

# Analysis Sweet Fern Essential Oil

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Date : August 9, 2017

#### SAMPLE IDENTIFICATION

**Internal code :** 17G28-FSE14-1-DM

**Customer identification :** Sweet Fern - Canada - HEB-COPCAN08F

**Type :** Essential oil

**Source :** *Comptonia peregrina*

**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 :** 2017-07-31



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.	
cis-Hex-3-en-1-ol	2.52	868	0.05	0.08	1340	5.27	Aliphatic alcohol
trans-Hex-2-en-1-ol	2.68	880	0.08	0.05	1366	5.66*	Aliphatic alcohol
Hexanol	2.73	885	0.11	0.12	1292	4.58	Aliphatic alcohol
Styrene	2.92	899	0.04	1.52	1205	3.37*	Phenylpropanoid
Tricyclene	3.25	919	0.01	0.01	924	0.92	Monoterpene
α-Thujene	3.34	924	0.18	0.38	954	1.05	Monoterpene
α-Pinene	3.45	930	2.23	2.01	946	1.02	Monoterpene
Camphene	3.73	948	0.07	0.06	1000	1.25	Monoterpene
Sabinene	4.16	973	0.06	0.05	1054	1.72	Monoterpene
β-Pinene	4.23	977	0.51	0.50	1040	1.57	Monoterpene
Benzaldehyde	4.24	978	0.07	0.10	1436	6.74	Simple phenolic
Myrcene	4.52	995	4.66	4.54	1103	2.26	Monoterpene
α-Phellandrene	4.78*	1009	0.10	0.06	1097	2.18	Monoterpene
Δ <sup>3</sup> -Carene	4.78*	1009	[0.10]	0.03	1082	2.01	Monoterpene
cis-Hex-3-en-1-yl acetate	4.90	1016	0.05	0.04	1261	4.14	Aliphatic ester
α-Terpinene	4.97	1020	0.49	0.57	1124	2.34	Monoterpene
Hexyl acetate	5.04	1023	0.05	0.04	1218	3.54	Aliphatic ester
para-Cymene	5.19	1031	1.55	[1.52]	1205	3.37*	Monoterpene
Limonene	5.22	1033	0.75	10.83	1147	2.64*	Monoterpene
1,8-Cineole	5.29	1037	9.63	[10.83]	1147	2.64*	Monoterp. ether
cis-β-Ocimene	5.39	1042	1.30	3.98	1188	3.15*	Monoterpene
trans-β-Ocimene	5.57	1052	1.77	1.59	1201	3.32	Monoterpene
γ-Terpinene	5.77	1063	2.69	[3.98]	1188	3.15*	Monoterpene
Terpinolene	6.23	1089	0.46	0.43	1222	3.60	Monoterpene
para-Cymenene	6.45	1100	0.07	[0.05]	1366	5.66*	Monoterpene
Linalool	6.78*	1112	4.13	4.15	1488	7.92*	Monoterp. alcohol
Nonanal	6.86	1115	0.06	0.04	1319	4.97	Aliphatic aldehyde
δ-Terpineol	8.69	1182	0.07	1.85	1602	11.32*	Monoterp. alcohol
Terpinen-4-ol	8.88	1189	1.14	34.52	1539	9.11*	Monoterp. alcohol
α-Terpineol	9.56	1208	1.01	1.07	1621	11.99*	Monoterp. alcohol
Benzylacetone	11.53	1252	0.14	0.14	1745	17.86	Simple phenolic
Vitispirane	12.47	1273	0.26				Terpenic ether
Bornyl acetate	13.00	1285	0.14	0.17	1508	8.40	Monoterp. ester
2-Undecanone	13.70*	1300	0.40	0.37	1567	10.04	Aliphatic ketone
trans-Pinocarvyl acetate	13.70*	1300	[0.40]	[34.52]	1539	9.11*	Monoterp. ester
Myrtenyl acetate	15.32	1325	1.25	[1.85]	1602	11.32*	Monoterp. ester
δ-Elementene	15.60	1329	0.03	0.03	1418	6.46	Sesquiterpene
α-Ylangene	17.21	1354	0.03	0.04	1424	6.56	Sesquiterpene
α-Copaene	17.82	1363	0.27	0.23	1444	6.91	Sesquiterpene
β-Elementene	19.08	1382	0.80	[34.52]	1539	9.11*	Sesquiterpene
α-Gurjunene	19.71	1392	0.14	0.13	1454	7.14	Sesquiterpene

