

Analysis Immortelle Essential Oil

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Date : December 9, 2016

SAMPLE IDENTIFICATION

Internal code : 16L05-FSE2-1-DM

Customer identification : Immortelle - Lot#HEL15L056

Type : Essential oil

Source : *Helichrysum italicum*

Customer : Flowers Shining Everywhere Inc.

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 : 2016-12-08

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-Methylbutyral	0.60	594	0.03	0.02	766	0.47	Aliphatic aldehyde
2-Methyl-3-pentanone	1.16*	730	0.22	0.24	899	0.69*	Aliphatic ketone
2-Methylbutyl alcohol	1.16*	730	[0.22]	5.91	1140	2.28*	Aliphatic alcohol
2,4-Dimethyl-3-pentanone	1.55	785	0.11	[0.24]	899	0.69*	Aliphatic ketone
4-Methyl-3-hexanone	2.09	834	0.56	0.75	1001	1.09	Aliphatic ketone
cis-Hex-3-en-1-ol	2.51	866	0.01	0.02	1312	4.49	Aliphatic alcohol
Tricyclene	3.18	913	tr	0.01	926	0.78	Monoterpene
α-Pinene	3.37	925	1.98	2.04	946	0.86	Monoterpene
α-Fenchene	3.63	941	0.47	0.40	985	1.02	Monoterpene
Camphene	3.65	942	0.19	0.13	995	1.07	Monoterpene
Sabinene	4.08	968	0.01	0.02	1051	1.46	Monoterpene
β-Pinene	4.14	972	0.51	0.51	1038	1.35	Monoterpene
Myrcene	4.43	989	0.08	0.08	1121	2.04	Monoterpene
trans-Dehydroxylinalool oxide	4.45	991	0.12	[5.91]	1140	2.28*	Monoterp. ether
6-Methyl-5-hepten-2-one	4.51	994	0.05	0.04	1268	3.88	Aliphatic ketone
α-Phellandrene	4.70*	1005	0.07	0.07	1112	1.96	Monoterpene
Δ3-Carene	4.70*	1005	[0.07]	0.02	1106	1.89	Monoterpene
6-Methyl-5-hepten-2-ol	4.73	1007	0.05	0.29	1413	5.95	Aliphatic alcohol
Mentha-1,5,8-triene	4.75	1008	0.03				Monoterpene
cis-Dehydroxylinalool oxide	4.83	1012	0.03				Monoterp. ether
α-Terpinene	4.88	1015	0.10	0.06	1125	2.09	Monoterpene
Limonene	5.14*	1029	4.81	[5.91]	1140	2.28*	Monoterpene
para-Cymene	5.14*	1029	[4.81]	0.25	1203	3.00	Monoterpene
1,8-Cineole	5.18	1032	1.16	[5.91]	1140	2.28*	Monoterp. ether
cis-β-Ocimene	5.30	1038	0.04	0.48	1185	2.80*	Monoterpene
trans-β-Ocimene	5.48	1048	0.15	0.12	1198	2.96	Monoterpene
Isobutyl angelate	5.60	1055	0.19	0.34	1233	3.40*	Aliphatic ester
γ-Terpinene	5.66	1059	0.46	[0.48]	1185	2.80*	Monoterpene
Terpinolene	6.13	1083	0.16	0.14	1222	3.24	Monoterpene
para-Cymenene	6.36	1096	0.03	0.03	1363	5.22	Monoterpene
2,4-Dimethyl-heptane-3,5-dione	6.41	1098	0.29	0.32	1471	7.02	Aliphatic ketone
Unknown (m/z = 81, 41 (96), 69 (74), 123 (57), 109 (56), 83 (53)... 137 (28)... 152 (4))	6.51	1102	0.38				Oxygenated monoterp.
2-Methylbutyl 2-methylbutyrate	6.55	1103	0.14	[0.34]	1233	3.40*	Aliphatic ester
Linalool	6.70	1109	1.99	5.92	1484	7.26*	Monoterp. alcohol

