



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: H90106

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**ESSENTIAL OIL:** HELICHRYSUM ITALICUM ORGANIC

**BOTANICAL NAME:** HELICHRYSUM ITALICUM

**ORIGIN:** CROATIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF HELICHRYSUM ITALICUM ORGANIC OIL	%
$\alpha$ -PINENE	26.5
$\gamma$ -CURCUMENE	16.2
NERYL ACETATE	7.9
$\beta$ -CARYOPHYLLENE	4.8
$\alpha$ -SELINENE	4.2
LIMONENE	4.8
ITALICENE	3.7
ISOITALICENE	2.5
$\beta$ -SELINENE	2.1
ITALIDIONE I	1.8
NERYL PROPIONATE + $\gamma$ -SELINENE	1.5
ISOAMYL ANGELATE	1.4
$\alpha$ r-CURCUMENE	1.1
cis- $\alpha$ -BERGAMOTENE	1.0
ITALIDIONE II	1.0

Comments from Robert Tisserand: Fresh, lemon-butter odor profile. This is an alpha-pinene chemotype with 4% italdiones.

**Date :** July 13, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17G12-PTH13-1-DM

**Customer identification :** Helichrysum Italicum Organic - H9010617R

**Type :** Essential oil

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

**Analysis date :** 2017-07-13

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.	
3-Pentanone	0.84	696	0.08	0.12	877	0.76*	Aliphatic ketone
2-Methyl-3-pentanone	1.19	743	0.16	0.15	897	0.84	Aliphatic ketone
2,4-Dimethyl-3-pentanone	1.46	778	0.06	0.04	891	0.81	Aliphatic ketone
2-Methyl-2-heptene	1.59	795	0.10				Alkene
4-Methyl-3-hexanone	2.14	839	0.22	0.26	1013	1.31	Aliphatic ketone
Bornylene	2.96	902	0.05	[0.12]	877	0.76*	Monoterpene
$\alpha$ -Thujene	3.33	924	0.04	26.64	951	1.06*	Monoterpene
$\alpha$ -Pinene	3.48	932	26.48	[26.64]	951	1.06*	Monoterpene
$\alpha$ -Fenchene	3.70	946	0.53	0.56	987	1.22	Monoterpene
Camphene	3.72	947	0.16	0.22	997	1.26	Monoterpene
Thuja-2,4(10)-diene	3.81	952	0.02	0.02	1057	1.73*	Monoterpene
Sabinene	4.15	973	tr	[0.02]	1057	1.73*	Monoterpene
$\beta$ -Pinene	4.21	976	0.79	0.75	1041	1.58	Monoterpene
Myrcene	4.49	993	0.11	0.07	1112	2.26	Monoterpene
$\alpha$ -Phellandrene	4.77*	1008	0.12	0.03	1104	2.19	Monoterpene
6-Methyl-5-hepten-2-ol	4.77*	1008	[0.12]	0.09	1408	6.42	Aliphatic alcohol
$\alpha$ -Terpinene	4.96	1019	0.28	0.24	1121	2.35	Monoterpene
para-Cymene	5.16	1030	0.13	0.17	1202	3.39	Monoterpene
Limonene	5.20	1032	4.77	5.13	1140	2.59*	Monoterpene
$\beta$ -Phellandrene	5.22	1033	0.03	[5.13]	1140	2.59*	Monoterpene
1,8-Cineole	5.25	1035	0.35	[5.13]	1140	2.59*	Monoterp. ether
cis- $\beta$ -Ocimene	5.36	1041	0.01	0.58	1184	3.15*	Monoterpene
trans- $\beta$ -Ocimene	5.55	1051	0.06	0.05	1197	3.33	Monoterpene
$\gamma$ -Terpinene	5.67	1057	0.50	[0.58]	1184	3.15*	Monoterpene
Isobutyl angelate	5.74	1061	0.61	0.65	1233	3.80*	Aliphatic ester
Terpinolene	6.21	1087	0.21	0.20	1219	3.62	Monoterpene
para-Cymenene	6.46	1101	0.02	0.02	1379	5.96	Monoterpene
2,4-Dimethyl-heptane-3,5-dione	6.57	1104	0.07	0.05	1464	7.53	Aliphatic ketone
2-Methylbutyl 2-methylbutyrate	6.64	1107	0.15	[0.65]	1233	3.80*	Aliphatic ester
Linalool	6.71	1110	0.86	1.06	1485	8.02	Monoterp. alcohol
Nonanal	6.80	1113	0.06	1.38	1339	5.34*	Aliphatic aldehyde
endo-Fenchol	7.15	1126	0.05	5.15	1523	8.90*	Monoterp. alcohol
trans-Pinocarveol	7.62	1143	0.04	0.13	1562	10.14*	Monoterp. alcohol
Camphor	7.78	1149	0.05	0.06	1418	6.56	Monoterp. ketone
Isoamyl angelate	7.90	1153	1.39	[1.38]	1339	5.34*	Aliphatic ester
Borneol	8.63	1180	0.06	0.71	1610	11.89*	Monoterp. alcohol
Terpinen-4-ol	8.81	1187	0.31	[5.15]	1523	8.90*	Monoterp. alcohol
Dimethyl octanedione isomer	8.88	1189	0.21	0.17	1533	9.16	$\beta$ -diketone

