

# ANALYSIS Inula Essential Oil

Laboratoire  
**PhytoChemia**





#### SAMPLE IDENTIFICATION

**Internal code :** 17B16-F5E9-1-DM

**Customer identification :** Inula - Lot #HE1G12665

**Type :** Essential oil

**Source :** *Inula graveolens*

**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).

• **Identifications** double-checked by GC-MS

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

**Analysis date :** 2017-02-20



Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174



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Selin-4,11-diene	24.78	1454	0.19				Sesquiterpene
$\beta$ -Selinene	25.81	1467	0.76	[0,10]	1628	14.54	Sesquiterpene
Prenyl benzoate analog?	27.68	1489	0.92				Synthetic
$\delta$ -Selinene	26.17	1471	0.13				Sesquiterpene
$\alpha$ -Selinene	26.41	1474	0.29	0.07	1639	15.35	Sesquiterpene
$\gamma$ -Cadinene	28.22	1496	0.26	0.26	1658	16.37	Sesquiterpene
$\delta$ -Cadinene	28.89	1504	0.13	0.12	1664	16.70	Sesquiterpene
Prenyl salicylate analog?	31.77	1544	0.48				Synthetic
Caryophyllene oxide	33.51	1569	4.72	4.87	1840	28.39	Sesquiterp. ether
(Z)-Hex-3-en-1-yl benzoate	34.21	1576	0.57	0.68	2003	37.36	Phenolic ester
Prenyl salicylate	34.80*	1587	2.78				Synthetic
Neryl isovalerate	34.80*	1587	[2.78]				Monoterp. ester
Selin-11-en-4- $\alpha$ -ol analog I	35.54	1597	0.22				Sesquiterp. alcohol
Selin-6-en-4 $\alpha$ -ol?	36.28	1613	0.34	0.46	2047	38.78	Sesquiterp. alcohol
Caryophylla-4(12),8(13)-dien-5 $\alpha$ -ol	36.46	1617	0.46	0.35	2163	42.11	Sesquiterp. alcohol
$\gamma$ -Cadinol	37.12	1633	1.10	1.33	2062	39.25	Sesquiterp. alcohol
14-Hydroxy-9-epi- $\beta$ -caryophyllene	37.65*	1646	1.50	0.66	2214	43.41	Sesquiterp. alcohol
Selin-11-en-4- $\alpha$ -ol	37.65*	1646	[1.50]	0.85	2125	41.11	Sesquiterp. alcohol
14-Hydroxy- $\beta$ -caryophyllene?	38.32	1660	0.59	0.76	2254	44.34	Sesquiterp. alcohol
Germacre-4(15),5,10(14)-trien-1- $\alpha$ -ol	38.64	1670	0.44				Sesquiterp. alcohol
Neryl caproate?	39.25	1685	1.21	1.18	1920	33.64	Monoterp. ester
$\beta$ -Costol	41.68	1758	0.62	0.51	2441	48.41	Sesquiterp. alcohol
Phenylethyl octanoate	44.12	1840	0.11				Phenolic ester
Phenylethyl benzoate	44.28	1846	0.48	0.13	2579	51.14	Phenolic ester
Unknown (m/z = 219, 91 (59), 105 (40), 79 (35)... 234 (27))	44.44	1852	1.03				
Bornyl ester	44.52	1855	0.60				Monoterp. ester
Unknown (m/z = 91, 79 (85), 95 (62), 105 (61), 93 (61), 147 (58), 77 (57)... 234 (21))	44.78	1864	0.84	1.02	2990	58.41	
Unknown (m/z = 91, 79 (90), 93 (76), 121 (73), 41 (63), 77 (61)... 234 (19))	45.93	1907	25.52	23.73	3000	58.57	
Unknown (m/z = 118, 117 (52), 91 (21), 119 (11))	47.41	1966	0.55				
Unknown (m/z = 43, 71 (77), 162 (65), 149 (64), 145 (61), 161 (28), 133 (20), 219	48.72	2020	0.77				

