

Date : December 18, 2017

SAMPLE IDENTIFICATION

Internal code : 17L13-GUR1-1-CC

Customer identification : Lavender Oil

Type : Essential oil

Source : *Lavandula angustifolia*

Customer : GuruNanda LLC.

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 : 2017-12-18

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.	
2-Methyl-3-buten-2-ol	0.55	658	0.02	0.23	954	1.16*	Aliphatic alcohol
Isovaleral	0.67	674	0.02	0.02	726	0.61*	Aliphatic aldehyde
2-Methylbutyral	0.70	678	0.01	[0.02]	726	0.61*	Aliphatic aldehyde
Toluene	1.32	759	0.01	0.24	945	1.12*	Simple phenolic
Hexan-2-ol	1.85	816	0.02				Aliphatic alcohol
Methyl hexyl ether	1.93	822	0.06	0.05	843	0.76	Aliphatic ether
cis-Hex-3-en-1-ol	2.52	867	0.02	0.08	1316	5.31	Aliphatic alcohol
Hexanol	2.74	883	0.04	0.08	1290	4.92	Aliphatic alcohol
Tricyclene	3.23	915	0.03	0.03	920	1.02	Monoterpene
α-Thujene	3.32	920	0.14	[0.23]	954	1.16*	Monoterpene
α-Pinene	3.42	927	0.35	[0.24]	945	1.12*	Monoterpene
Camphene	3.71	944	0.25	0.24	1000	1.39	Monoterpene
Butyl isobutyrate	3.90	955	0.01	0.02	1109	2.40	Aliphatic ester
Sabinene	4.14	969	0.04	0.04	1053	1.91	Monoterpene
β-Pinene	4.21	973	0.06	0.05	1038	1.75	Monoterpene
Myrcene	4.49	989	0.78	0.83	1115	2.48*	Monoterpene
Octen-3-ol	4.53*	992	0.62	0.16	1390	6.48*	Aliphatic alcohol
Octan-3-one	4.53*	992	[0.62]	10.50	1188	3.43*	Aliphatic ketone
Butyl butyrate	4.69	1001	0.08				Aliphatic ester
α-Phellandrene	4.76*	1005	0.22	[0.83]	1115	2.48*	Monoterpene
Δ3-Carene	4.76*	1005	[0.22]	0.14	1078	2.20	Monoterpene
Octan-3-ol	4.83	1009	0.05	0.13	1341	5.70*	Aliphatic alcohol
α-Terpinene	4.95	1015	0.08	[0.83]	1115	2.48*	Monoterpene
Hexyl acetate	5.00	1018	0.39	0.57	1219	3.87*	Aliphatic ester
para-Cymene	5.15	1026	0.20	4.65	1202	3.62*	Monoterpene
Limonene	5.18	1028	0.32	1.34	1142	2.84*	Monoterpene
β-Phellandrene	5.22	1030	0.06	[1.34]	1142	2.84*	Monoterpene
1,8-Cineole	5.24	1031	0.98	[1.34]	1142	2.84*	Monoterp. ether
cis-β-Ocimene	5.40	1040	10.31	[10.50]	1188	3.43*	Monoterpene
trans-β-Ocimene	5.56	1049	4.23	[4.65]	1202	3.62*	Monoterpene
γ-Terpinene	5.74	1058	0.25	[10.50]	1188	3.43*	Monoterpene
cis-Linalool oxide (fur.)	6.01	1073	0.11	[0.16]	1390	6.48*	Monoterp. alcohol
cis-Sabinene hydrate	6.09	1077	0.06	0.15	1400	6.62*	Monoterp. alcohol
Terpinolene	6.21	1084	0.13	[0.57]	1219	3.87*	Monoterpene
trans-Linalool oxide (fur.)	6.33	1091	0.08	[0.15]	1400	6.62*	Monoterp. alcohol
para-Cymenene	6.43	1096	0.02	0.34	1366	6.09*	Monoterpene
Linalool	6.85*	1112	25.39	23.58	1492	8.74*	Monoterp. alcohol
Octen-3-yl acetate	6.85*	1112	[25.39]	0.93	1327	5.49	Aliphatic ester
Octan-3-yl acetate	7.05	1119	0.05	0.11	1296	5.01	Aliphatic ester
cis-para-Menth-2-en-1-ol	7.25	1126	0.07	[23.58]	1492	8.74*	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.76	1145	0.07	0.22	1555	10.85*	Monoterp. alcohol

