

GC-MS Profiling Analysis Prepared for Jade Bloom, Inc

Date: March 9, 2018

Sample: Fir Needle Siberian

Type: Essential Oil

Source: *Abies sibirica*

Batch: 130632

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Toluene	0.01	0.12*	Simple phenolic
Hexanal	tr	tr	Aliphatic aldehyde
Hexanol	tr	0.01	Aliphatic alcohol
Santene	2.74	2.75*	Monoterpene
Unknown	0.02	[0.12]*	Normonoterpene
Bornylene	tr	[2.75]*	Monoterpene
Tricyclene	2.33	2.33	Monoterpene
α -Thujene	0.08	[0.12]*	Monoterpene
α -Pinene	12.24	12.25	Monoterpene
Camphene	23.25*	23.25	Monoterpene
α -Fenchene	[23.25]*	0.03	Monoterpene
Thuja-2,4(10)-diene	0.03	0.02*	Monoterpene
meta-Cymene	0.03	0.63*	Monoterpene
β -Pinene	2.15*	2.15	Monoterpene
Sabinene	[2.15]*	[0.02]*	Monoterpene
Unknown	0.01		Monoterpene
Myrcene	0.58	[0.63]*	Monoterpene
α -Phellandrene	0.19	0.19	Monoterpene
Δ 3-Carene	12.15	12.22	Monoterpene
α -Terpinene	0.12	0.11	Monoterpene
para-Cymene	0.06	0.08	Monoterpene
Limonene	8.11*	4.57	Monoterpene
1,8-Cineole	[8.11]*	3.62*	Monoterpenic ether
β -Phellandrene	[8.11]*	[3.62]*	Monoterpene
(Z)- β -Ocimene	0.01	0.01	Monoterpene
(E)- β -Ocimene	tr	tr	Monoterpene
γ -Terpinene	0.16	0.17	Monoterpene
cis-Sabinene hydrate	tr	tr	Monoterpenic alcohol
meta-Cymenene	0.01	0.01	Monoterpene
Fenchone	0.03	tr	Aliphatic alcohol
Isoterpinolene	1.24*	0.05	Monoterpene
para-Cymenene	[1.24]*	0.01	Monoterpene
Terpinolene	[1.24]*	1.18	Monoterpene
γ -Campholenal	0.01	0.01	Aliphatic alcohol
Unknown	0.01	0.01	Unknown
Unknown	0.04*		Unknown
Linalool	[0.04]*	0.04	Monoterpenic alcohol
α -Thujone	tr	0.01	Monoterpenic ketone
endo-Fenchol	0.02	0.02	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02*	tr	Monoterpenic alcohol
α -Campholenal	[0.02]*	0.01	Monoterpenic aldehyde
trans-Pinocarveol	0.02	0.05*	Monoterpenic alcohol
Camphor	0.19	0.20	Monoterpenic ketone
Camphene hydrate	0.08	0.09	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.01	0.57*	Monoterpenic alcohol
Isoborneol	0.02	0.03	Monoterpenic alcohol
Myrtenyl methyl ether	0.01		Monoterpenic ether
Pinocarpone	0.03	0.06	Monoterpenic ketone

