

## GC/MS BATCH NUMBER: L40105

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**ESSENTIAL OIL:** LAVENDER  
**BOTANICAL NAME:** LAVANDULA ANGUSTIFOLIA  
**ORIGIN:** BULGARIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LAVENDER OIL	%
LINALOOL	32.4
LINALYL ACETATE	32.0
LAVANDULYL ACETATE	3.8
$\beta$ -CARYOPHYLLENE	3.7
TERPINEN-4-OL	3.6
cis- $\beta$ -OCIMENE	3.6
trans- $\beta$ -OCIMENE	2.4
trans- $\beta$ -FARNESENE	1.5
OCTAN-3-ONE	1.3
$\alpha$ -TERPINEOL	1.2
1,8-CINEOLE	0.9
LAVANDULOL	0.7
CAMPHOR	0.4
LIMONENE	0.4
$\beta$ -PHELLANDRENE	0.1

Comments from Robert Tisserand: Has the beautiful "dried lavender flowers" odor of a high quality Bulgarian Lavender oil. The analysis shows all 13 key ISO constituents with range.

**Date :** June 3, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16E10-PTH13-1-SM

**Customer identification :** Lavender - Bulgaria - L4010557

**Type :** Essential oil

**Source :** *Lavandula angustifolia*

**Customer :** Plant Therapy

*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 :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2016-05-31

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.	
Ethanol	0.28	481	tr	tr	813	0.55	Aliphatic alcohol
Isovaleral	0.52	567	0.01	0.01	786	0.51	Aliphatic aldehyde
Hexanal	1.67	803	0.01	tr	1016	1.22	Aliphatic aldehyde
Hexan-2-ol	1.81	814	0.02				Aliphatic alcohol
Methyl hexyl ether	1.88	820	0.07	0.07	855	0.62	Aliphatic ether
<i>cis</i> -Hex-3-en-1-ol	2.39	860	0.06	0.86	1335	4.90*	Aliphatic alcohol
Hexanol	2.59	877	0.11	0.14	1305	4.46	Aliphatic alcohol
Tricyclene	3.15	917	0.01	0.01	930	0.82	Monoterpene
$\alpha$ -Thujene	3.23	922	0.06	0.07	958	0.93	Monoterpene
$\alpha$ -Pinene	3.33	928	0.16	0.14	949	0.90	Monoterpene
Camphene	3.62	945	0.12	0.10	1004	1.13	Monoterpene
Sabinene	4.04	971	0.04	0.03	1059	1.57	Monoterpene
$\beta$ -Pinene	4.10	975	0.09	0.08	1042	1.43	Monoterpene
Myrcene	4.36	990	0.46	0.40	1117	2.07	Monoterpene
Octen-3-ol	4.38	991	0.46	0.47	1404	5.91	Aliphatic alcohol
Octan-3-one	4.42	994	1.33	1.23	1202	3.06	Aliphatic ketone
Butyl butyrate	4.60	1004	0.11				Aliphatic ester
Octan-3-ol	4.65*	1007	0.25	0.18	1353	5.16	Aliphatic alcohol
$\Delta$ 3-Carene	4.65*	1007	[0.25]	0.04	1093	1.83	Monoterpene
$\alpha$ -Phellandrene	4.65*	1007	[0.25]	0.01	1110	1.99	Monoterpene
$\alpha$ -Terpinene	4.83	1017	0.02	0.02	1124	2.15*	Monoterpene
Hexyl acetate	4.90*	1021	0.32	0.29	1225	3.36	Aliphatic ester
meta-Cymene	4.90*	1021	[0.32]	[0.02]	1124	2.15*	Monoterpene
para-Cymene	5.01	1027	0.13	0.15	1212	3.17	Monoterpene
Limonene	5.06	1030	0.47	0.43	1142	2.36	Monoterpene
$\beta$ -Phellandrene	5.08	1031	0.09	1.01	1147	2.42*	Monoterpene
1,8-Cineole	5.12	1034	0.89	[1.01]	1147	2.42*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.25	1041	3.57	3.60	1191	2.92*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.42	1050	2.41	2.37	1207	3.11	Monoterpene
Lavender lactone	5.52	1056	tr	0.01	1611	10.88	Lactone
$\gamma$ -Terpinene	5.60	1060	0.17	[3.60]	1191	2.92*	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.87	1075	0.15	0.15	1383	5.60	Monoterp. alcohol
<i>cis</i> -Sabinene hydrate	5.90	1077	0.10	0.11	1412	6.03	Monoterp. alcohol
Terpinolene	6.07	1086	0.31	0.27	1226	3.38	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.18	1092	0.12	0.17	1411	6.00*	Monoterp. alcohol
<i>trans</i> -Sabinene hydrate	6.39	1103	0.02	0.02	1493	7.56	Monoterp. alcohol
Linalool	6.62	1112	32.37	32.15	1506	7.82*	Monoterp. alcohol
Octen-3-yl acetate	6.69	1114	0.87	[0.86]	1335	4.90*	Aliphatic ester
Octan-3-yl acetate	6.91	1123	0.13	0.15	1297	4.34	Aliphatic ester
<i>cis</i> -para-Menth-2-en-1-ol	7.05	1128	0.08	[32.15]	1506	7.82*	Monoterp. alcohol
<i>trans</i> -para-Menth-2-en-1-ol	7.48	1144	0.03	0.02	1571	9.68	Monoterp. alcohol

