

Date : March 30, 2017

SAMPLE IDENTIFICATION

Internal code : 17C27-GUR7-1-DM

Customer identification : Lavender - 137/Lv/17

Type : Essential oil

Source : *Lavandula angustifolia*

Customer : HealthLand 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 : 2017-03-28

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.	
Hexan-2-ol	1.86	817	0.03				Aliphatic alcohol
Methyl hexyl ether	1.93	823	0.14	0.13	849	0.80	Aliphatic ether
<i>cis</i> -Hex-3-en-1-ol	2.46	864	0.03	0.03	1323	5.50	Aliphatic alcohol
Hexanol	2.66	879	0.11	0.12	1299	5.13	Aliphatic alcohol
Tricyclene	3.22	917	0.02	0.02	918	1.06	Monoterpene
α -Thujene	3.30	922	0.11	0.10	954	1.20	Monoterpene
α -Pinene	3.41	928	0.21	0.20	943	1.16	Monoterpene
Camphene	3.69*	945	0.15	0.15	996	1.45	Monoterpene
α -Fenchene	3.69*	945	[0.15]	tr	985	1.35	Monoterpene
Thuja-2,4(10)-diene	3.78	951	tr	0.04	1056	1.97*	Monoterpene
Sabinene	4.12	971	0.05	[0.04]	1056	1.97*	Monoterpene
β -Pinene	4.18	974	0.06	0.05	1038	1.80	Monoterpene
Myrcene	4.46*	991	0.90	0.61	1114	2.55	Monoterpene
Octen-3-ol	4.46*	991	[0.90]	0.25	1397	6.67	Aliphatic alcohol
Octan-3-one	4.50	993	1.95	1.86	1199	3.65	Aliphatic ketone
Butyl butyrate	4.68	1003	0.13				Aliphatic ester
α -Phellandrene	4.73*	1006	0.50	0.02	1108	2.46	Monoterpene
Octan-3-ol	4.73*	1006	[0.50]	0.37	1344	5.83	Aliphatic alcohol
Δ 3-Carene	4.73*	1006	[0.50]	0.01	1098	2.33	Monoterpene
α -Terpinene	4.92	1017	0.02	0.02	1121	2.63	Monoterpene
Hexyl acetate	4.98	1020	0.75	0.79	1221	3.97*	Aliphatic ester
<i>para</i> -Cymene	5.10	1027	0.22	0.26	1207	3.78	Monoterpene
Limonene	5.14	1029	0.41	0.38	1139	2.87	Monoterpene
β -Phellandrene	5.17	1031	0.28	1.17	1145	2.94*	Monoterpene
1,8-Cineole	5.21	1032	0.89	[1.17]	1145	2.94*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.34	1039	3.17	3.21	1186	3.48*	Monoterpene
<i>trans</i> - β -Ocimene	5.51	1049	2.23	2.22	1201	3.69	Monoterpene
γ -Terpinene	5.69	1059	0.10	[3.21]	1186	3.48*	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.96	1073	0.14	0.14	1375	6.32	Monoterp. alcohol
<i>cis</i> -Sabinene hydrate	5.99	1075	0.06	0.20	1406	6.81*	Monoterp. alcohol
Isoterpinolene	6.09	1081	tr	0.01	1218	3.93	Monoterpene
Terpinolene	6.17	1085	0.10	[0.79]	1221	3.97*	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.27	1091	0.11	[0.20]	1406	6.81*	Monoterp. alcohol
<i>para</i> -Cymenene	6.38	1096	0.04	0.04	1377	6.35	Monoterpene
Linalool	6.74	1111	33.93	33.97	1500	9.09*	Monoterp. alcohol
Octen-3-yl acetate	6.79	1113	1.02	0.95	1329	5.58	Aliphatic ester
Octan-3-yl acetate	7.02	1121	0.20	0.22	1290	4.99	Aliphatic ester
<i>cis</i> - <i>para</i> -Menth-2-en-1-ol	7.16	1126	0.03	[33.97]	1500	9.09*	Monoterp. alcohol
Camphor	7.71	1146	0.39	0.35	1422	7.21*	Monoterp. ketone
Lavandulol	8.25	1166	0.95	4.00	1615	13.35*	Monoterp. alcohol
Borneol	8.49	1175	0.71	1.05	1618	13.49*	Monoterp. alcohol

