

Date : March 28, 2017

SAMPLE IDENTIFICATION

Internal code : 17C27-GUR3-1-DM

Customer identification : Grapefruit - Lot #1608069

Type : Essential oil

Source : *Citrus x paradisi*

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 : 2017-03-28

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-Thujene	3.30	922	tr	0.01	954	1.20	Monoterpene
α-Pinene	3.41	928	0.45	0.44	945	1.16	Monoterpene
Sabinene	4.12	971	0.31	0.30	1057	1.98	Monoterpene
β-Pinene	4.18	974	0.04	0.04	1039	1.81	Monoterpene
Myrcene	4.46	991	1.75	1.73	1116	2.56	Monoterpene
α-Phellandrene	4.74	1007	0.03	0.02	1109	2.47	Monoterpene
Octanal	4.84	1012	0.31	0.31	1231	4.13	Aliphatic aldehyde
Limonene	5.28*	1036	94.15	94.47	1153	3.06	Monoterpene
para-Cymene	5.28*	1036	[94.15]	0.01	1208	3.79	Monoterpene
1,8-Cineole	5.28*	1036	[94.15]	0.28	1154	3.07	Monoterp. ether
cis-β-Ocimene	5.34	1040	0.01	0.02	1188	3.52*	Monoterpene
trans-β-Ocimene	5.52	1049	0.09	0.09	1201	3.69	Monoterpene
γ-Terpinene	5.70	1059	0.02	[0.02]	1188	3.52*	Monoterpene
cis-Sabinene hydrate	6.00	1076	tr	0.03	1406	6.81	Monoterp. alcohol
Octanol	6.12	1083	0.03	0.03	1503	9.15	Aliphatic alcohol
Terpinolene	6.17	1085	0.01	0.01	1222	4.00	Monoterpene
Linalool	6.60	1106	0.08	0.08	1493	8.90	Monoterp. alcohol
Nonanal	6.74	1111	0.05	0.04	1335	5.68	Aliphatic aldehyde
cis-Limonene oxide	7.29	1131	0.01	0.01	1370	6.24	Monoterp. ether
trans-Limonene oxide	7.41	1135	0.01	0.01	1383	6.45	Monoterp. ether
Citronellal	7.90	1153	0.05	0.04	1421	7.18	Monoterp. aldehyde
α-Terpineol	9.27	1202	0.08	0.07	1622	13.72	Monoterp. alcohol
Decanal	9.70	1212	0.30	0.28	1435	7.52	Aliphatic aldehyde
Neral	11.01	1241	0.08	0.08	1598	12.62	Monoterp. aldehyde
Geranial	12.49	1274	0.10	0.10	1647	14.99	Monoterp. aldehyde
Undecanal	14.54	1313	0.01	0.01	1554	10.95	Aliphatic aldehyde
α-Copaene	17.54	1359	0.08	0.08	1427	7.34	Sesquiterpene
β-Cubebene	18.51	1373	0.03	0.04	1470	8.38	Sesquiterpene
β-Elemene	18.72	1376	0.02	0.02	1520	9.72	Sesquiterpene
Geranyl acetate	19.15	1383	0.06	0.06	1689	17.19	Monoterp. ester
β-Caryophyllene	20.37	1401	0.25	0.26	1517	9.60	Sesquiterpene
Dodecanal	21.26	1412	0.02	0.02	1643	14.77	Aliphatic aldehyde
α-Humulene	23.12	1434	0.04	0.03	1577	11.85	Sesquiterpene
Germacrene D	25.26	1460	0.02	0.02	1618	13.49	Sesquiterpene
δ-Cadinene	29.00	1506	0.06	0.08	1670	16.20	Sesquiterpene
Nootkatone	42.74	1791	0.09	0.08	2348	45.86	Sesquiterp. ketone
7-Methoxy-8-(2-formyl-methylpropyl)-coumarin	53.48	2234	0.06	0.06	3408	64.28	Coumarin
Auraptene	60.95	2619	0.17	0.11	3728	68.79	Coumarin
Tangeretin	69.80	3155	0.08				Flavonoid

Heptamethoxyflavone isomer?	72.59	3330	0.13		Flavonoid
Hexamethoxyflavone isomer?	72.80	3341	0.07		Flavonoid
Total identified	99.15%			99.37%	

*: 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 : Orange liquid

Refractive index : 1.4725 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 3053:2005 (CITRUS X PARADISI)

Compound	Min. Content	Max. Content	Observed %	Complies?
α-Pinene	0.2	0.6	0.5	Yes
Sabinene	0.1	0.6	0.3	Yes
β-Pinene	0.05	0.2	0.04	No
Myrcene	1.5	2.5	1.8	Yes
Limonene	92	96	94.5	Yes
Octanal	0.2	0.8	0.3	Yes
Nonanal	0.04	0.1	0.05	Yes
Decanal	0.1	0.6	0.3	Yes
Neral	0.02	0.04	0.08	No
β-Caryophyllene	0.2	0.5	0.3	Yes
Nootkatone	0.01	0.8	0.09	Yes
Refractive index	1.474	1.479	1.4725	No

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The oil does not comply with the ISO norm.