## IDENTIFIED COMPOUNDS



Identification	Column: BPS			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Acetic acid	0.52	654	0.08				Aliphatic acid
Isobutyric acid	1.43	774	0.11				Aliphatic acid
Santolinatriene	2.93	900	0.04	0.04	975	1.33	Monoterpene
$\alpha$ -Pinene	3.40	928	0.02	0.02	948	1.20	Monoterpene
Camphene	3.68	944	0.56	0.55	996	1.51	Monoterpene
$\beta$ -Pinene	4.17	973	0.12	0.11	1039	1.88	Monoterpene
Dehydro-1,8-cineole	4.45	990	0.06	0.05	1130	2.83	Monoterpene
para-Cymene	5.07	1025	0.05	0.05	1207	3.89	Monoterpene
Limonene	5.12	1028	0.22	0.20	1139	2.96	Monoterpene
1,8-Cineole	5.21	1032	0.01	0.01	1145	3.04	Monoterp. ether
Santolin alcohol	5.25	1035	0.02	0.02	1364	6.31	Monoterp. alcohol
$\gamma$ -Terpinene	5.67	1058	0.01	0.01	1188	3.60	Monoterpene
Terpinolene	6.14	1083	0.02	0.02	1221	4.10	Monoterpene
para-Cymenene	6.32	1093	0.02	0.03	1366	6.35	Monoterpene
Linalool	6.56	1104	0.04	0.04	1495	9.25	Monoterp. alcohol
Camphor	7.67	1145	0.05	0.05	1420	7.42	Monoterp. ketone
Camphene hydrate	7.85	1152	0.07	0.23	1518	10.15*	Monoterp. alcohol
cis-Chrysanthemol	8.26	1166	0.14	0.10	1624	14.54*	Monoterp. alcohol
Borneol	8.51	1175	13.73	14.38	1617	14.16	Monoterp. alcohol
Terpinen-4-ol	8.65	1181	0.05	0.08	1542	11.04	Monoterp. alcohol
para-Cymen-8-ol	9.05	1195	0.06	0.12	1775	23.75	Monoterp. alcohol
$\alpha$ -Terpineol	9.21	1201	0.35	1.11	1618	14.26	Monoterp. alcohol
$\beta$ -Phellandren-8-ol	9.31	1203	0.08	0.07	1712	19.47	Monoterp. alcohol
Bornyl formate	10.23	1223	0.08	0.02	1463	8.48	Monoterp. ester
Nerol	10.34	1226	0.09	0.11	1724	20.26	Monoterp. alcohol
Thymol methyl ether	10.43	1228	0.23	0.23	1518	10.15*	Monoterp. ether
Bornyl acetate	12.90	1283	14.82	15.88	1504	9.61	Monoterp. ester
Thymol	13.91	1303	0.11				Monoterp. alcohol
(3Z)-Hexenyl tiglate	15.28	1324	0.06				Aliphatic ester
Neryl acetate	17.62	1360	0.09	0.08	1665	16.75	Monoterp. ester
Bornyl propionate?	18.13	1368	0.06				Monoterp. ester
2,2-Dimethylchroman?	18.63	1375	0.03				Chromane
Isocaryophyllene	19.29	1385	0.07	0.16	1506	9.65	Sesquiterpene
$\beta$ -Caryophyllene	20.37	1401	4.41	4.58	1514	9.99	Sesquiterpene
Bornyl isobutyrate	20.67	1405	0.03				Monoterp. ester
Isoamyl benzoate?	23.02	1433	0.15				Phenolic ester
$\alpha$ -Humulene	23.13	1434	0.06	0.05	1595	13.03	Sesquiterpene
Prenyl benzoate?	23.83	1443	0.93				Synthetic
4,5-diepi-Aristolochene	24.29	1448	0.32	0.31	1588	12.77	Sesquiterpene

(16,...)			
<b>Total identified</b>	<b>56.35%</b>	<b>50.65%</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** : Yellow liquid

**Refractive index** : 1.4950 ± 0.0003 (20°C)

#### CONCLUSION

Current knowledge on *Inula* is insufficient to reach a conclusion.