Terpinen-4-ol	8.71	1183	3.77	3.72	1529	10.06	Monoterp. alcohol
Cryptone	9.05	1195	0.19	0.20	1564	11.34	Monoterp. ketone
Hexyl butyrate	9.14*	1199	0.52	0.44	1364	6.15	Aliphatic ester
para-Cymen-8-ol	9.14*	1199	[0.52]	0.10	1765	21.90	Monoterp. alcohol
α-Terpineol	9.30	1203	1.20	1.20	1623	13.76	Monoterp. alcohol
γ-Terpineol	9.39	1205	0.02	0.02	1631	14.13	Monoterp. alcohol
Bornyl formate	10.05	1219	0.07	0.05	1449	7.86	Monoterp. ester
Nerol	10.44	1228	0.20	0.23	1729	19.53	Monoterp. alcohol
Linalyl acetate	11.53	1252	29.63	30.27	1509	9.32	Monoterp. ester
Geraniol	11.66	1255	0.51	0.48	1781	22.94	Monoterp. alcohol
Geranial	12.53	1274	0.04	0.05	1654	15.35	Monoterp. aldehyde
Bornyl acetate	12.83	1281	0.13	0.12	1510	9.37	Monoterp. ester
Lavandulyl acetate	13.17	1289	3.32	3.40	1548	10.76	Monoterp. ester
Cuminol	13.82	1302	0.03	0.04	2003	36.44	Monoterp. alcohol
α-Cubebene	15.84	1333	0.05	[0.35]	1422	7.21*	Sesquiterpene
Neryl acetate	17.70	1361	0.33	0.35	1657	15.53*	Monoterp. ester
β-Elemene	18.78	1377	0.07	0.09	1526	9.92	Sesquiterpene
Geranyl acetate	19.19	1384	0.63	0.63	1689	17.21	Monoterp. ester
Hexyl hexanoate	19.70	1391	0.12	0.12	1578	11.87	Aliphatic ester
β-Caryophyllene	20.46	1402	3.23	3.23	1522	9.78	Sesquiterpene
α-Santalene	20.81	1407	0.35	0.40	1512	9.46	Sesquiterpene
α-Humulene	23.16	1435	0.10	0.07	1593	12.41	Sesquiterpene
<i>trans</i> -β-Farnesene	24.39	1450	3.00	[4.00]	1615	13.35*	Sesquiterpene
Germacrene D	25.35	1461	0.39	[1.05]	1618	13.49*	Sesquiterpene
γ-Cadinene	28.37	1497	0.10	0.09	1664	15.88	Sesquiterpene
β-Bisabolene	28.59	1500	0.04	[0.35]	1657	15.53*	Sesquiterpene
Caryophyllene oxide	33.52*	1569	0.45	0.39	1845	27.40	Sesquiterp. ether
Caryophyllene oxide epimer	33.52*	1569	[0.45]	0.06	1840	27.04	Sesquiterp. ether
τ-Cadinol	37.20	1635	0.05	0.06	2070	38.81	Sesquiterp. alcohol
Total identified			98.68%	98.75%			

*: 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 : 1.4620 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 3515:2004 (LAVANDULA ANGUSTIFOLIA, BULGARIA)

Compound	%	ISO 3515:2004 : <i>Lavandula angustifolia</i>				Complies?
		Clonal lavender, "other origins" (non- Bulgarian)		Clonal lavender, Bulgaria		
		% min	% max	% min	% max	
Octan-3-one	2.0		3	0.2	1.6	Other origins
Limonene	0.4		1		0.6	Yes
β-Phellandrene	0.3		1		0.6	Yes
1,8-Cineole	0.9		3		2	Yes
<i>cis</i> -β-Ocimene	3.2	1	10	3	9	Yes
<i>trans</i> -β-Ocimene	2.2	0.5	6	2	5	Yes
Linalool	33.9	20	43	22	34	Yes
Camphor	0.4		1.5		0.6	Yes
Lavandulol	1.0		3	0.3		Yes
Terpinen-4-ol	3.8		8	2	5	Yes
α-Terpineol	1.2		2	0.8	2	Yes
Linalyl acetate	29.6	25	47	30	42	Other origins
Lavandulyl acetate	3.3		8	2	5	Yes
Refractive index	1.4620	1.460	1.464	1.459	1.463	Yes

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The oil comply with the ISO norm.



