

**Date :** September 13, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17I07-ORA1-1-DM

**Customer identification :** Peppermint

**Type :** Essential oil

**Source :** *Mentha x piperita*

**Customer :** Organic Aromas

*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 :** 2017-09-11

Checked and approved by :

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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.	
2,5-Diethyltetrahydrofuran	2.91	896	0.02	0.03	971	1.34*	Furan
$\alpha$ -Thujene	3.31	920	0.02	[0.03]	971	1.34*	Monoterpene
$\alpha$ -Pinene	3.42	927	0.70	0.66	941	1.20	Monoterpene
$\alpha$ -Fenchene	3.71*	944	0.03	tr	985	1.45	Monoterpene
Camphene	3.71*	944	[0.03]	0.01	991	1.50	Monoterpene
Thuja-2,4(10)-diene	3.80	949	0.01	0.40	1058	2.05*	Monoterpene
3-Methylcyclohexanone	4.03	963	0.04	0.05	1247	4.45	Aliphatic ketone
Sabinene	4.14	969	0.37	[0.40]	1058	2.05*	Monoterpene
$\beta$ -Pinene	4.20	973	1.10	1.01	1037	1.88	Monoterpene
Myrcene	4.48	989	0.19	0.15	1113	2.65	Monoterpene
Octen-3-ol	4.53	992	0.04	25.89	1394	6.77*	Aliphatic alcohol
$\Delta^3$ -Carene	4.76	1005	0.03	0.02	1109	2.60	Monoterpene
Octan-3-ol	4.82	1008	0.14	0.15	1344	5.95	Aliphatic alcohol
$\alpha$ -Terpinene	4.95	1015	0.10	0.12	1120	2.73	Monoterpene
para-Cymene	5.15	1026	0.12	0.18	1210	3.90	Monoterpene
Limonene	5.18	1028	2.58	7.07	1143	3.03*	Monoterpene
1,8-Cineole	5.25	1032	4.54	[7.07]	1143	3.03*	Monoterp. ether
$\gamma$ -Terpinene	5.73	1058	0.18	0.25	1191	3.62	Monoterpene
cis-Sabinene hydrate	6.07	1076	0.21	0.19	1404	7.01	Monoterp. alcohol
Terpinolene	6.21*	1084	0.16	0.07	1225	4.14	Monoterpene
Octanol	6.21*	1084	[0.16]	6.71	1499	9.35*	Aliphatic alcohol
Linalool	6.72*	1107	0.18	0.23	1505	9.57*	Monoterp. alcohol
trans-Sabinene hydrate	6.72*	1107	[0.18]	0.05	1477	8.75	Monoterp. alcohol
Isopulegol	7.90	1150	0.14	[0.23]	1505	9.57*	Monoterp. alcohol
Menthone	8.17	1160	25.60	[25.89]	1394	6.77*	Monoterp. ketone
Menthofuran	8.25	1163	3.00	7.42	1410	7.16*	Monoterp. ether
Isomenthone	8.36	1167	4.45	[7.42]	1410	7.16*	Monoterp. ketone
neo-Menthol	8.61	1175	3.74	4.07	1529	10.44*	Monoterp. alcohol
Borneol	8.68	1178	0.19	1.83	1619	14.12*	Monoterp. alcohol
Terpinen-4-ol	8.86	1185	0.48	[4.07]	1529	10.44*	Monoterp. alcohol
Menthol	9.12	1194	34.57	35.11	1576	12.21	Monoterp. alcohol
Isomenthol	9.23	1198	0.67	0.60	1555	11.40*	Monoterp. alcohol
neoiso-Menthol	9.40	1202	0.35	[1.83]	1619	14.12*	Monoterp. alcohol
$\alpha$ -Terpineol	9.57	1205	0.47	[1.83]	1619	14.12*	Monoterp. alcohol
Pulegone	11.06	1238	1.17	1.21	1547	11.10	Monoterp. ketone
Carvone	11.46	1247	0.10				Monoterp. ketone
Piperitone	11.86	1256	0.80	[1.83]	1619	14.12*	Monoterp. ketone
neo-Menthyl acetate	12.44	1269	0.28	0.20	1464	8.42	Monoterp. ester
Decanol	13.10	1283	0.23	0.33	1705	18.80	Aliphatic alcohol
Menthyl acetate	13.47	1291	5.98	[6.71]	1499	9.35*	Monoterp. ester
Isomenthyl acetate	14.08	1302	0.13	3.50	1519	10.07*	Monoterp. ester

Bicycloelemene	15.07	1317	0.14	0.15	1422	7.41	Sesquiterpene
α-Copaene	17.74	1358	0.14	0.11	1431	7.64	Sesquiterpene
β-Bourbonene	18.17	1364	0.23	0.33	1452	8.13	Sesquiterpene
β-Elemene	18.97	1376	0.12	[4.07]	1529	10.44*	Sesquiterpene
β-Caryophyllene	20.70	1401	3.27	[3.50]	1519	10.07*	Sesquiterpene
β-Copaene	21.57	1412	0.10	[3.50]	1519	10.07*	Sesquiterpene
cis-Muurolo-3,5-diene	23.11	1430	0.15	[0.60]	1555	11.40*	Sesquiterpene
α-Humulene	23.44	1434	0.20	0.24	1585	12.53	Sesquiterpene
trans-β-Farnesene	24.56	1447	0.15	0.18	1611	13.74	Sesquiterpene
Germacrene D	25.67	1461	0.56	[1.83]	1619	14.12*	Sesquiterpene
Bicyclogermacrene	26.90	1475	0.08	0.08	1638	15.18*	Sesquiterpene
α-Muurolole	27.03	1477	0.10	[0.08]	1638	15.18*	Sesquiterpene
δ-Cadinene	29.39	1506	0.10	0.09	1672	16.95	Sesquiterpene
Caryophyllene oxide	33.86	1569	0.14	0.13	1841	28.26	Sesquiterp. ether
Viridiflorol	34.86	1583	0.06	0.06	1972	35.86	Sesquiterp. alcohol
<b>Total identified</b>			<b>98.65%</b>	<b>98.88%</b>			

\*: 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 :** 1.4605 ± 0.0003 (20 °C)

#### CONCLUSION

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

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