

Date : September 20, 2017

SAMPLE IDENTIFICATION

Internal code : 17I07-ORA22-1-DM

Customer identification : Sweet Ginger

Type : Essential oil

Source : *Zingiber officinale*

Customer : Organic Aromas

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 : 2017-09-18

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.	
Toluene	1.31	758	0.01	1.59	938	1.19*	Simple phenolic
Hexanal	1.70	804	0.24	0.65	1004	1.61	Aliphatic aldehyde
2-Heptanone	2.92	897	0.07	0.71	1111	2.62*	Aliphatic ketone
2-Heptanol	3.17	912	0.04	0.05	1268	4.77	Aliphatic alcohol
Tricyclene	3.22	915	0.12	0.10	913	1.08	Monoterpene
α -Pinene	3.42	926	1.58	[1.59]	938	1.19*	Monoterpene
Camphene	3.72	944	5.81	5.36	989	1.49	Monoterpene
Sabinene	4.13	969	0.05	0.05	1055	2.03	Monoterpene
β -Pinene	4.20	972	0.22	0.21	1035	1.86	Monoterpene
Myrcene	4.47	989	0.60	[0.71]	1111	2.62*	Monoterpene
Δ^3 -Carene	4.75*	1004	0.18	0.03	1090	2.36	Monoterpene
α -Phellandrene	4.75*	1004	[0.18]	0.11	1104	2.53	Monoterpene
Octanal	4.87	1011	0.11	0.11	1230	4.21	Aliphatic aldehyde
α -Terpinene	4.94	1015	0.01	[0.71]	1111	2.62*	Monoterpene
para-Cymene	5.14	1026	0.04	0.09	1208	3.87*	Monoterpene
Limonene	5.17	1027	1.01	6.17	1143	3.03*	Monoterpene
β -Phellandrene	5.21	1030	2.87	[6.17]	1143	3.03*	Monoterpene
1,8-Cineole	5.23	1031	2.35	[6.17]	1143	3.03*	Monoterp. ether
cis- β -Ocimene	5.35	1037	tr	0.02	1183	3.59*	Monoterpene
trans- β -Ocimene	5.53	1047	tr	[0.09]	1208	3.87*	Monoterpene
γ -Terpinene	5.72	1057	0.03	[0.02]	1183	3.59*	Monoterpene
Terpinolene	6.19	1083	0.16	0.13	1223	4.10	Monoterpene
Rose furan	6.41	1095	0.14	0.13	1343	5.94	Monoterp. ether
Linalool	6.68	1106	0.26	0.23	1492	9.11	Monoterp. alcohol
Nonanal	6.79	1109	0.03	0.04	1329	5.71	Aliphatic aldehyde
Camphor	7.76	1145	0.09	0.12	1416	7.30	Monoterp. ketone
Camphene hydrate	8.03	1155	0.05	1.15	1519	10.06*	Monoterp. alcohol
Rosefuran epoxide	8.49	1171	0.10	0.07	1539	10.81	Monoterp. ether
Borneol	8.63	1176	0.80	1.61	1616	14.00*	Monoterp. alcohol
Terpinen-4-ol	8.80	1182	0.08	0.33	1531	10.50*	Monoterp. alcohol
α -Terpineol	9.46	1203	0.44	[1.61]	1616	14.00*	Monoterp. alcohol
Decanal	9.79	1210	0.16	0.20	1433	7.68	Aliphatic aldehyde
Citronellol	10.81	1233	0.10	0.15	1704	18.73	Monoterp. alcohol
Neral	11.16	1240	0.07	0.77	1595	12.92*	Monoterp. aldehyde
Geraniol	11.84	1255	0.18	0.14	1794	24.75	Monoterp. alcohol
Geranial	12.67	1274	0.12	6.13	1661	16.39*	Monoterp. aldehyde
Bornyl acetate	12.90	1279	0.10	0.13	1515	9.92	Monoterp. ester
2-Undecanone	13.82	1299	0.18	0.19	1564	11.75	Aliphatic ketone
para-Vinylguaicol	15.30	1321	0.11				Simple phenolic
α -Cubebene	15.97	1331	0.02	0.03	1404	6.99	Sesquiterpene
Cycloisativene	17.01	1347	0.20	0.41	1412	7.20*	Sesquiterpene

