



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: H20105

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**ESSENTIAL OIL:** HELICHRYSUM ITALICUM  
**BOTANICAL NAME:** HELICHRYSUM ITALICUM  
**ORIGIN:** CROATIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF HELICHRYSUM ITALICUM OIL	%
$\alpha$ -PINENE	25.4
$\gamma$ -CURCUMENE	16.5
ITALIDIONE II + $\alpha$ -SELINENE	6.0
NERYL ACETATE	5.9
$\beta$ -CARYOPHYLLENE + cis- $\alpha$ -BERGAMOTENE	5.2
ITALICENE	3.7
LIMONENE	3.3
ISOITALICENE	2.6
ITALIDIONE I	2.4
$\beta$ -SELINENE	2.0
$\alpha$ r-CURCUMENE	1.6
ITALIDIONE ISOMER	1.5
$\gamma$ -SELINENE + NERYL PROPIONATE	1.4
ISOAMYL ANGELATE	1.3
$\beta$ -CURCUMENE	1.2

Comments from Robert Tisserand: Excellent "lemon tobacco" odor profile. This is an alpha-pinene chemotype, and has 9% italidiones. No red flags.

**Date :** July 12, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17G11-PTH3-1-DM

**Customer identification :** Helichrysum Italicum - Croatia - H2010575R

**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 :** 2017-07-12

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	1.20	743	0.05	0.05	897	0.84	Aliphatic ketone
2,4-Dimethyl-3-pentanone	1.46	778	0.04				Aliphatic ketone
4-Methyl-3-hexanone	2.14	839	0.16	0.18	1013	1.32	Aliphatic ketone
$\alpha$ -Thujene	3.33	924	0.02	25.72	951	1.06*	Monoterpene
$\alpha$ -Pinene	3.48	932	25.41	[25.72]	951	1.06*	Monoterpene
$\alpha$ -Fenchene	3.70	946	0.36	0.37	987	1.22	Monoterpene
Camphene	3.72	947	0.16	0.18	997	1.27	Monoterpene
$\beta$ -Pinene	4.21	976	0.52	0.50	1041	1.59	Monoterpene
Myrcene	4.49*	993	0.08	0.18	1121	2.35*	Monoterpene
<i>trans</i> -Dehydroxylinalool oxide	4.49*	993	[0.08]	3.56	1140	2.59*	Monoterp. ether
6-Methyl-5-hepten-2-one	4.60	999	0.01	0.02	1271	4.35	Aliphatic ketone
$\alpha$ -Phellandrene	4.77*	1008	0.11	0.05	1113	2.27	Monoterpene
$\Delta^3$ -Carene	4.77*	1008	[0.11]	0.03	1105	2.19	Monoterpene
$\alpha$ -Terpinene	4.96	1019	0.21	[0.18]	1121	2.35*	Monoterpene
para-Cymene	5.15	1030	0.12	0.15	1203	3.40	Monoterpene
Limonene	5.20	1032	3.31	[3.56]	1140	2.59*	Monoterpene
1,8-Cineole	5.25	1035	0.27	[3.56]	1140	2.59*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.37	1041	0.01	0.44	1184	3.16*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.55	1051	0.05	0.04	1197	3.34	Monoterpene
Isobutyl angelate	5.67	1058	0.44	0.62	1233	3.81*	Aliphatic ester
$\gamma$ -Terpinene	5.74	1061	0.44	[0.44]	1184	3.16*	Monoterpene
Terpinolene	6.21	1087	0.17	0.16	1220	3.63	Monoterpene
para-Cymenene	6.47	1101	0.01	0.02	1379	5.97	Monoterpene
2,4-Dimethyl-heptane-3,5-dione	6.49	1102	0.04	0.03	1457	7.36	Aliphatic ketone
2-Methylbutyl 2-methylbutyrate	6.64	1107	0.16	[0.62]	1233	3.81*	Aliphatic ester
Linalool	6.71	1110	0.58	0.70	1485	8.03	Monoterp. alcohol
Nonanal	6.80	1113	0.06	1.27	1339	5.35*	Aliphatic aldehyde
endo-Fenchol	7.16	1126	0.05	4.98	1524	8.93*	Monoterp. alcohol
<i>trans</i> -Pinocarveol	7.63	1143	0.04	0.12	1563	10.18*	Monoterp. alcohol
Camphor	7.79	1149	0.04	0.07	1418	6.57	Monoterp. ketone
Isoamyl angelate	7.90	1153	1.29	[1.27]	1339	5.35*	Aliphatic ester
Borneol	8.65	1181	0.06	0.73	1611	11.92*	Monoterp. alcohol
Terpinen-4-ol	8.82	1187	0.21	[4.98]	1524	8.93*	Monoterp. alcohol
Dimethyl octanedione isomer	8.90	1190	0.22	1.05	1531	9.09*	$\beta$ -diketone
4,6-Dimethyl-3,5-octanedione	8.95	1192	0.23	0.18	1542	9.41	$\beta$ -diketone
$\alpha$ -Terpineol	9.48	1207	0.22	18.06	1635	12.78*	Monoterp. alcohol

