terpinene	4.89	1015	0.30	0.59	1118	2.01	Monoterpene
<b>Limonene</b>	5.16*	1031	10.83	7.89	1140	2.27	Monoterpene
para-Cymene	5.16*	1031	[10.83]	1.42	1200	2.98	Monoterpene
$\beta$ -Phellandrene	5.18	1032	1.47	2.43	1143	2.31*	Monoterpene
1,8-Cineole	5.25	1036	0.03	[2.43]	1143	2.31*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.29	1038	0.03	0.07	1181	2.75*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.47	1048	0.01	0.01	1195	2.92	Monoterpene
$\gamma$ -Terpinene	5.65	1058	0.07	[0.07]	1181	2.75*	Monoterpene
Terpinolene	6.13	1083	0.74	0.66	1218	3.19	Monoterpene
para-Cymenene	6.34	1095	0.02	0.02	1361	5.19	Monoterpene
$\alpha$ -Pinene oxide	6.44	1099	0.02	0.01	1291	4.19	Monoterp. ether
<b>Linalool</b>	6.65	1107	0.02	0.64	1483	7.23*	Monoterp. alcohol
endo-Fenchol	7.10	1124	0.06	0.09	1503	7.61	Monoterp. alcohol
<i>trans</i> -Pinocarveol	7.55	1141	0.07	0.06	1555	8.95	Monoterp. alcohol
Camphor	7.67	1145	0.01	0.01	1421	6.06	Monoterp. ketone
Camphene hydrate	7.90	1154	0.02	0.03	1516	7.86	Monoterp. alcohol
Borneol	8.58	1179	0.10	0.10	1605	10.46*	Monoterp. alcohol
Terpinen-4-ol	8.69	1183	0.07	1.88	1522	7.97*	Monoterp. alcohol
Cryptone	9.06	1197	0.01	0.01	1566	9.27	Monoterp. ketone
$\alpha$ -Terpineol	9.39	1204	0.70	0.61	1616	10.78	Monoterp. alcohol
Bornyl acetate	12.75	1279	0.86	0.85	1493	7.43	Monoterp. ester
$\alpha$ -Cubebene	15.71	1329	0.06	0.07	1408	5.88	Sesquiterpene
$\alpha$ -Ylangene	16.95	1348	0.03	0.04	1407	5.86	Sesquiterpene
$\alpha$ -Copaene	17.40	1355	0.09	0.07	1433	6.29	Sesquiterpene
Longifolene	19.36	1386	0.76	[0.64]	1483	7.23*	Sesquiterpene
$\beta$ -Caryophyllene	20.34	1399	1.93	[1.88]	1522	7.97*	Sesquiterpene
$\alpha$ -Humulene	23.04	1432	0.16	0.14	1578	9.66	Sesquiterpene

$\gamma$ -Muuroolene	25.09	1457	0.02	[0.10]	1605	10.46*	Sesquiterpene
Germacrene D	25.22	1458	0.01	0.02	1627	11.12	Sesquiterpene
$\alpha$ -Muuroolene	27.24	1482	0.02	0.03	1645	11.91	Sesquiterpene
$\gamma$ -Cadinene	28.28	1494	0.01	0.02	1666	12.83	Sesquiterpene
$\delta$ -Cadinene	28.94	1504	0.11	0.09	1671	13.04	Sesquiterpene
<i>trans</i> -Calamenene	29.12	1506	0.01	0.02	1733	15.81	Sesquiterpene
Caryophyllene oxide	33.53	1566	0.17	0.14	1845	22.36	Sesquiterp. ether
Bulnesol	38.21	1658	0.05	0.05	2106	37.11	Sesquiterp. alcohol
Isopimaradiene?	46.77	1938	0.02				Diterpene
<b>Total identified</b>			<b>98.75%</b>	<b>98.98%</b>			

\*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

**Bolded:** Allergen substance (EU regulation)

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.

#### ALLERGENS (AS PER THE EUROPEAN GUIDELINES)

**Limonene** – 7.90% (sum of D and L)

**Linalool** – 0.02%



