

GC/MS BATCH NUMBER: H20103

ESSENTIAL OIL: HELICHRYSUM ITALICUM
BOTANICAL NAME: HELICHRYSUM ITALICUM
ORIGIN: ITALY

KEY CONSTITUENTS PRESENT IN THIS BATCH OF HELICHRYSUM ITALICUM OIL	%
α -PINENE	34.1
NERYL ACETATE	22.9
γ -CURCUMENE	8.6
ITALICENE	3.3
β -CARYOPHYLLENE	2.4
α -SELINENE	2.2
LIMONENE	2.0
β -SELINENE	2.0
α -CURCUMENE	1.8
β -PINENE	1.7
ITALIDIONE I	1.2
ISOITALICENE	1.2

Comments from Robert Tisserand: A wonderfully fresh, buttery Immortelle oil high in both α -pinene and neryl acetate, and 2% total italdiones.

Date : June 14, 2016

SAMPLE IDENTIFICATION

Internal code : 16F09-PTH2-1-SM

Customer identification : Helichrysum Italicum - Italy - H2010363

Type : Essential oil

Source : *Helychrisum italicum*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Analyst : Alexis St-Gelais, M. Sc., chimiste

Analysis date : 2016-06-09

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-pentanone	1.15	733	0.06	0.06	914	0.76	Aliphatic ketone
2,4-Dimethyl-3-pentanone	1.54	787	0.05				Aliphatic ketone
4-Methyl-3-hexanone	2.08	836	0.14	0.14	1014	1.21	Aliphatic ketone
Heptanal	2.88	900	0.02	0.02	1133	2.26	Aliphatic aldehyde
Tricyclene	3.16	918	0.08	0.07	935	0.84	Monoterpene
α -Thujene	3.25	923	0.04	34.60	964	0.96*	Monoterpene
α -Pinene	3.40	932	34.09	[34.60]	964	0.96*	Monoterpene
α -Fenchene	3.61	945	0.25	0.22	1002	1.12	Monoterpene
Camphene	3.64	946	0.37	0.31	1009	1.16	Monoterpene
Thuja-2,4(10)-diene	3.73	952	0.02	0.03	1062	1.59*	Monoterpene
Sabinene	4.06	972	0.02	[0.03]	1062	1.59*	Monoterpene
β -Pinene	4.12	976	1.67	1.68	1047	1.47	Monoterpene
Myrcene	4.40*	993	0.17	0.14	1121	2.11	Monoterpene
<i>trans</i> -Dehydroxylinalool oxide	4.40*	993	[0.17]	0.03	1158	2.55	Monoterp. ether
6-Methyl-5-hepten-2-one	4.45	996	0.01	0.02	1282	4.15	Aliphatic ketone
Δ 3-Carene	4.67*	1009	0.85	0.78	1098	1.87	Monoterpene
α -Phellandrene	4.67*	1009	[0.85]	0.02	1114	2.04	Monoterpene
<i>cis</i> -Dehydroxylinalool oxide	4.80	1016	0.01				Monoterp. ether
α -Terpinene	4.86	1019	0.08	0.07	1128	2.19	Monoterpene
para-Cymene	5.05	1030	0.11	0.13	1215	3.21	Monoterpene
Limonene	5.09	1032	1.99	1.91	1146	2.41	Monoterpene
β -Phellandrene	5.11	1033	0.23	0.50	1152	2.47*	Monoterpene
1,8-Cineole	5.16	1036	0.22	[0.50]	1152	2.47*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.27	1042	0.01	0.19	1195	2.97*	Monoterpene
<i>trans</i> - β -Ocimene	5.45	1052	0.03	0.03	1210	3.14	Monoterpene
γ -Terpinene	5.58	1059	0.15	[0.19]	1195	2.97*	Monoterpene
Isobutyl angelate	5.63	1062	0.17	0.21	1243	3.61*	Aliphatic ester
Terpinolene	6.10	1088	0.17	0.17	1230	3.43	Monoterpene
para-Cymenene	6.32	1100	0.01	0.01	1375	5.49	Monoterpene
2,4-Dimethyl-heptane-3,5-dione	6.39	1103	0.03	0.03	1466	7.06	Aliphatic ketone
2-Methylbutyl 2-methylbutyrate	6.49	1107	0.04	[0.21]	1243	3.61*	Aliphatic ester
Linalool	6.67*	1114	0.65	0.44	1501	7.71	Monoterp. alcohol
Nonanal	6.67*	1114	[0.65]	0.05	1346	5.05	Aliphatic aldehyde
endo-Fenchol	7.11	1130	0.04	0.02	1513	7.94	Monoterp. alcohol
Camphor	7.59	1148	0.05	0.05	1430	6.35	Monoterp. ketone
Isoamyl angelate	7.76	1154	0.54	0.52	1351	5.13	Aliphatic ester
Borneol	8.62	1187	0.06	0.51	1625	11.44*	Monoterp. alcohol

