

# Analysis Ginger Root Essential Oil

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Date : December 15, 2016

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#### SAMPLE IDENTIFICATION

**Internal code :** 16L05-FSE26-1-DM

**Customer identification :** Ginger - Lot#111816

**Type :** Essential oil

**Source :** Zingiber officinale

**Customer :** Flowers Shining Everywhere Inc.

#### ANALYSIS

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**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 :** 2016-12-13

Checked and approved by :

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Alexis St-Gelais

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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.	
2,4-Pentadienal?	2.12	836	0.78	0.69	1077	1.66	Aliphatic aldehyde
Tricyclene	3.19	914	0.04	0.02	932	0.81	Monoterpene
$\alpha$ -Pinene	3.38	926	0.22	0.30	952	0.88	Monoterpene
Camphene	3.67	943	0.98	1.33	1004	1.10	Monoterpene
$\beta$ -Pinene	4.16	973	0.03	0.04	1042	1.39	Monoterpene
Myrcene	4.44	990	0.13	0.22	1117	2.00*	Monoterpene
$\alpha$ -Phellandrene	4.86	1014	0.06	[0.22]	1117	2.00*	Monoterpene
Octanal	4.96	1020	0.51	0.56	1247	3.58	Aliphatic aldehyde
para-Cymene	5.11	1028	0.03	0.01	1206	3.04	Monoterpene
Limonene	5.13	1029	0.19	0.94	1145	2.33*	Monoterpene
$\beta$ -Phellandrene	5.16	1031	0.11	[0.94]	1145	2.33*	Monoterpene
1,8-Cineole	5.18	1032	0.44	[0.94]	1145	2.33*	Monoterp. ether
Terpinolene	6.16	1085	0.02	0.02	1226	3.30	Monoterpene
Rose furan	6.39	1097	0.06	0.09	1340	4.89	Monoterp. ether
Linalool	6.71	1109	0.16	0.15	1483	7.23	Monoterp. alcohol
Camphor	7.71	1147	0.02	0.03	1419	6.03	Monoterp. ketone
Borneol	8.68	1183	0.42	0.73	1607	10.52*	Monoterp. alcohol
$\alpha$ -Terpineol	9.49	1206	0.17	0.17	1618	10.84	Monoterp. alcohol
Decanal	9.81	1213	1.41	1.77	1443	6.50	Aliphatic aldehyde
Neral	11.12	1243	0.42	[0.73]	1607	10.52*	Monoterp. aldehyde
Geraniol	11.99	1263	0.41	0.58	1771	18.04	Monoterp. alcohol
Geranial	12.65	1277	0.70	1.45	1645	11.91*	Monoterp. aldehyde
2-Undecanone	13.80	1300	0.09	0.06	1575	9.56	Aliphatic ketone
$\alpha$ -Copaene	17.55	1358	0.08	0.05	1437	6.37	Sesquiterpene
$\beta$ -Elemene	19.29	1384	0.09	0.12	1537	8.39	Sesquiterpene
Geranyl acetate	19.96	1395	0.08	0.14	1687	13.72	Monoterp. ester
$\beta$ -Caryophyllene	21.06	1408	0.08	0.14	1543	8.58*	Sesquiterpene
trans- $\alpha$ -Bergamotene	21.68	1416	0.11	[0.14]	1543	8.58*	Sesquiterpene
9-epi- $\beta$ -Caryophyllene	24.40	1448	0.13	2.72	1675	13.24	Sesquiterpene
$\beta$ -Selinene	26.11	1469	0.05	0.04	1636	11.48	Sesquiterpene
$\alpha$ -Curcumene	26.68	1475	4.49	4.79	1712	14.82	Sesquiterpene
$\alpha$ -Selinene	26.97	1479	0.43	[1.45]	1645	11.91*	Sesquiterpene
$\alpha$ -Zingiberene	27.91	1490	4.48	5.93	1670	13.01*	Sesquiterpene
(E,E)- $\alpha$ -Farnesene	28.86	1502	2.02	7.64	1707	14.61*	Sesquiterpene
$\delta$ -Cadinene	29.08	1505	1.03	[5.93]	1670	13.01*	Sesquiterpene
trans- $\gamma$ -Bisabolene	29.28	1508	0.07	0.15	1697	14.21	Sesquiterpene
$\beta$ -Sesquiphellandrene	30.29	1522	3.90	[7.64]	1707	14.61*	Sesquiterpene
$\alpha$ -Elemol	31.92	1544	0.03	0.06	2000	32.40	Sesquiterp. alcohol
cis-Sesquisabinene hydrate	33.93	1572	0.08				Sesquiterp. alcohol
trans-Sesquisabinene hydrate	34.97	1586	0.03				Sesquiterp. alcohol