Camphor	7.81	1146	0.35	0.35	1418	7.00*	Monoterp. ketone
Lavandulol	8.43	1169	0.72	0.60	1606	12.73	Monoterp. alcohol
(3E,5Z)-1,3,5-Undecatriene	8.57	1174	0.07	[0.13]	1341	5.70*	Alkene
Borneol	8.75	1181	0.77	0.81	1611	12.94	Monoterp. alcohol
Terpinen-4-ol	8.92	1187	5.47	9.64	1524	9.72*	Monoterp. alcohol
Hexyl butyrate	9.22*	1198	0.36	[0.34]	1366	6.09*	Aliphatic ester
Cryptone	9.22*	1198	[0.36]	[0.22]	1555	10.85*	Monoterp. ketone
para-Cymen-8-ol	9.30	1200	0.10	0.16	1754	20.93	Monoterp. alcohol
α -Terpineol	9.59	1206	1.22	4.63	1618	13.28*	Monoterp. alcohol
Bornyl formate	10.41	1224	0.10				Monoterp. ester
Nerol	10.76	1232	0.22	0.20	1721	18.76	Monoterp. alcohol
Linalyl acetate	11.66	1251	29.23	30.89	1506	9.09*	Monoterp. ester
Geraniol	11.98	1258	0.47	0.48	1771	22.09	Monoterp. alcohol
Bornyl acetate	12.97	1280	0.22	[30.89]	1506	9.09*	Monoterp. ester
Lavandulyl acetate	13.33	1288	4.09	4.13	1546	10.51	Monoterp. ester
α -Cubebene	16.06	1332	0.06	[0.35]	1418	7.00*	Sesquiterpene
Neryl acetate	17.93	1361	0.36	0.36	1654	15.18*	Monoterp. ester
β -Elemene	18.96	1376	0.08	[9.64]	1524	9.72*	Sesquiterpene
Geranyl acetate	19.44	1383	0.59	0.67	1686	16.83*	Monoterp. ester
Hexyl hexanoate	19.89	1390	0.02	0.21	1581	11.83	Aliphatic ester
β -Caryophyllene	20.75	1402	3.89	[9.64]	1524	9.72*	Sesquiterpene
α -Santalene	21.05	1406	0.46	0.48	1516	9.42	Sesquiterpene
<i>trans</i> - α -Bergamotene	22.23	1420	0.13	[9.64]	1524	9.72*	Sesquiterpene
allo-Aromadendrene	23.50	1435	0.11	[0.22]	1555	10.85*	Sesquiterpene
Coumarin	24.16	1443	0.13	0.12	2274	44.17	Coumarin
<i>trans</i> - β -Farnesene	24.67	1449	3.05	[4.63]	1618	13.28*	Sesquiterpene
Germacrene D	25.74	1461	0.26	[4.63]	1618	13.28*	Sesquiterpene
γ -Cadinene	28.82	1498	0.11	0.10	1666	15.82	Sesquiterpene
β -Bisabolene	28.93	1500	0.03	[0.36]	1654	15.18*	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.18	1503	0.08	[0.67]	1686	16.83*	Sesquiterpene
<i>trans</i> - γ -Bisabolene	30.11	1516	0.04	[0.67]	1686	16.83*	Sesquiterpene
Caryophyllene oxide	33.92	1570	0.20	0.18	1841	26.86	Sesquiterp. ether
τ -Cadinol	37.64	1640	0.05	0.05	2063	38.53	Sesquiterp. alcohol
Total identified			98.67%	98.79%			

*: 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 : Faintly yellow liquid

Refractive index : 1.4638 ± 0.0003 (20 °C)