Terpinen-4-ol	8.70	1189	0.12	0.18	1535	8.61	Monoterp. alcohol
Dimethyl octanedione isomer	8.76	1192	0.19	0.67	1539	8.73*	β -diketone
4,6-Dimethyl-3,5-octanedione	8.82	1194	0.19	0.18	1542	8.81	β -diketone
α -Terpineol	9.34	1209	0.17	0.34	1631	11.72	Monoterp. alcohol
Decanal	9.40	1210	0.24	1.62	1444	6.64*	Aliphatic aldehyde
Unknown (m/z = 81, 168 (53), 67 (49), 140 (47), 41 (44))	10.25	1229	0.18				
Neral	10.65	1239	0.68	0.90	1612	10.91*	Monoterp. aldehyde
3-Methylamyl angelate	11.17	1250	0.07	[1.62]	1444	6.64*	Aliphatic ester
Hexyl angelate	13.03	1292	0.16	[0.51]	1625	11.44*	Aliphatic ester
α -Terpinyl acetate	16.78	1354	0.17	[0.51]	1625	11.44*	Monoterp. ester
α -Ylangene	16.88	1355	0.15	0.11	1420	6.19	Sesquiterpene
Isoitalicene	17.36*	1363	1.54	[1.62]	1444	6.64*	Sesquiterpene
α -Copaene	17.36*	1363	[1.54]	0.31	1436	6.47	Sesquiterpene
Neryl acetate	17.99	1372	22.88	23.80	1673	13.60*	Monoterp. ester
Geranyl acetate	19.08	1389	0.09	1.65	1706	15.06*	Monoterp. ester
Italicene	19.32	1393	3.33	2.64	1486	7.43	Sesquiterpene
β -Caryophyllene	20.26	1406	2.37	2.18	1532	8.50	Sesquiterpene
β -Gurjunene	20.33	1407	0.41	0.61	1523	8.23	Sesquiterpene
Aromadendrene	21.79	1425	0.51	[0.67]	1539	8.73*	Sesquiterpene
Italidione I	22.99	1439	1.20	1.08	1809	21.00	β -diketone
β -Acoradiene	23.74	1449	0.18	0.25	1593	10.36	Sesquiterpene
γ -Selinene	24.09	1453	0.24	0.24	1601	10.60	Sesquiterpene
<i>trans</i> - β -Farnesene	24.19	1454	0.13	[0.90]	1612	10.91*	Sesquiterpene
Neryl propionate	24.56	1458	0.78	0.74	1733	16.51	Monoterp. ester
Germacrene D	24.70	1460	0.55	[0.51]	1625	11.44*	Sesquiterpene
Italidione isomer	25.35	1468	0.21				β -diketone
γ -Curcumene	25.83*	1474	10.47	8.64	1639	12.07	Sesquiterpene
β -Selinene	25.83*	1474	[10.47]	1.96	1641	12.17	Sesquiterpene
α -Selinene	26.27	1479	2.23	1.71	1647	12.43	Sesquiterpene
α -Curcumene	26.49	1482	1.78	[1.65]	1706	15.06*	Sesquiterpene
Italidione II	26.63	1483	0.81				β -diketone
α -Muurolene	27.19	1490	0.15	0.18	1649	12.55	Sesquiterpene
γ -Cadinene	28.21	1503	0.22	[23.80]	1673	13.60*	Sesquiterpene
Italidione II isomer	28.56*	1507	0.73	0.55	1813	21.24	β -diketone
β -Bisabolene	28.56*	1507	[0.73]	0.16	1659	12.95	Sesquiterpene
β -Curcumene	28.56*	1507	[0.73]	0.48	1679	13.89	Sesquiterpene
δ -Cadinene	28.87	1512	0.46	0.44	1684	14.11	Sesquiterpene
β -Sesquiphellandrene	29.80	1524	0.14				Sesquiterpene
Italicene ether	31.44	1547	0.06				Sesquiterp. ether
Italidione III	33.53	1575	0.18				β -diketone

Italidione III isomer	33.59	1576	0.12				β-diketone
Italidione III isomer II	33.88	1580	0.12				β-diketone
Italidione III isomer III	33.97	1581	0.10				β-diketone
Guaiol	34.25	1585	0.16	0.14	2004	33.75	Sesquiterp. alcohol
Rosifoliol analog?	35.69	1606	0.39	0.26	2020	34.69	Sesquiterp. alcohol
Neryl angelate?	36.80	1633	0.14				Monoterp. ester
Selin-11-en-4-α-ol	37.72	1655	0.14	0.14	2138	38.91	Sesquiterp. alcohol
Total identified			97.39%	95.12%			

*: 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 : 1.4710 ± 0.0003 (20 °C)

CONCLUSION

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