Nonanal	6.77	1112	0.15	0.28	1330	4.74	Aliphatic aldehyde
endo-Fenchol	7.12	1125	0.06	0.07	1512	7.78	Monoterp. alcohol
trans-Pinocarveol	7.59	1142	0.04	0.02	1556	8.99	Monoterp. alcohol
Camphor	7.76	1148	0.11	0.09	1421	6.07	Monoterp. ketone
Isoamyl angelate	7.80	1150	1.06	0.76	1340	4.89	Aliphatic ester
Borneol	8.62	1181	0.08	0.46	1607	10.51*	Monoterp. alcohol
Terpinen-4-ol	8.73	1185	0.44	0.74	1524	8.05*	Monoterp. alcohol
Dimethyl octanedione isomer	8.82	1188	0.75	0.77	1528	8.17	β -diketone
4,6-Dimethyl-3,5-octanedione	8.88	1190	0.81	0.75	1532	8.25	β -diketone
α -Terpineol	9.43	1205	0.78	0.82	1618	10.84	Monoterp. alcohol
Unknown (m/z = 81, 168 (64), 67 (59), 140 (49) 41 (46))	9.89	1215	0.03				
Unknown (m/z = 81, 168 (53), 67 (49), 140 (47), 41 (44))	10.32	1225	0.59				
Nerol	10.69	1233	3.48	3.87	1729	15.60	Monoterp. alcohol
Neral	11.22	1245	0.21	[0.46]	1607	10.51*	Monoterp. aldehyde
cis-Isogeraniol	11.45	1251	0.06	0.07	1739	16.15	Monoterp. alcohol
Hexyl angelate	13.08	1286	0.04	0.05	1630	11.27	Aliphatic ester
Carvacrol	16.49	1341	0.03	0.03	2140	38.26	Monoterp. alcohol
α -Copaene	17.45	1356	0.91	0.73	1443	6.48	Sesquiterpene
Neryl acetate	18.30*	1369	35.13	36.30	1667	12.89*	Monoterp. ester
Isoitalicene	18.30*	1369	[35.13]	0.65	1448	6.58	Sesquiterpene
Geranyl acetate	19.27	1384	0.19	3.35	1701	14.35*	Monoterp. ester
Italicene	19.54	1388	3.39	[5.92]	1484	7.26*	Sesquiterpene
Sesquithujene	19.89	1394	0.28	[0.74]	1524	8.05*	Sesquiterpene
β -Caryophyllene	20.49*	1401	0.66	0.24	1522	7.98	Sesquiterpene
cis- α -Bergamotene	20.49*	1401	[0.66]	0.15	1505	7.65	Sesquiterpene
Aromadendrene	21.93	1419	0.35	0.39	1539	8.48	Sesquiterpene
trans- α -Bergamotene	22.23	1422	0.07	0.10	1535	8.33	Sesquiterpene
Italidione I	23.21*	1434	2.76	4.99	1804	19.90*	β -diketone
α -Humulene	23.21*	1434	[2.76]	0.14	1592	10.05	Sesquiterpene
trans- β -Farnesene	23.94	1443	0.31	0.21	1627	11.11	Sesquiterpene
β -Acoradiene	24.28	1447	0.48	0.34	1601	10.33	Sesquiterpene
Neryl propionate	24.78*	1453	4.41	4.20	1724	15.38	Monoterp. ester
γ -Selinene	24.78*	1453	[4.41]	[0.46]	1607	10.51*	Sesquiterpene
γ -Curcumene	26.10	1469	9.48	9.69	1641	11.71*	Sesquiterpene
Italidione isomer	26.45	1472	2.26	[4.99]	1804	19.90*	β -diketone
ar-Curcumene	26.56	1474	2.29	[3.35]	1701	14.35*	Sesquiterpene
Italidione II	26.87*	1477	1.93	0.55	1821	20.87	β -diketone
α -Selinene	26.87*	1477	[1.93]	[9.69]	1641	11.71*	Sesquiterpene

α -Murolene	27.32	1483	0.07	[9.69]	1641	11.71*	Sesquiterpene
γ -Cadinene	28.39	1496	0.10	[36.30]	1667	12.89*	Sesquiterpene
Italidione II isomer	28.72*	1501	1.27	0.94	1809*	20.23	β -diketone
β -Curcumene	28.72*	1501	[1.27]	0.41	1677	13.31	Sesquiterpene
β -Bisabolene	28.72*	1501	[1.27]	[36.30]	1667	12.89*	Sesquiterpene
<i>trans</i> - γ -Bisabolene	29.95*	1517	0.13	0.04	1687	13.72	Sesquiterpene
<i>trans</i> -Cadin-1,4-diene	29.95*	1517	[0.13]	[3.35]	1701	14.35*	Sesquiterpene
β -Sesquiphellandrene	30.30	1522	0.11	[3.35]	1701	14.35*	Sesquiterpene
<i>trans</i> - α -Bisabolene	31.04	1532	0.06	0.07	1714	14.93	Sesquiterpene
Italicene ether	31.60	1540	0.08				Sesquiterp. ether
α -Elemol	31.98*	1545	0.07	0.09	1991	31.87	Sesquiterp. alcohol
Italidione III	33.62	1568	0.21	0.22	1824	21.08	β -diketone
Italidione III isomer	33.96	1572	0.23				β -diketone
Italidione III isomer II	34.05	1573	0.18				β -diketone
Italidione III isomer III	34.29	1577	0.46				β -diketone
Guaiol	34.84	1584	0.24	0.28	2023	33.72	Sesquiterp. alcohol
Italidione III isomer IV	35.28	1590	0.70				β -diketone
Rosifolol analog?	35.82	1600	1.55	1.62	2018	33.49	Sesquiterp. alcohol
γ -Eudesmol	36.86	1626	0.42	0.50	2059	35.50	Sesquiterp. alcohol
Neryl angelate?	37.01	1629	0.51				Monoterp. ester
τ -Cadinol	37.32	1637	0.03	0.03	2073	35.99	Sesquiterp. alcohol
β -Eudesmol	37.80	1648	0.79	0.92	2111	37.28*	Sesquiterp. alcohol
α -Eudesmol	37.95	1652	0.15	[0.92]	2111	37.28*	Sesquiterp. alcohol
Bulnesol	38.27	1660	0.14	0.11	2105	37.06	Sesquiterp. alcohol
Unknown dione (m/z = 98, 41 (50), 83 (46), 82 (43), 137 (43)... 202 (5), 220 (3), 238 (1), 281 (2))	42.88	1793	0.10				β -diketone
Total identified			94.54%	94.25%			