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

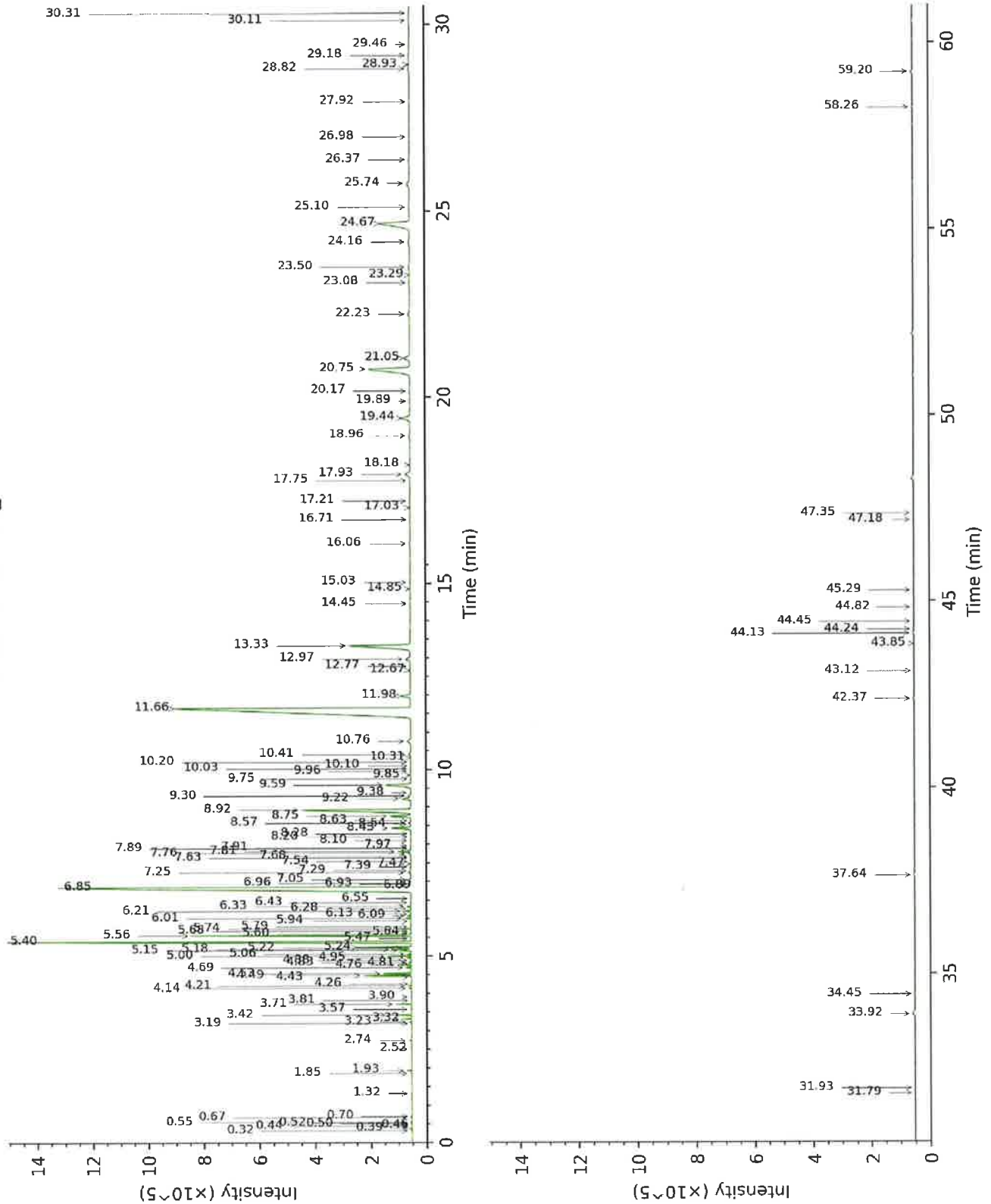
Compound	%	ISO 3515:2004 : <i>Lavandula angustifolia</i>				Complies?
		Clonal lavender, "other origins" (non- Bulgarian)		Clonal lavender, Bulgaria		
		% min	% max	% min	% max	
Octan-3-one	0.4		3	0.2	1.6	Yes
Limonene	0.3		1		0.6	Yes
β-Phellandrene	0.06		1		0.6	Yes
1,8-Cineole	1.0		3		2	Yes
cis-β-Ocimene	10	1	10	3	9	Yes
trans-β-Ocimene	4.2	0.5	6	2	5	Yes
Linalool	23.6	20	43	22	34	Yes
Camphor	0.4		1.5		0.6	Yes
Lavandulol	0.7		3	0.3		Yes
Terpinen-4-ol	5.5		8	2	5	Other
α-Terpineol	1.2		2	0.8	2	Yes
Linalyl acetate	29.2	25	47	30	42	Other
Lavandulyl acetate	4.1		8	2	5	Yes
Refractive index	1.4638	1.460	1.464	1.459	1.463	Other

CONCLUSION

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



17L13-GUR1-1-CC_BP5



17L13-GUR1-1-CC_WAX