Camphor	7.58	1148	0.43	0.39	1425	6.28	Monoterp. ketone
Lavandulol	8.10	1167	0.71	0.73	1618	11.14	Monoterp. alcohol
Borneol	8.33	1176	0.94	2.51	1623	11.36*	Monoterp. alcohol
Terpinen-4-ol	8.55	1184	3.59	3.74	1535	8.59*	Monoterp. alcohol
Cryptone	8.91	1197	0.06	0.06	1568	9.58	Monoterp. ketone
Hexyl butyrate	8.98	1200	0.39	0.33	1374	5.48	Aliphatic ester
α-Terpineol	9.12	1204	1.23	1.48	1629	11.63	Monoterp. alcohol
γ-Terpineol	9.46	1212	0.02	0.02	1634	11.86	Monoterp. alcohol
Nerol	10.24	1229	0.31	0.33	1733	16.48	Monoterp. alcohol
Hexyl isovalerate	10.90	1244	0.19	0.14	1409	5.98	Aliphatic ester
Linalyl acetate	11.32	1254	31.98	33.07	1515	7.99	Monoterp. ester
Geraniol	11.44	1256	0.53	0.49	1784	19.52	Monoterp. alcohol
Lavandulyl acetate	12.94	1290	3.84	3.90	1553	9.16	Monoterp. ester
α-Cubebene	15.55	1335	0.08	[0.17]	1411	6.00*	Sesquiterpene
Neryl acetate	17.40	1363	0.58	0.64	1662	13.08*	Monoterp. ester
β-Elemene	18.45	1379	0.09	3.67	1529	8.40*	Sesquiterpene
Geranyl acetate	18.87	1386	0.92	0.98	1693	14.51	Monoterp. ester
Hexyl hexanoate	19.36	1394	0.06	0.05	1582	10.02	Aliphatic ester
β-Caryophyllene	20.10	1404	3.65	[3.67]	1529	8.40*	Sesquiterpene
α-Santalene	20.44	1409	0.27	0.37	1521	8.16	Sesquiterpene
Aromadendrene	21.61	1423	0.13	[3.74]	1535	8.59*	Sesquiterpene
α-Humulene	22.72	1436	0.15	0.13	1587	10.18	Sesquiterpene
<i>trans</i> -β-Farnesene	23.97	1451	1.54	[2.51]	1623	11.36*	Sesquiterpene
Germacrene D	24.93*	1463	0.50	0.27	1627	11.55	Sesquiterpene
γ-Murolene	24.93*	1463	[0.50]	0.10	1602	10.65	Sesquiterpene
γ-Cadinene	27.92	1499	0.24	0.24	1672	13.56	Sesquiterpene
β-Bisabolene	28.16	1502	0.11	[0.64]	1662	13.08*	Sesquiterpene
Lavandulyl 2-methylbutyrate	28.59	1508	0.21	0.17	1711	15.29	Monoterp. ester
Caryophyllene oxide	33.17	1570	0.21	0.16	1848	23.62	Sesquiterp. ether
τ-Cadinol	36.95	1637	0.04	0.03	2072	36.69	Sesquiterp. alcohol
α-Bisabolol	38.96	1685	0.04	0.03	2132	38.75	Sesquiterp. alcohol
<b>Total identified</b>			<b>98.66%</b>	<b>98.79%</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 :** 1.4598 ± 0.0003 (20 °C)

#### CONCLUSION

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