Unknown (m/z = 81, 168 (64), 67 (59), 140 (49) 41 (46))	9.83	1215	0.05				
Unknown (m/z = 81, 168 (53), 67 (49), 140 (47), 41 (44))	10.45	1228	0.24				
Nerol	10.60	1232	0.41	1.11	1724	17.28*	Monoterp. alcohol
Neral	11.38	1249	0.09	1.75	1597	11.41*	Monoterp. aldehyde
cis-Isogeraniol	11.63*	1254	0.09	0.05	1737	17.90	Monoterp. alcohol
3-Methylamyl angelate	11.63*	1254	[0.09]	0.03	1444	7.07	Aliphatic ester
Hexyl angelate	13.28	1291	0.42	[0.73]	1611	11.92*	Aliphatic ester
α-Ylangene	17.19	1353	0.27	0.40	1427	6.71*	Sesquiterpene
2,6-Dimethyl-1,7-octadiene-3,6-diol	17.30	1355	0.17	0.17	1995	34.35	Monoterp. alcohol
Isoitalicene	17.79*	1362	2.52	2.58	1439	6.93	Sesquiterpene
α-Copaene	17.79*	1362	[2.52]	[0.40]	1427	6.71*	Sesquiterpene
Neryl acetate	18.07	1367	5.94	6.39	1662	14.06*	Monoterp. ester
Geranyl acetate	19.53	1389	0.13	1.77	1696	15.82*	Monoterp. ester
Italicene	19.78	1393	3.71	4.00	1474	7.79	Sesquiterpene
β-Caryophyllene	20.77*	1406	5.24	[4.98]	1524	8.93*	Sesquiterpene
cis-α-Bergamotene	20.77*	1406	[5.24]	0.90	1511	8.64	Sesquiterpene
trans-α-Bergamotene	22.25	1424	0.71	[1.05]	1531	9.09*	Sesquiterpene
6,9-Guaiadiene	22.65	1429	0.12	[1.05]	1531	9.09*	Sesquiterpene
Italidione I	23.36	1437	2.38	5.51	1803	22.03*	β-diketone
α-Humulene	23.47	1439	0.22	0.35	1588	11.10	Sesquiterpene
allo-Aromadendrene	23.72	1442	0.07	[0.12]	1563	10.18*	Sesquiterpene
α-Acoradiene	24.27	1448	0.37	0.40	1582	10.86	Sesquiterpene
trans-β-Farnesene	24.63	1452	0.56	[0.73]	1611	11.92*	Sesquiterpene
β-Acoradiene	24.89	1456	0.71	[1.75]	1597	11.41*	Sesquiterpene
γ-Selinene	25.24*	1460	1.35	[1.75]	1597	11.41*	Sesquiterpene
Neryl propionate	25.24*	1460	[1.35]	[1.11]	1724	17.28*	Monoterp. ester
Germacrene D	25.58	1464	0.24	0.33	1619	12.22*	Sesquiterpene
α-Amorphene	25.89	1468	0.28	[0.33]	1619	12.22*	Sesquiterpene
γ-Curcumene	26.46	1474	16.45	[18.06]	1635	12.78*	Sesquiterpene
Italidione isomer	26.58*	1476	4.76	1.48	1811	22.55	β-diketone
β-Selinene	26.58*	1476	[4.76]	2.04	1636	12.85*	Sesquiterpene
ar-Curcumene	26.84	1479	1.57	[1.77]	1696	15.82*	Sesquiterpene
Italidione II	27.12*	1482	5.96	[5.51]	1803	22.03*	β-diketone
α-Selinene	27.12*	1482	[5.96]	4.11	1643	13.13	Sesquiterpene
α-Murolene	27.78	1490	0.32	0.21	1652	13.56	Sesquiterpene
δ-Amorphene	27.93	1492	0.30	[2.04]	1636	12.85*	Sesquiterpene
γ-Cadinene	28.80	1503	0.44	0.76	1672	14.59*	Sesquiterpene
β-Curcumene	29.02	1506	1.18	[6.39]	1662	14.06*	Sesquiterpene
Italidione II isomer	29.14	1508	0.35	0.52	1822	23.25	β-diketone

