

**Date :** July 20, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17G14-BUB2-1-CC

**Customer identification :** Organic Lavender Essential Oil - Bulgaria - Lot #06001

**Type :** Essential oil

**Source :** *Lavandula angustifolia*

**Customer :** Buhbli Organics

*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 :** Benoit Roger Ph. D.

**Analysis date :** 2017-07-19

Checked and approved by :

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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.	
Hexan-2-ol	1.86	818	0.01				Aliphatic alcohol
Methyl hexyl ether	1.94	823	0.09	0.09	844	0.71	Aliphatic ether
Hexanol	2.71	883	0.09	0.10	1294	4.69	Aliphatic alcohol
Tricyclene	3.24	918	0.02	0.02	918	0.92	Monoterpene
$\alpha$ -Thujene	3.32	923	0.14	0.17	950	1.05	Monoterpene
$\alpha$ -Pinene	3.43	930	0.28	0.26	940	1.01	Monoterpene
Camphene	3.72*	947	0.14	0.12	995	1.26	Monoterpene
$\alpha$ -Fenchene	3.72*	947	[0.14]	tr	983	1.20	Monoterpene
Sabinene	4.15	972	0.04	0.04	1056	1.72	Monoterpene
$\beta$ -Pinene	4.21	976	0.04	0.04	1040	1.57	Monoterpene
Myrcene	4.49	993	0.62	0.57	1111	2.25	Monoterpene
Octan-3-one	4.53*	995	1.80	1.31	1193	3.28	Aliphatic ketone
Octen-3-ol	4.53*	995	[1.80]	0.32	1388	6.11	Aliphatic alcohol
Butyl butyrate	4.70	1005	0.09				Aliphatic ester
$\alpha$ -Phellandrene	4.77*	1008	0.15	0.03	1104	2.18	Monoterpene
$\Delta$ 3-Carene	4.77*	1008	[0.15]	0.11	1085	2.01	Monoterpene
Octan-3-ol	4.80	1010	0.22	0.24	1340	5.37	Aliphatic alcohol
$\alpha$ -Terpinene	4.96	1019	0.04	0.04	1120	2.33	Monoterpene
Hexyl acetate	5.01	1022	0.49	0.59	1216	3.58*	Aliphatic ester
para-Cymene	5.15	1029	0.21	0.30	1202	3.39	Monoterpene
Limonene	5.18	1031	0.36	0.27	1138	2.56	Monoterpene
$\beta$ -Phellandrene	5.21	1033	0.15	0.80	1141	2.61*	Monoterpene
1,8-Cineole	5.24	1034	0.58	[0.80]	1141	2.61*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.38	1042	4.85	4.94	1183	3.14*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.56	1052	3.06	3.11	1197	3.33	Monoterpene
$\gamma$ -Terpinene	5.73	1061	0.17	[4.94]	1183	3.14*	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	6.01	1076	0.15	0.15	1368	5.81	Monoterp. alcohol
<i>cis</i> -Sabinene hydrate	6.06	1079	0.13	0.25	1397	6.24*	Monoterp. alcohol
Terpinolene	6.21	1087	0.08	[0.59]	1216	3.58*	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.33	1094	0.11	[0.25]	1397	6.24*	Monoterp. alcohol
$\alpha$ -Pinene oxide	6.53	1103	0.03	0.09	1291	4.64	Monoterp. ether
Linalool	6.83*	1114	31.95	30.94	1490	8.15*	Monoterp. alcohol
Octen-3-yl acetate	6.83*	1114	[31.95]	1.06	1326	5.15	Aliphatic ester
Octan-3-yl acetate	7.06	1123	0.11	0.12	1288	4.59	Aliphatic ester
<i>cis</i> -para-Menth-2-en-1-ol	7.25	1129	0.05	[30.94]	1490	8.15*	Monoterp. alcohol
Camphor	7.79	1149	0.24	0.20	1417	6.56	Monoterp. ketone
Lavandulol	8.39	1171	0.94	0.90	1603	11.62	Monoterp. alcohol
Borneol	8.67	1182	0.59	0.64	1609	11.83	Monoterp. alcohol
Terpinen-4-ol	8.87	1189	5.91	5.59	1527	9.01*	Monoterp. alcohol
Hexyl butyrate	9.21*	1201	0.57	0.35	1364	5.73	Aliphatic ester
Cryptone	9.21*	1201	[0.57]	0.17	1562	10.14	Monoterp. ketone

α-Terpineol	9.50	1207	1.08	3.78	1616	12.09*	Monoterp. alcohol
Bornyl formate	10.38	1227	0.04	0.03	1456	7.34	Monoterp. ester
Nerol	10.65	1233	0.20	0.19	1723	17.17	Monoterp. alcohol
Hexyl 2-methylbutyrate	10.83	1237	0.03				Aliphatic ester
Linalyl acetate	11.65	1255	31.02	31.91	1501	8.40*	Monoterp. ester
Geraniol	11.87	1260	0.49	0.46	1776	20.27	Monoterp. alcohol
Bornyl acetate	12.96	1284	0.15	[31.91]	1501	8.40*	Monoterp. ester
Lavandulyl acetate	13.30	1291	3.20	3.27	1548	9.63	Monoterp. ester
α-Cubebene	16.01	1335	0.04	[0.25]	1397	6.24*	Sesquiterpene
Neryl acetate	17.89	1364	0.30	0.29	1656	13.78	Monoterp. ester
β-Elementene	18.94	1380	0.07	3.61	1524	8.92*	Sesquiterpene
Geranyl acetate	19.39	1387	0.55	0.53	1685	15.27	Monoterp. ester
Hexyl hexanoate	19.87	1394	0.08	0.11	1579	10.77	Aliphatic ester
Sesquithujene	20.46	1402	0.07	[31.91]	1501	8.40*	Sesquiterpene
β-Caryophyllene	20.69	1405	3.24	[3.61]	1524	8.92*	Sesquiterpene
α-Santalene	21.02	1409	0.36	0.36	1510	8.62	Sesquiterpene
<i>trans</i> -α-Bergamotene	22.21	1423	0.10	[5.59]	1527	9.01*	Sesquiterpene
α-Humulene	23.42	1438	0.09	0.07	1593	11.26	Sesquiterpene
9-epi-β-Caryophyllene	24.12	1446	0.09	0.05	1658	13.89	Sesquiterpene
<i>trans</i> -β-Farnesene	24.62	1452	2.29	[3.78]	1616	12.09*	Sesquiterpene
Germacrene D	25.65	1465	0.31	[3.78]	1616	12.09*	Sesquiterpene
γ-Cadinene	28.71	1502	0.10	0.11	1669	14.38*	Sesquiterpene
( <i>E,E</i> )-α-Farnesene	29.10	1507	0.03	0.04	1693	15.62	Sesquiterpene
<i>trans</i> -γ-Bisabolene	29.90	1518	0.03	[0.11]	1669	14.38*	Sesquiterpene
Caryophyllene oxide	33.82	1573	0.37	0.32	1847	24.87	Sesquiterp. ether
τ-Cadinol	37.51	1643	0.06	0.07	2065	37.36	Sesquiterp. alcohol
<b>Total identified</b>			<b>98.89%</b>	<b>99.13%</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 :** 1.4608 ± 0.0003 (20 °C)

#### CONCLUSION

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

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