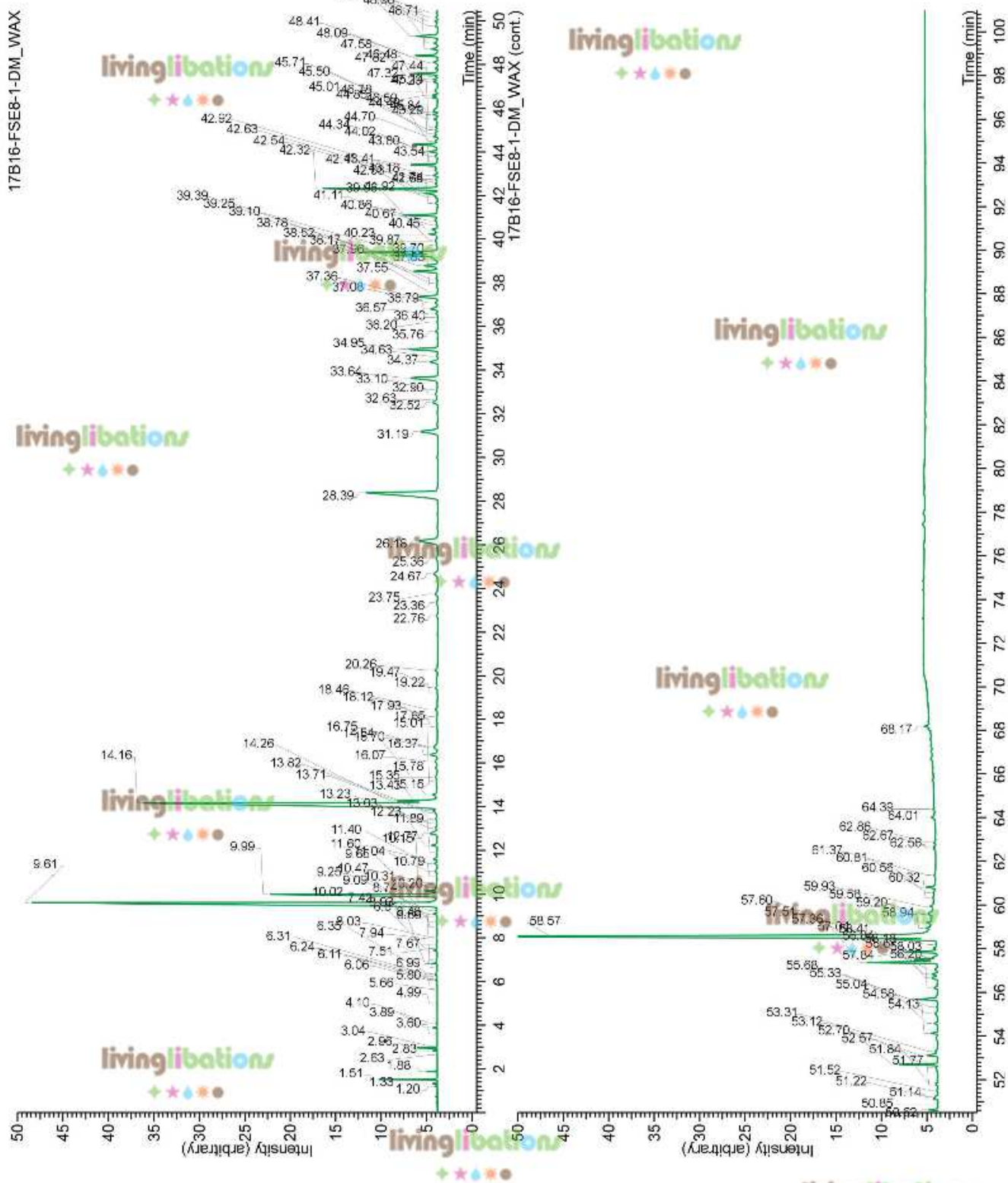




Essential oil, *Inula graveolens*  
Internal Code: 17B16-FSE8-1-DM

Customer Identification:  
Inula - Lot #HE1G12665

Report prepared for  
Flowers Shining Everywhere Inc.



Laboratoire  
**PhytoChemia**

Plus que des analyses... des conseils