α -Ylangene	17.12	1348	0.07	[0.41]	1412	7.20*	Sesquiterpene
α -Copaene	17.70	1357	0.49	0.46	1428	7.55	Sesquiterpene
β -Elemene	18.94	1376	0.86	[1.15]	1519	10.06*	Sesquiterpene
Geranyl acetate	19.34	1382	0.39	0.38	1687	17.75	Monoterp. ester
Sesquithujene	20.09	1393	0.27	[1.15]	1519	10.06*	Sesquiterpene
β -Caryophyllene	20.58	1400	0.08	[1.15]	1519	10.06*	Sesquiterpene
γ -Elemene	21.86	1415	0.18	0.18	1579	12.33	Sesquiterpene
<i>trans</i> - α -Bergamotene	22.15	1419	0.13	[0.33]	1531	10.50*	Sesquiterpene
α -Humulene	23.37	1433	0.03	[0.77]	1595	12.92*	Sesquiterpene
Sesquisabinene	23.64	1437	0.27	[0.77]	1595	12.92*	Sesquiterpene
9-epi- β -Caryophyllene	24.06	1442	0.30	0.29	1662	16.46	Sesquiterpene
<i>trans</i> - β -Farnesene	24.52	1447	0.38	[1.61]	1616	14.00*	Sesquiterpene
γ -Gurjunene	25.12	1454	0.26	0.34	1607	13.52*	Sesquiterpene
γ -Muurolene	25.52	1459	0.16	[0.34]	1607	13.52*	Sesquiterpene
Germacrene D	25.64	1460	1.20	1.37	1614	13.86*	Sesquiterpene
α -Amorphene	25.90	1463	0.11	[1.37]	1614	13.86*	Sesquiterpene
β -Selinene	26.25	1468	0.24	[1.61]	1616	14.00*	Sesquiterpene
α -Curcumene	26.82	1474	10.02	22.63	1699	18.41*	Sesquiterpene
α -Selinene	27.18	1479	2.15	3.91	1623	14.34	Sesquiterpene
α -Zingiberene	28.32	1492	31.77	32.46	1658	16.22	Sesquiterpene
γ -Cadinene	28.62	1496	0.31	0.17	1668	16.76	Sesquiterpene
β -Bisabolene	29.13	1503	7.56	[6.13]	1661	16.39*	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.32*	1505	3.73	1.93	1700	18.48	Sesquiterpene
δ -Cadinene	29.32*	1505	[3.73]	0.41	1672	16.98	Sesquiterpene
β -Sesquiphellandrene	30.56	1523	12.23	[22.63]	1699	18.41*	Sesquiterpene
Germacrene B	32.09	1544	0.49	0.48	1717	19.62	Sesquiterpene
α -Elemol	32.63	1552	0.40	0.43	1985	36.48	Sesquiterp. alcohol
<i>cis</i> -Sesquisabinene hydrate	33.13	1559	0.14				Sesquiterp. alcohol
(<i>E</i>)-Nerolidol	33.86	1569	0.41	0.42	1979	36.18	Sesquiterp. alcohol
<i>trans</i> -Sesquisabinene hydrate	35.28	1589	0.20				Sesquiterp. alcohol
10-epi- γ -Eudesmol	36.09	1602	0.08	0.07	1974	35.95	Sesquiterp. alcohol
(<i>cis</i> ?) -Zingiberenol	36.47	1612	0.41	0.24	2011	37.51	Sesquiterp. alcohol
γ -Eudesmol	36.71	1617	0.20	0.11	2063	39.15	Sesquiterp. alcohol
(<i>trans</i> ?) -Zingiberenol	37.33	1633	0.19	0.40	2023	37.90	Sesquiterp. alcohol
β -Eudesmol	37.87	1646	0.21	0.26	2101	40.36	Sesquiterp. alcohol
Zingerone	38.61	1664	0.07				Sesquiterp. ketone
Cedr-8-en-13-ol	39.54	1687	0.29	0.32	2256	44.27	Sesquiterp. alcohol
Unknown (m/z = 69, 41 (95), 109 (88), 43 (83), 95 (56), 177 (54), 55 (50)...))	43.69	1817	0.25	0.27	2632	52.00	
Total identified			95.01%	94.47%			

*: 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-orange liquid

Refractive index : 1.4895 ± 0.0003 (20 °C)

CONCLUSION

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

17107-ORA22-1-DM_BP5



