

GC-MS Profiling Analysis Prepared for Jade Bloom, Inc

Date: April 30, 2018

Sample: Juniper Berry

Type: Essential Oil

Source: *Juniperus communis*

Batch: 00083-03/2

Identification	DB-5 (%)	DB-WAX (%)	Classe
Toluene	tr	0.01	Simple phenolic
Hexanal	0.01	0.01	Aliphatic aldehyde
Tricyclene	0.07	0.07	Monoterpene
α -Thujene	1.93	1.95	Monoterpene
α -Pinene	32.17	32.25	Monoterpene
Camphene	0.24*	0.21	Monoterpene
α -Fenchene	[0.24]*	0.03	Monoterpene
Thuja-2,4(10)-diene	0.03	15.08*	Monoterpene
meta-Cymene	0.05	14.01*	Monoterpene
β -Pinene	16.84*	2.10	Monoterpene
Sabinene	[16.84]*	[15.08]*	Monoterpene
Unknown	0.01	0.01	Monoterpene
Octen-3-ol	0.18	0.45*	Aliphatic alcohol
Myrcene	13.83	[14.01]*	Monoterpene
Menthatriene isomer I	0.18*	0.03	Monoterpene
α -Phellandrene	[0.18]*	0.17	Monoterpene
Pseudolimonene	[0.18]*	0.01	Monoterpene
Δ 3-Carene	0.14	0.14	Monoterpene
α -Terpinene	1.12	1.12	Monoterpene
ortho-Cymene	0.01	0.48*	Simple phenolic
para-Cymene	0.49	[0.48]*	Monoterpene
Limonene	4.47*	3.93	Monoterpene
1,8-Cineole	[4.47]*	0.57	Monoterpenic ether
(Z)- β -Ocimene	0.01	1.96*	Monoterpene
(E)- β -Ocimene	0.04	0.05	Monoterpene
γ -Terpinene	1.94	[1.96]*	Monoterpene
cis-Sabinene hydrate	0.08	0.08	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	0.01	Monoterpenic alcohol
para-Cymenene	1.48*	0.07	Monoterpene
Terpinolene	[1.48]*	1.43	Monoterpene
6,7-Epoxyterpinolene	0.02	0.01	Monoterpenic ether
trans-Sabinene hydrate	0.06	0.11*	Monoterpenic alcohol
Linalool	0.07	0.05	Monoterpenic alcohol
Nonanal	0.02	0.03	Aliphatic aldehyde
α -Thujone	0.01	0.01	Monoterpenic ketone
endo-Fenchol	0.02	1.96*	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.08	0.12	Monoterpenic alcohol
α -Campholenal	0.03	0.02	Monoterpenic aldehyde
1-Terpineol	0.03	[1.96]*	Monoterpenic alcohol
Camphor	0.06*	0.01	Monoterpenic ketone
trans-Pinocarveol	[0.06]*	0.03	Monoterpenic alcohol
cis-Verbenol	0.03	1.26*	Monoterpenic alcohol
trans-Verbenol	0.02*	0.43*	Monoterpenic alcohol
Epoxyterpinolene	[0.02]*	0.02	Monoterpenic ether
Borneol	0.03	4.51*	Monoterpenic alcohol
α -Phellandren-8-ol	0.01	0.02	Monoterpenic alcohol
Nonanol	2.36*	0.05	Aliphatic alcohol
Terpinen-4-ol	[2.36]*	2.36*	Monoterpenic alcohol