*: 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 : 1.4680 \pm 0.0003 (20 °C)

CONCLUSION

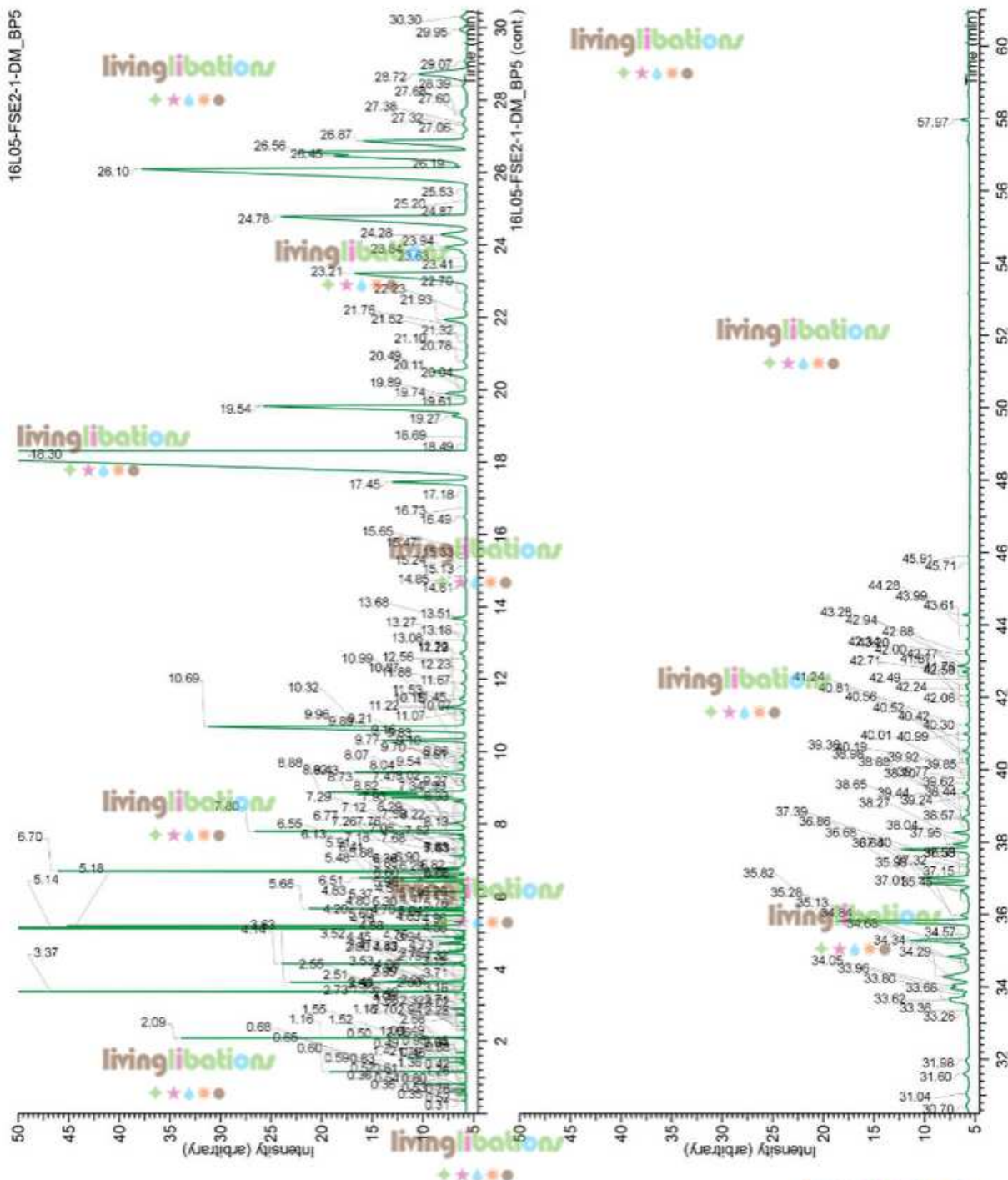
No adulterant, contaminant or diluent were detected using this method.

Essential oil, *Helichrysum italicum*
Internal Code: 16L05-FSE2-1-DM

Customer Identification:
Immortelle - Lot#HEL15L056

Report prepared for
Flowers Shining Everywhere Inc.

16L05-FSE2-1-DM_BP5



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Internal Code: 16L05-FSE2-1-DM

Customer Identification:
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16L05-FSE2-1-DM_WAX