4,6-Dimethyl-3,5-octanedione	8.94	1191	0.24	0.20	1541	9.37	β-diketone
α-Terpineol	9.47	1206	0.30	17.73	1633	12.74*	Monoterp. alcohol
Unknown (m/z = 81, 168 (64), 67 (59), 140 (49) 41 (46))	9.81	1214	0.05				
Unknown (m/z = 81, 168 (53), 67 (49), 140 (47), 41 (44))	10.44	1228	0.20				
Nerol	10.59	1231	0.62	1.49	1724	17.23*	Monoterp. alcohol
Neral	11.37	1249	0.05	0.04	1604	11.65	Monoterp. aldehyde
3-Methylamyl angelate	11.57	1253	0.07	0.07	1443	7.04	Aliphatic ester
Hexyl angelate	13.27	1291	0.36	[0.71]	1610	11.89*	Aliphatic ester
α-Ylangene	17.17	1353	0.27	0.23	1425	6.68	Sesquiterpene
2,6-Dimethyl-1,7-octadiene-3,6-diol	17.28	1355	0.17	0.13	1993	34.27	Monoterp. alcohol
Isoitalicene	17.78*	1362	2.45	2.50	1438	6.91	Sesquiterpene
α-Copaene	17.78*	1362	[2.45]	0.18	1428	6.72	Sesquiterpene
Neryl acetate	18.07	1367	7.88	8.42	1661	14.05*	Monoterp. ester
Geranyl acetate	19.51	1389	0.13	1.19	1695	15.75*	Monoterp. ester
Italicene	19.76	1392	3.73	3.95	1473	7.76	Sesquiterpene
β-Caryophyllene	20.75*	1406	5.50	[5.15]	1523	8.90*	Sesquiterpene
cis-α-Bergamotene	20.75*	1406	[5.50]	0.95	1510	8.61	Sesquiterpene
trans-α-Bergamotene	22.23	1424	0.74	1.01	1529	9.06*	Sesquiterpene
6,9-Guaiadiene	22.63	1428	0.11	[1.01]	1529	9.06*	Sesquiterpene
Italidione I	23.29	1436	1.76	3.42	1802	22.00*	β-diketone
α-Humulene	23.45	1438	0.23	0.35	1587	11.05	Sesquiterpene
allo-Aromadendrene	23.70	1441	0.06	[0.13]	1562	10.14*	Sesquiterpene
α-Acoradiene	24.24	1448	0.36	0.31	1580	10.83	Sesquiterpene
trans-β-Farnesene	24.59	1452	0.50	0.48	1618	12.19	Sesquiterpene
β-Acoradiene	24.86	1455	0.96	1.94	1596	11.38*	Sesquiterpene
Neryl propionate	25.22*	1459	1.51	[1.49]	1724	17.23*	Monoterp. ester
γ-Selinene	25.22*	1459	[1.51]	[1.94]	1596	11.38*	Sesquiterpene
Germacrene D	25.54	1463	0.17	[17.73]	1633	12.74*	Sesquiterpene
α-Amorphene	25.87	1467	0.25	[0.71]	1610	11.89*	Sesquiterpene
γ-Curcumene	26.43	1474	16.19	[17.73]	1633	12.74*	Sesquiterpene
β-Selinene	26.54*	1475	3.99	2.10	1635	12.80*	Sesquiterpene
Italidione isomer	26.54*	1475	[3.99]	0.87	1809	22.47	β-diketone
ar-Curcumene	26.77	1478	1.12	[1.19]	1695	15.75*	Sesquiterpene
Italidione II	27.06*	1482	5.26	[3.42]	1802	22.00*	β-diketone
α-Selinene	27.06*	1482	[5.26]	4.23	1643	13.10	Sesquiterpene
α-Murolene	27.74	1490	0.23	[17.73]	1633	12.74*	Sesquiterpene
δ-Amorphene	27.88	1491	0.29	[2.10]	1635	12.80*	Sesquiterpene
γ-Cadinene	28.77	1502	0.30	0.53	1671	14.53*	Sesquiterpene