(cis?)-Zingiberenol	36.51	1617	0.34				Sesquiterp. alcohol
(trans?)-Zingiberenol	37.39	1638	0.22	0.21	2028	34.01	Sesquiterp. alcohol
β-Eudesmol	37.92	1651	0.21	0.25	2115	37.38	Sesquiterp. alcohol
Zingerone	38.72	1671	4.29	4.90	2653	49.33	Phenylbutanoid
Linoleic acid	52.28	2175	0.62	0.44	3114	56.83	Fatty acid
[6]-Shogaol	55.34	2322	6.96	7.77	3398	60.95	Gingerol derivative
[7]-Paradol	55.86	2348	0.16	0.30	3266	59.09	Gingerol derivative
[6]-Gingerol	57.45	2429	10.34				Gingerol derivative
Methyl [6]-gingerol	57.71	2442	0.64				Gingerol derivative
[8]-Shogaol	59.41	2531	6.68	6.24	3633	64.12	Gingerol derivative
[9]-Paradol	59.46	2535	[6.68]	0.34	3506	62.44	Gingerol derivative
Diacetoxy-[6]-gingerdiol	59.88	2557	0.18				Gingerol derivative
[8]-Gingerol	61.35	2638	2.09				Gingerol derivative
[10]-Shogaol	63.29	2749	5.57	4.85	3877	67.23	Gingerol derivative
[11]-Paradol	64.14	2798	0.56				Gingerol derivative
[10]-Gingerol	65.06	2854	0.34				Gingerol derivative
1-Dehydro-[8]-gingerdione	66.75	2956	0.39				Gingerol derivative
[12]-Shogaol	67.05	2975	0.23				Gingerol derivative
[13]-Paradol	68.87	3092	0.50	0.88	3841	66.78	Gingerol derivative
1-Dehydro-[10]-gingerdione	69.34	3122	4.22				Gingerol derivative
[15]-Paradol	70.67	3210	0.60	0.45	4053	69.35	Gingerol derivative
1-Dehydro-[12]-gingerdione	72.47	3320	0.79				Gingerol derivative
<b>Total identified</b>			<b>70.51%</b>	<b>57.57%</b>			

\*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

Note: no correction factor was applied

#### OTHER DATA

**Physical aspect :** Bright orange liquid

**Refractive index :** 1.5045 ± 0.0003 (20 °C)

#### CONCLUSION

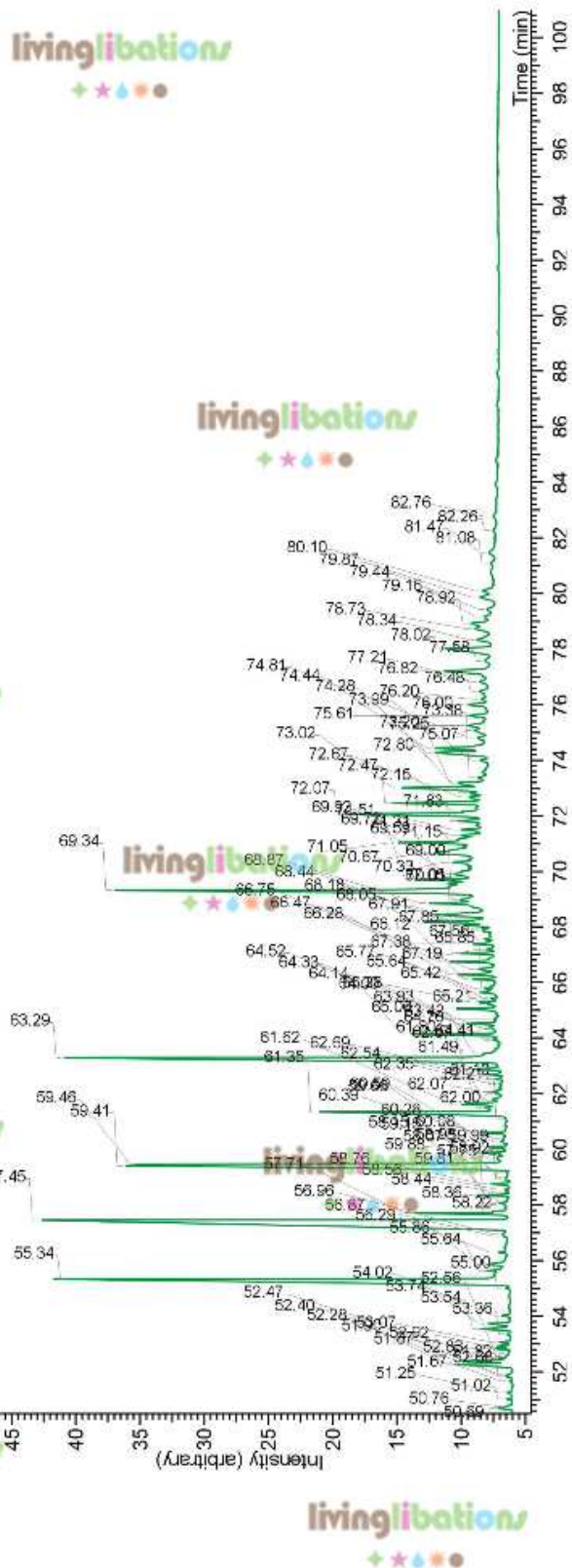
No adulterant, contaminant or diluent were detected using this method. Please note that CO2 extracts often contain more unidentifiable compounds than essential oils.

Essential oil, *Zingiber officinale*  
Internal Code: 16L05-FSE26-1-DM

Customer Identification:  
Ginger - Lot#111816

Report prepared for  
Flowers Shining Everywhere Inc.

16L05-FSE26-1-DM\_BP5



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