

GC-MS Profiling Analysis Prepared for Jade Bloom, Inc

Date: May 1, 2018

Sample: Bergamot

Type: Essential Oil

Source: *Citrus aurantium var. bergamia*

Batch: 041844695

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Ethanol	0.03	0.02	Aliphatic alcohol
(3Z)-Hexenol	tr	tr	Aliphatic alcohol
Hexanol	tr	tr	Aliphatic alcohol
Tricyclene	tr	tr	Monoterpene
α -Thujene	0.21	0.21	Monoterpene
α -Pinene	0.83	0.84	Monoterpene
Camphene	0.02*	0.02	Monoterpene
α -Fenchene	[0.02]*	tr	Monoterpene
β -Pinene	5.54*	4.78	Monoterpene
Sabinene	[5.54]*	0.83	Monoterpene
Myrcene	0.85	0.86	Monoterpene
Pseudolimonene	0.02*	tr	Monoterpene
α -Phellandrene	[0.02]*	0.02	Monoterpene
Octanal	0.04	0.03	Aliphatic aldehyde
Δ 3-Carene	0.03	tr	Monoterpene
α -Terpinene	0.08	0.08	Monoterpene
ortho-Cymene	0.02	0.41*	Simple phenolic
para-Cymene	35.61	[0.41]*	Monoterpene
Limonene	[35.61]*	35.54	Monoterpene
1,8-Cineole	[35.61]*	0.18*	Monoterpenic ether
β -Phellandrene	[35.61]*	[0.18]*	Monoterpene
(Z)- β -Ocimene	0.03	5.98*	Monoterpene
(E)- β -Ocimene	0.20	0.19	Monoterpene
γ -Terpinene	5.87	[5.98]*	Monoterpene
cis-Sabinene hydrate	0.03	0.04*	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	0.01	Monoterpenic alcohol
Terpinolene	0.24*	0.25	Monoterpene
trans-Linalool oxide (fur.)	[0.24]*	[0.04]*	Monoterpenic alcohol
trans-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Linalool	12.44*	12.69	Monoterpenic alcohol
Nonanal	[12.44]*	0.02	Aliphatic aldehyde
cis-Limonene oxide	tr	tr	Monoterpenic ether
trans-Limonene oxide	0.02	tr	Monoterpenic ether
Camphor	tr	tr	Monoterpenic ketone
Citronellal	0.01	0.01	Monoterpenic aldehyde
Terpinen-4-ol	0.06	0.04	Monoterpenic alcohol
α -Terpineol	0.22	0.26*	Monoterpenic alcohol
γ -Terpineol	0.02	tr	Monoterpenic alcohol
Decanal	0.05	0.05	Aliphatic aldehyde
Octyl acetate	0.13	0.12	Aliphatic ester
Nerol	0.16*	0.11	Monoterpenic alcohol
Citronellol	[0.16]*	0.01	Monoterpenic alcohol
Neral	0.16	0.16	Monoterpenic aldehyde
Linalyl acetate	30.48*	30.51*	Monoterpenic ester
Geraniol	[30.48]*	0.04	Monoterpenic alcohol
Unknown	tr		Unknown
Geranial	0.25	0.25	Monoterpenic aldehyde
Bornyl acetate	0.02	0.03	Monoterpenic ester

Unknown	tr		Unknown
<i>cis</i> -para-Mentha-2,8-diene-1-hydroperoxide	0.01		Monoterpenic peroxide
<i>trans</i> -para-Mentha-2,8-diene-1-hydroperoxide	tr		Monoterpenic peroxide
para-Mentha-1,8-diene-4-hydroperoxide	0.02		Monoterpenic peroxide
Linalyl propionate	0.03	0.03	Monoterpenic ester
α -Terpinyl acetate	0.16	0.20	Monoterpenic ester
Unknown	0.01		Monoterpenic ester
Neryl acetate	0.49*	0.53	Monoterpenic ester
Hodiendiol derivative III	[0.49]*		Oxygenated monoterpene
Geranyl acetate	0.36	0.37	Monoterpenic ester
Dodecanal	0.01	0.01	Aliphatic aldehyde
β -Caryophyllene	0.46*	[0.73]	Sesquiterpene
<i>cis</i> - α -Bergamotene	[0.46]*	[30.51]*	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.34	0.73	Sesquiterpene
α -Humulene	0.04	0.03	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.08	0.09	Sesquiterpene
Germacrene D	0.06	[0.26]*	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.04	0.04	Sesquiterpene
Hodiendiol derivative II	0.04		Oxygenated monoterpene
β -Bisabolene	0.49	0.48	Sesquiterpene
(<i>E</i>)-Nerolidol	0.03	0.03	Sesquiterpenic alcohol
α -Bisabolol	0.03	0.03	Sesquiterpenic alcohol
Nootkatone	0.08	0.08	Sesquiterpenic ketone
Citropten	0.18		Furanocoumarin
Unknown	0.01		Unknown
Bergapten	0.18		Furanocoumarin
Linoleic acid	0.11	0.06	Aliphatic acid
Oleic acid	0.15	0.23*	Aliphatic acid
Stearic acid	0.14	[0.23]*	Aliphatic acid
Isopimpinellin	tr		Furanocoumarin
Total identified	97.24%	97.57%	

*: 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: Bright yellow/green liquid

Refractive index: 1.4673 ± 0.0003 (20 °C)

COMPLIANCE WITH NF T 75-215:2009 (CITRUS AURANTIUM L. SSP. BERGAMIA, ITALY)

Compound	Min. Content	Max. Content	Observed Content	Complies?
β-Pinene	5.5	9.5	4.8	No
Limonene	30	45	35.5	Yes
γ-Terpinene	6	10	6.0	Yes
Linalool	3	15	12.5	Yes
Linalyl acetate	22	36	30.5	Yes
Geranial	0.25	0.50	0.25	Yes
β-Bisabolene	0.30	0.55	0.49	Yes
Refractive index	1.465	1.470	1.4673	Yes

CONCLUSION

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



Jade Bloom

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