GC-MS Profiling Analysis
Prepared for Jade Bloom, Inc

Date: February 15, 2018
Sample: Grapefruit
Type: Essential Oil
Source: *Citrus paradisi*
Batch: 020218-21

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetone	0.01		Aliphatic ketone
Heptanal	tr	tr	Aliphatic aldehyde
α-Thujene	tr	tr	Monoterpene
α-Pinene	0.52	0.53	Monoterpene
Camphene	tr	tr	Monoterpene
Sabinene	0.41*	0.36	Monoterpene
β-Pinene	[0.41]*	0.05	Monoterpene
Myrcene	1.91	1.94	Monoterpene
α-Phellandrene	0.03	0.03	Monoterpene
Octanal	0.46	0.45	Aliphatic aldehyde
Δ3-Carene	0.01	tr	Monoterpene
β-Phellandrene	91.50*	92.50*	Monoterpene
Limonene	[91.50]*	[92.50]*	Monoterpene
1,8-Cineole	[91.50]*	[92.50]*	Monoterpenic ether
(*Z*)-β-Ocimene	[91.50]	0.01	Monoterpene
(*E*)-β-Ocimene	0.09	0.10	Monoterpene
γ-Terpinene	0.01	0.01	Monoterpene
cis-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Octanol	0.02	0.03	Aliphatic alcohol
Terpinolene	0.01	0.01	Monoterpene
Linalool	0.10	0.11	Monoterpenic alcohol
Nonanal	0.07	0.07	Aliphatic aldehyde
Heptyl acetate	tr	tr	Aliphatic ester
(*E*)-4,8-Dimethylnona-1,3,7-triene	0.01	0.01	Terpene derivative
trans-para-Mentha-2,8-dien-1-ol	0.01	0.01	Monoterpenic alcohol
cis-Limonene oxide	0.01	0.01	Monoterpenic ether
cis-para-Mentha-2,8-dien-1-ol	0.01	0.06*	Monoterpenic alcohol
Citronellal	0.05	0.05	Monoterpenic aldehyde
Terpinen-4-ol	tr	0.01	Monoterpenic alcohol
α-Terpineol	0.05	0.12*	Monoterpenic alcohol
Decanal	0.37	0.35	Aliphatic aldehyde
Octyl acetate	0.02	0.02	Aliphatic ester
trans-Carveol	0.01	0.01	Monoterpenic alcohol
Citronellol	tr	0.01	Monoterpenic alcohol
Neral	0.07*	[0.06]*	Monoterpenic aldehyde
Carvone	[0.07]*	0.02*	Monoterpenic ketone
Geraniol	tr	0.01	Monoterpenic alcohol
Isopiperitenone	tr	0.01	Monoterpenic ketone
Geranial	0.11	0.10	Monoterpenic aldehyde
Unknown	0.01		Oxygenated monoterpene
cis-para-Mentha-2,8-diene-1-hydroperoxide	0.01*		Monoterpenic peroxide
Undecanal	[0.01]*	0.01	Aliphatic aldehyde
α-Terpinyl acetate	0.01	0.01	Monoterpenic ester
Limonene hydroperoxide IV	0.01		Monoterpenic peroxide
Neryl acetate	0.01	0.01	Monoterpenic ester
α-Copaene	0.09	0.09	Sesquiterpene
Geranyl acetate	0.10*	0.04	Monoterpenic ester

β-Cubebene	[0.10]*	0.08	Sesquiterpene
Decanoic acid	0.02*		Aliphatic acid
β-Elemene	[0.02]*	0.34*	Sesquiterpene
Dodecanal	0.03*	0.02	Aliphatic aldehyde
Limonen-10-yl acetate	[0.03]*	0.01	Monoterpenic ester
β-Caryophyllene	0.33	[0.34]*	Sesquiterpene
α-Humulene	0.04	0.04	Sesquiterpene
(*E*)-β-Farnesene	0.03	0.03	Sesquiterpene
Germacrene D	0.08	[0.12]*	Sesquiterpene
Bicyclogermacrene	0.03	0.03	Sesquiterpene
α-Muurolene	0.02	[0.02]*	Sesquiterpene
Cubebol	0.01	0.01	Sesquiterpenic alcohol
δ-Cadinene	0.11	0.10	Sesquiterpene
α-Elemol	0.02	0.02	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.01	0.01	Sesquiterpenic alcohol
Germacrene D-4-ol	0.01	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01*	tr	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.01]*	tr	Sesquiterpenic ether
β-Sinensal	0.04	0.04	Sesquiterpenic aldehyde
(2*E*,6*E*)-Farnesal	0.02	0.01	Sesquiterpenic aldehyde
Myristic acid	0.05	0.06	Aliphatic acid
Nootkatone	0.04	0.04	Sesquiterpenic ketone
Palmitic acid	0.11	0.12	Aliphatic acid
Bergapten	0.02		Furanocoumarin
Osthole	0.07		Coumarin
Linoleic acid	0.07	0.05	Aliphatic acid
Oleic acid	0.11	0.22*	Aliphatic acid
cis-Vaccenic acid?	0.11	0.07	Aliphatic acid
Stearic acid	0.20	[0.22]*	Aliphatic acid
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	0.04		Coumarin
Isoauraptene	0.15		Coumarin
Meranzin	0.29		Coumarin
Auraptenol	0.03		Coumarin
Meranzin hydrate	0.01		Coumarin
Unknown	0.01		Coumarin
Auraptene	0.67		Coumarin
Epoxyaurapten	0.25		Coumarin
Tangeretin	0.03		Flavonoid
(2*E*,6*E*)-Farnesol		0.01	Sesquiterpenic alcohol
Total identified	**99.17%**	**98.51%**	

*: Two or more compounds are coeluting on this column

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

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

PHYSICOCHEMICAL DATA

Physical aspect: Orange liquid
Refractive index: 1.4748 ± 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	0.4	Yes
β-Pinene	0.05	0.2	0.05	Yes
Myrcene	1.5	2.5	1.9	Yes
Limonene	92	96	92	Yes
Octanal	0.2	0.8	0.5	Yes
Nonanal	0.04	0.1	0.07	Yes
Decanal	0.1	0.6	0.4	Yes
Neral	0.02	0.04	0.05	No
β-Caryophyllene	0.2	0.5	0.3	Yes
Nootkatone	0.01	0.8	0.04	Yes
Refractive index	1.474	1.479	1.4748	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil marginally does not comply with the ISO standard.