Borneol	1.42	1.60*	Monoterpenic alcohol
Isopinocampone	0.06	0.01	Monoterpenic ketone
Terpinen-4-ol	0.11	0.04*	Monoterpenic alcohol
meta-Cymen-8-ol	0.02	0.02	Monoterpenic alcohol
Cryptone	0.03	[0.05]*	Normonoterpenic ketone
para-Cymen-8-ol	0.02	0.03	Monoterpenic alcohol
α -Terpineol	0.16	[1.60]*	Monoterpenic alcohol
Myrtenal	0.02*	0.02	Monoterpenic aldehyde
Myrtenol	[0.02]*	tr	Monoterpenic alcohol
Unknown	0.04	0.02	Oxygenated monoterpene
Verbenone	0.02	0.06*	Monoterpenic ketone
endo-Fenchyl acetate	0.02	0.02	Monoterpenic ester
Thymol methyl ether	0.04	1.12*	Monoterpenic ether
Citronellol	0.01	0.01	Monoterpenic alcohol
Carvone	0.03	0.03	Monoterpenic ketone
Piperitone	0.01	0.04*	Monoterpenic ketone
Phellandral	0.03	0.17*	Monoterpenic aldehyde
Bornyl acetate	27.79	27.57	Monoterpenic ester
2-Undecanone	0.02	[0.04]*	Aliphatic ketone
Thymol	0.01	0.01	Monoterpenic alcohol
Isohexyl isocaproate	0.03	0.02*	Aliphatic ester
α -Longipinene	0.02	0.02	Sesquiterpene
Citronellyl acetate	0.03	0.01	Monoterpenic ester
Neryl acetate	0.07	0.20*	Monoterpenic ester
α -Copaene	0.01	tr	Sesquiterpene
Geranyl acetate	0.21	0.20	Monoterpenic ester
Sativene	0.02	[0.02]*	Sesquiterpene
Longifolene	0.12*	0.10	Sesquiterpene
β -Longipinene	[0.12]*	tr	Sesquiterpene
Methyleugenol	0.02	0.02	Phenylpropanoid
Dodecanal	0.17	[0.17]*	Aliphatic aldehyde
β -Caryophyllene	1.01	[1.12]*	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.01	[1.12]*	Sesquiterpene
α -Humulene	0.57	[0.57]*	Sesquiterpene
(<i>E</i>)- β -Farnesene	tr	[0.06]*	Sesquiterpene
γ -Himachalene	0.02	[0.06]*	Sesquiterpene
Unknown	0.09		Sesquiterpene
β -Himachalene	0.02	0.01	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.02*	tr	Sesquiterpene
α -Muurolene	[0.02]*	0.02	Sesquiterpene
β -Bisabolene	0.13	[0.20]*	Sesquiterpene
(<i>Z</i>)- γ -Bisabolene	0.05	[0.04]*	Sesquiterpene
δ -Cadinene	0.02	0.01	Sesquiterpene
(<i>E</i>)- γ -Bisabolene	0.08	0.08	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.01	0.01	Sesquiterpene
(<i>E</i>)-Nerolidol	0.02	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	0.03	Sesquiterpenic ether
Humulene epoxide II	0.01	0.01	Sesquiterpenic ether
Selin-6-en-4 α -ol?	0.05		Sesquiterpenic alcohol
α -Bisabolol	0.14	0.14	Sesquiterpenic alcohol
Manoyl oxide	0.03		Diterpenic ether
13-epi-Manoyl oxide	0.02		Diterpenic ether

Total identified	98.71%	98.50%	
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*: 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: Clear liquid

Refractive index: 1.4695 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 10869:2011 (ABIES SIBIRICA, NEEDLES)

Compound	Min. Content	Max. Content	Observed %	Complies?
Santene	1.5	3.5	2.7	Yes
Tricyclene	1.5	3.5	2.3	Yes
α-Pinene	10.0	22.0	12.2	Yes
Camphene	15.0	26.0	23.2	Yes
β-Pinene	1.0	3.5	2.1	Yes
Δ3-Carene	9.0	15.0	12.2	Yes
Limonene	4.0	10.0	4.6	Yes
β-Phellandrene	1.5	5.0	3.6	Yes
Borneol	1.0	3.0	1.4	Yes
Bornyl acetate	20.0	35.0	27.8	Yes
Isobornyl acetate		0.1	ND	Yes
β-Caryophyllene	0.5	2.0	1.0	Yes
α-Humulene	0.3	0.9	0.6	Yes
Refractive index	1.468	1.473	1.4695	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil complies with the ISO standard for *A. sibirica* needles oil.