para-Cymen-8-ol	0.04	0.04	Monoterpenic alcohol
α -Terpineol	0.18	[4.51]*	Monoterpenic alcohol
Myrtenal	0.04	0.04	Monoterpenic aldehyde
Myrtenol	0.01	0.02	Monoterpenic alcohol
Verbenone	0.02	0.07*	Monoterpenic ketone
endo-Fenchyl acetate	0.01	0.01	Monoterpenic ester
<i>trans</i> -Carveol	0.01	0.01	Monoterpenic alcohol
Thymol methyl ether	0.04	1.06*	Monoterpenic ether
Citronellol	0.05	0.05*	Monoterpenic alcohol
Neral	0.01	tr	Monoterpenic aldehyde
Carvacrol methyl ether	0.02	[2.36]*	Monoterpenic ether
Methyl citronellate	0.05	0.04	Monoterpenic ester
<i>trans</i> -Ascaridole glycol	0.01	0.01	Monoterpenic alcohol
Decanol	0.02	[0.05]*	Aliphatic alcohol
Bornyl acetate	0.20	0.18	Monoterpenic ester
2-Undecanone	0.05	0.04	Aliphatic ketone
Terpinen-4-yl acetate	0.04	0.03	Monoterpenic ester
Myrtenyl acetate	0.04	0.51*	Monoterpenic ester
Bicycloelemene	0.03	0.04	Sesquiterpene
Terpinyl acetate analog	0.05	[0.07]*	Monoterpenic ester
α -Cubebene	0.55*	[0.45]*	Sesquiterpene
α -Terpinyl acetate	[0.55]*	0.15	Monoterpenic ester
Citronellyl acetate	0.06	0.08	Monoterpenic ester
α -Ylangene	0.06	0.05	Sesquiterpene
α -Copaene	0.26	0.26	Sesquiterpene
<i>cis</i> - β -Elemene	0.07	0.07	Sesquiterpene
β -Cubebene	0.11	0.06	Sesquiterpene
β -Elemene	1.30	[1.06]*	Sesquiterpene
α -Funebrene	0.02	0.10*	Sesquiterpene
Sibirene	0.13*	[0.10]*	Sesquiterpene
Longifolene	[0.13]*	[0.11]*	Sesquiterpene
α -Gurjunene	0.01	0.01	Sesquiterpene
β -Caryophyllene	1.79	[1.96]*	Sesquiterpene
β -Copaene	0.11	0.08	Sesquiterpene
γ -Elemene	0.58	0.52*	Sesquiterpene
6,9-Guaiadiene	0.01	[2.36]*	Sesquiterpene
α -Himachalene	0.03	0.02	Sesquiterpene
α -Humulene	1.34	[1.26]*	Sesquiterpene
allo-Aromadendrene	0.03	[0.52]*	Sesquiterpene
β -Acoradiene	0.41	[0.43]*	Sesquiterpene
10-epi- β -Acoradiene	0.02	[0.51]*	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.08	0.06	Sesquiterpene
γ -Muurolene	0.37	[0.51]*	Sesquiterpene
Germacrene D	4.41	[4.51]*	Sesquiterpene
β -Selinene	0.27	0.26	Sesquiterpene
γ -Amorphene	0.09	0.07	Sesquiterpene
α -Selinene	0.85*	0.32	Sesquiterpene
Bicyclogermacrene	[0.85]*	0.34	Sesquiterpene
Valencene	[0.85]*	0.02	Sesquiterpene
α -Muurolene	0.44	0.43	Sesquiterpene
Cuparene	0.25	2.57*	Sesquiterpene
γ -Cadinene	0.53	0.80*	Sesquiterpene

δ -Cadinene	1.37*	1.29	Sesquiterpene
<i>trans</i> -Calamenene	[1.37]*	0.02	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.16*	0.09	Sesquiterpene
Selina-4(15),7(11)-diene	[0.16]*	0.25	Sesquiterpene
(<i>E</i>)- γ -Bisabolene	0.15	[0.80]*	Sesquiterpene
Selina-3,7(11)-diene	0.10	0.07	Sesquiterpene
Germacrene B	2.58	[2.57]*	Sesquiterpene
Germacrene D-4-ol	0.13*	0.02	Sesquiterpenic alcohol
Spathulenol	[0.13]*	0.07	Sesquiterpenic alcohol
Caryophyllene oxide	0.04	0.03	Sesquiterpenic ether
Humulene epoxide II	0.02	0.02*	Sesquiterpenic ether
10- <i>epi</i> -Cubenol	0.03		Sesquiterpenic alcohol
1,10- <i>diepi</i> -Cubenol	0.03	[0.02]*	Sesquiterpenic alcohol
τ -Cadinol	0.12*	0.08	Sesquiterpenic alcohol
τ -Muurolol	[0.12]*	0.06	Sesquiterpenic alcohol
α -Muurolol	0.04	0.02	Sesquiterpenic alcohol
Unknown	0.02		Oxygenated sesquiterpene
α -Cadinol	0.11	0.13	Sesquiterpenic alcohol
α -Bisabolol	0.01	0.01	Sesquiterpenic alcohol
Mayurone?	0.02		Norsesquiterpenic ketone
<i>meta</i> -Camphorene	0.04	0.03	Diterpene
Trachylobane?	0.04		Diterpene
<i>para</i> -Camphorene	0.02	0.01	Diterpene
<i>ar</i> -Abietatriene	0.02	0.02	Diterpene
Sandaracopimarinal?	0.25		Diterpenic aldehyde
Total identified	98.54%	97.84%	

*: 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: Faintly yellow liquid

Refractive index: 1.4748 \pm 0.0003 (20 °C)

COMPLIANCE WITH ISO 8897:2010 (JUNIPER BERRY)

Compound	Min. %	Max. %	Observed %	Complies?
α -Pinene	25.0	45.0	32.2	Yes
Sabinene	4.0	20.0	15.1	Yes
β -Pinene	1.0	12	2.1	Yes
Myrcene	3.0	22.0	13.8	Yes
Limonene	2.0	8.0	3.9	Yes
Terpinen-4-ol	1.0	6.0	2.4	Yes
Bornyl acetate		0.6	0.2	Yes
β -Caryophyllene	1.5	5.0	1.8	Yes
α -Humulene	1.0	4.0	1.3	Yes
Germacrene D	1.0	5.0	4.4	Yes
δ -Cadinene	1.0	3.5	1.3	Yes
Refractive index	1.470	1.483	1.4748	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil complies with the ISO standard for European juniper berry oil.