$\beta$ -Caryophyllene	21.09	1410	31.64	[34.52]	1539	9.11*	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	22.05	1421	0.35	[34.52]	1539	9.11*	Sesquiterpene
Aromadendrene	22.32	1425	0.14	[34.52]	1539	9.11*	Sesquiterpene
$\alpha$ -Humulene	23.62	1440	2.51	2.46	1589	10.86	Sesquiterpene
allo-Aromadendrene	23.83	1443	0.12	0.11	1561	9.83	Sesquiterpene
Unknown (m/z = 105, 161 (58), 91 (41), 93 (41)... 204 (21))	24.84	1455	0.21				Sesquiterpene
Unknown (m/z = 189, 105 (80), 133 (77), 91 (76), 204 (51))	25.30	1460	0.45	0.42	1616	11.82	Sesquiterpene
$\gamma$ -Murolene	25.51*	1463	0.65	[1.07]	1621	11.99*	Sesquiterpene
Unknown (m/z = 119, 93 (75), 121 (74), 105 (59), 91 (54), 41 (50)... 204 (40))	25.51*	1463	[0.65]				Sesquiterpene
$\delta$ -Selinene	26.28	1472	0.48				Sesquiterpene
$\beta$ -Selinene	26.49	1475	3.17	2.98	1637	12.57	Sesquiterpene
$\alpha$ -Curcumene	26.81	1479	0.44	0.52	1689	15.02	Sesquiterpene
Eremophilene	27.13*	1483	2.82	1.96	1647	12.90	Sesquiterpene
$\alpha$ -Selinene	27.13*	1483	[2.82]	0.87	1650	13.02	Sesquiterpene
$\gamma$ -Cadinene	27.84	1491	0.54	0.47	1657	13.40	Sesquiterpene
$\beta$ -Curcumene	27.98	1493	0.10	0.14	1669	13.98	Sesquiterpene
$\beta$ -Bisabolene	28.20	1495	0.05	0.05	1665	13.78	Sesquiterpene
$\delta$ -Cadinene	28.93	1505	1.87	1.88	1678	14.47	Sesquiterpene
<i>trans</i> -Calamenene	29.03	1506	0.15	0.10	1743	17.74	Sesquiterpene
$\alpha$ -Cadinene	29.22	1509	0.52	1.22	1701	15.57*	Sesquiterpene
<i>trans</i> -Cadinene-1,4-diene	29.35	1511	0.45	[1.22]	1701	15.57*	Sesquiterpene
Selina-3,7(11)-diene	29.63	1514	2.50	2.59	1684	14.75	Sesquiterpene
Germacrene B	30.64	1529	0.73	0.80	1729	17.04	Sesquiterpene
$\alpha$ -Elemol	32.22	1551	0.92	2.69	1995	33.83*	Sesquiterp. alcohol
Caryophyllene oxide	33.99	1575	1.57	1.27	1856	24.79	Sesquiterp. ether
( <i>E</i> )-Nerolidol	34.10	1577	2.40	[2.69]	1995	33.83*	Sesquiterp. alcohol
Spathulenol	34.35	1580	0.30	0.13	2018	34.84	Sesquiterp. alcohol
Humulene epoxide II	34.95	1589	0.17	0.10	1907	28.40	Sesquiterp. ether
1,10-diepi-Cubenol	36.33	1614	0.12	0.09	1959	32.06	Sesquiterp. alcohol
$\tau$ -Cadinol	37.65	1646	0.37	0.38	2073	37.25	Sesquiterp. alcohol
$\alpha$ -Cadinol	38.00	1655	0.30	0.28	2117	38.54	Sesquiterp. alcohol
Linalool	6.78*	1112	[4.13]	[4.15]	1488	7.92*	Monoterp. alcohol
<b>Total identified</b>	<b>92.23%</b>		<b>90.82%</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



Essential oil, *Comptonia peregrina*  
Internal Code: 17G28-FSE11-1-DM

Customer Identification:  
Sweet Fern - Canada - HEB-COPCAN08F

Report prepared for  
Flowers Shining Everywhere Inc.

#### OTHER DATA

**Physical aspect:** Faintly yellow liquid

**Refractive index:**  $1.4873 \pm 0.0003$  (20 °C)

#### CONCLUSION

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



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17G28-FSE11-1-DM\_BP5

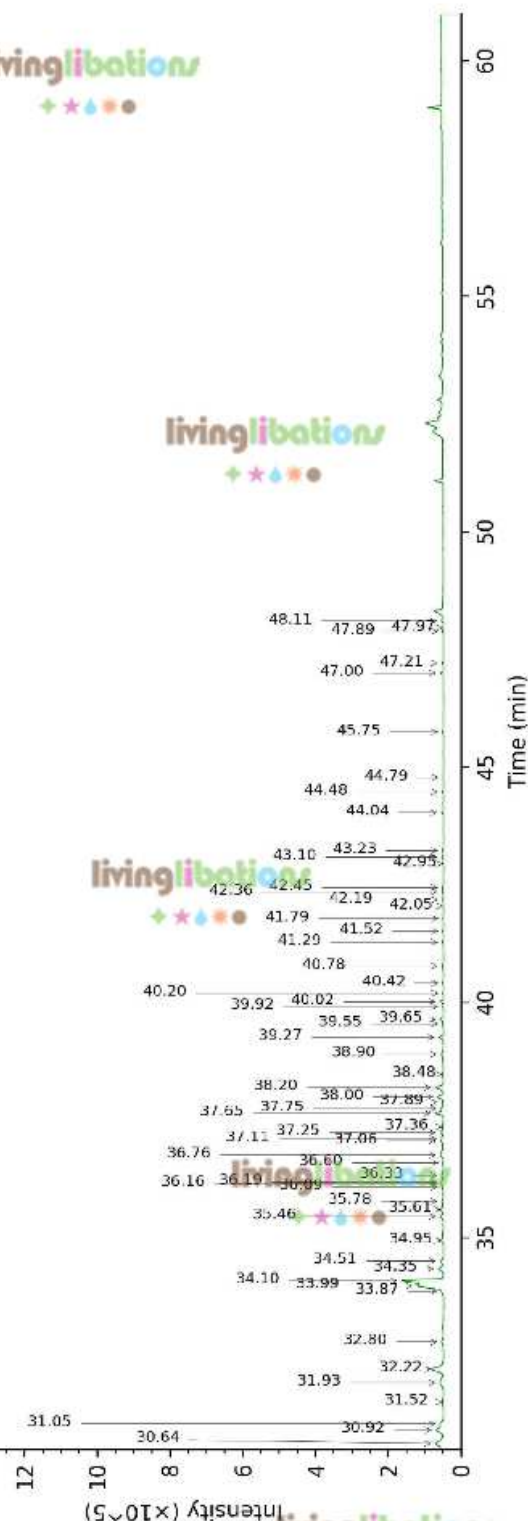


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