

Date : March 30, 2017

SAMPLE IDENTIFICATION

Internal code : 17C27-GUR4-1-DM

Customer identification : Orange - RII9421-02

Type : Essential oil

Source : *Citrus sinensis*

Customer : HealthLand LLC.

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 : 2017-03-29

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.	
α -Pinene	3.41	928	0.49	0.49	943	1.16	Monoterpene
Sabinene	4.12	971	0.38	0.37	1056	1.98	Monoterpene
β -Pinene	4.18	974	0.02	0.02	1038	1.81	Monoterpene
Myrcene	4.46	991	1.85	1.87	1115	2.56	Monoterpene
α -Phellandrene	4.74*	1007	0.15	0.04	1109	2.47	Monoterpene
Δ 3-Carene	4.74*	1007	[0.15]	0.11	1086	2.28	Monoterpene
Octanal	4.84	1012	0.29	0.28	1231	4.13	Aliphatic aldehyde
Limonene	5.28*	1036	93.15	94.63	1153	3.05	Monoterpene
1,8-Cineole	5.28*	1036	[93.15]	0.31	1154	3.06	Monoterp. ether
<i>cis</i> - β -Ocimene	5.35	1040	0.01	tr	1188	3.51	Monoterpene
<i>trans</i> - β -Ocimene	5.52	1049	0.02	0.02	1201	3.69	Monoterpene
γ -Terpinene	5.70	1059	tr	0.01	1186	3.49	Monoterpene
<i>cis</i> -Sabinene hydrate	6.00	1076	0.01	0.01	1406	6.82	Monoterp. alcohol
Isoterpinolene	6.09	1081	tr	tr	1218	3.93	Monoterpene
Octanol	6.13	1083	0.01	0.02	1503	9.16	Aliphatic alcohol
Terpinolene	6.17	1085	0.02	0.02	1222	4.00	Monoterpene
Linalool	6.60	1106	0.36	0.37	1493	8.91	Monoterp. alcohol
Nonanal	6.74	1111	0.05	0.05	1334	5.68	Aliphatic aldehyde
<i>cis</i> -Limonene oxide	7.29	1131	tr				Monoterp. ether
<i>trans</i> -Limonene oxide	7.41	1135	0.01	0.01	1383	6.45	Monoterp. ether
Citronellal	7.90	1153	0.05	0.04	1415	7.03	Monoterp. aldehyde
α -Terpineol	9.27	1202	0.04	0.04	1622	13.71	Monoterp. alcohol
Decanal	9.70	1212	0.24	0.22	1434	7.51	Aliphatic aldehyde
Neral	11.02	1241	0.06	0.05	1598	12.61	Monoterp. aldehyde
Geranial	12.50	1274	0.09	0.09	1647	14.98	Monoterp. aldehyde
Undecanal	14.55	1313	0.01	0.01	1538	10.41	Aliphatic aldehyde
α -Copaene	17.54	1359	0.02	0.03	1427	7.33	Sesquiterpene
β -Cubebene	18.51	1373	0.02	0.03	1470	8.37	Sesquiterpene
β -Caryophyllene	20.38	1401	0.01	0.03	1516	9.56	Sesquiterpene
Dodecanal	21.28	1412	0.03	0.03	1643	14.77	Aliphatic aldehyde
Germacrene D	25.32	1461	0.02	0.02	1618	13.47	Sesquiterpene
α -Selinene	26.32	1473	0.04	0.03	1627	13.91	Sesquiterpene
Valencene	27.46	1486	0.01				Sesquiterpene
δ -Cadinene	29.01	1506	0.03	0.04	1670	16.19	Sesquiterpene
β -Sinensal	39.57	1693	0.03	0.03	2125	40.48	Sesquiterp. aldehyde
α -Sinensal	41.51	1752	0.02	0.02	2224	43.07	Sesquiterp. aldehyde
Nootkatone	42.74	1791	0.01				Sesquiterp. ketone
Tangeretin	69.82	3157	0.26				Flavonoid
Nobiletin	72.63	3332	0.53				Flavonoid

Heptamethoxyflavone isomer?	72.87	3345	0.56		Flavonoid
Total identified			98.9%	99.34%	

*: 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 : 1.4720 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 3140:2011 (CITRUS SINENSIS)

Compound	Min. Content	Max. Content	Observed Content	Complies?
α-Pinene	0.4	0.8	0.5	Yes
β-Pinene	0.02	0.15	0.02	Yes
Sabinene	0.2	0.8	0.4	Yes
Myrcene	1.5	3.5	1.9	Yes
Limonene	93.0	96.0	94.6	Yes
Octanal	0.1	0.4	0.3	Yes
Nonanal	0.01	0.06	0.05	Yes
Decanal	0.1	0.7	0.2	Yes
Linalool	0.15	0.7	0.4	Yes
Neral	0.03	0.1	0.06	Yes
Valencene	0.01	0.4	0.01	Yes
Geranial	0.05	0.2	0.09	Yes
β-Sinensal	0.01	0.06	0.03	Yes
Refractive index	1.470	1.476	1.4720	Yes

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The oil comply with the ISO norm.