δ-Cadinene	29.47	1512	0.76	0.72	1676	14.79	Sesquiterpene
<i>trans</i> -γ-Bisabolene	30.25	1523	0.24	[0.76]	1672	14.59*	Sesquiterpene
β-Sesquiphellandrene	30.65	1529	0.20	[1.77]	1696	15.82*	Sesquiterpene
<i>trans</i> -α-Bisabolene	31.94	1547	0.08	0.09	1707	16.38	Sesquiterpene
Italicene ether	32.20	1550	0.12				Sesquiterp. ether
Italidione III	33.89	1574	0.79	[5.51]	1803	22.03*	β-diketone
Italidione III isomer	34.16	1578	0.28				β-diketone
Italidione III isomer II	34.25	1579	0.27				β-diketone
Italidione III isomer III	34.45	1582	0.23				β-diketone
Guaiol	35.39	1595	0.14	0.15	2005	34.77	Sesquiterp. alcohol
Italidione III isomer IV	35.81	1601	0.37				β-diketone
Rosifoliol analog?	35.92	1604	0.35	0.36	2018	35.35	Sesquiterp. alcohol
10-epi-γ-Eudesmol	36.06	1607	0.18	0.15	1999	34.54	Sesquiterp. alcohol
Neryl angelate?	37.02	1631	0.19				Monoterp. ester
β-Eudesmol	37.91	1652	0.14	0.20	2111	38.74	Sesquiterp. alcohol
Selin-11-en-4-α-ol	38.08	1657	0.28	0.28	2133	39.42	Sesquiterp. alcohol
Unknown dione (m/z = 98, 41 (50), 83 (46), 82 (43), 137 (43)... 202 (5), 220 (3), 238 (1), 281 (2))	42.87	1795	0.11				β-diketone
<b>Total identified</b>			<b>97.10%</b>	<b>96.27%</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

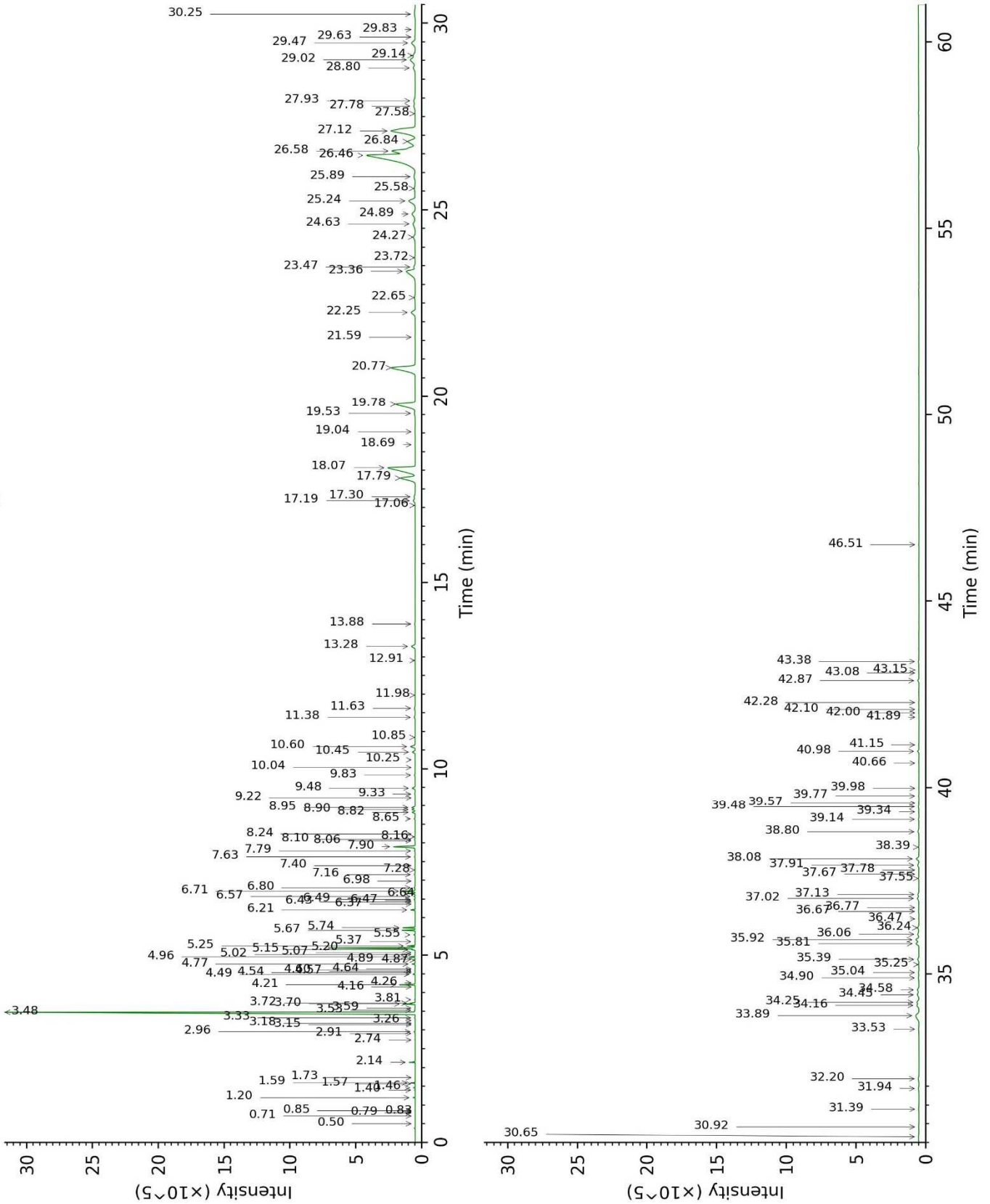
**Physical aspect :** Faintly yellow liquid

**Refractive index :** 1.4770 ± 0.0003 (20 °C)

#### CONCLUSION

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

17G11-PTH3-1-DM\_BP5



17G11-PTH3-1-DM\_WAX