β-Curcumene	28.96	1505	0.65	[8.42]	1661	14.05*	Sesquiterpene
Italidione II isomer	29.09	1507	0.35	0.34	1821	23.16	β-diketone
δ-Cadinene	29.43	1512	0.53	0.52	1675	14.72	Sesquiterpene
trans-γ-Bisabolene	30.27	1523	0.19	[0.53]	1671	14.53*	Sesquiterpene
β-Sesquiphellandrene	30.56	1527	0.08	[1.19]	1695	15.75*	Sesquiterpene
trans-α-Bisabolene	31.91	1546	0.07	0.06	1706	16.32	Sesquiterpene
Italicene ether	32.17	1550	0.08				Sesquiterp. ether
Italidione III	33.84	1573	0.36	[3.42]	1802	22.00*	β-diketone
Italidione III isomer	34.11	1577	0.11				β-diketone
Italidione III isomer II	34.20	1578	0.13				β-diketone
Italidione III isomer III	34.42	1581	0.13				β-diketone
Guaiol	35.36	1594	0.07	0.06	1998	34.47	Sesquiterp. alcohol
Italidione III isomer IV	35.77	1600	0.12				β-diketone
Rosifoliol analog?	35.87	1603	0.15	0.16	2017	35.30	Sesquiterp. alcohol
Neryl angelate?	36.99	1630	0.10				Monoterp. ester
β-Eudesmol	37.87	1652	0.06	0.06	2110	38.71	Sesquiterp. alcohol
Selin-11-en-4-α-ol	38.04	1656	0.13	0.13	2132	39.39	Sesquiterp. alcohol
Unknown dione (m/z = 98, 41 (50), 83 (46), 82 (43), 137 (43)... 202 (5), 220 (3), 238 (1), 281 (2))	42.84	1794	0.02				β-diketone
<b>Total identified</b>			<b>98.25%</b>	<b>98.35%</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

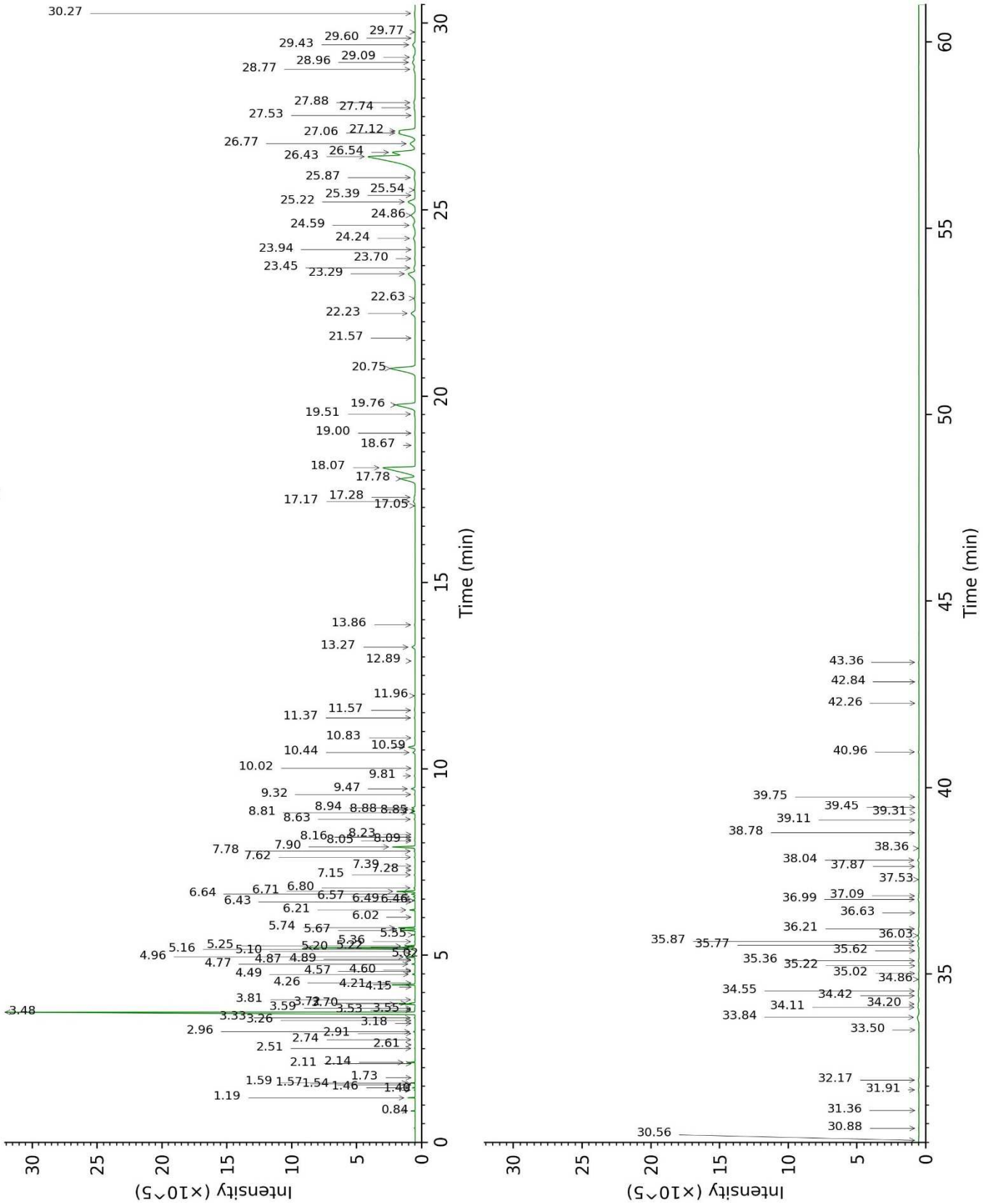
**Physical aspect :** Faintly yellow liquid

**Refractive index :** 1.4750 ± 0.0003 (20 °C)

#### CONCLUSION

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

17G12-PTH13-1-DM\_BP5



17G12-PTH13-1-DM\_WAX

