



Gas Chromatography Analysis

Dear Customer,

Attached you will find the results of gas chromatographic analysis based on the information provided by our Producer/Laboratory for:

Sample Reference **1465**

We testify that the Chromatographic Analysis (GC) for the mentioned sample is identical with:

Product No.:	1465
Product Name:	Spruce (Black Spruce) organic
Botanical Name:	Picea mariana
Batch No.:	1019359

Bühl, 2019-12-11


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Dr. David Nayan

2-Methylfuran	tr
Isovaleral	tr
Toluene	0.03
Hexanal	0.02
Octane	tr
Unknown	tr
(3Z)-Hexenol	0.01
Hexanol	0.01
Santene	2.34
Styrene	0.02
Unknown	0.10
Bornylene	0.01
Tricyclene	1.72
α -Thujene	0.17
α -Pinene	19.63
α -Fenchene	14.93*
Camphene	[14.93]*
Thuja-2,4(10)-diene	0.04
Benzaldehyde	0.01
meta-Cymene	0.05
β -Pinene	8.74*
Sabinene	[8.74]*
6-Methyl-5-hepten-2-one	0.02*
Dehydro-1,8-cineole	[0.02]*
Myrcene	3.27
2-Carene	0.04
α -Phellandrene	0.41*
Pseudolimonene	[0.41]*
Δ^3 -Carene	9.18
α -Terpinene	0.37
ortho-Cymene	0.02
para-Cymene	0.31
Limonene	6.80*
β -Phellandrene	[6.80]*
1,8-Cineole	[6.80]*
(Z)- β -Ocimene	0.02
(E)- β -Ocimene	0.02
γ -Terpinene	0.35
Unknown	0.06
Unknown	0.01
Fenchone	0.05*
meta-Cymenene	[0.05]*
Isoterpinolene	0.05
Terpinolene	1.57*
γ -Campholenal	[1.57]*
para-Cymenene	[1.57]*
α -Pinene oxide	0.02*
2-Nonanone	[0.02]*

Unknown	0.18*	
Linalool	[0.18]*	0.20
Nonanal	0.02	[0.02]*
endo-Fenchol	0.16	0.16
3-Methyl-3-butenyl isovalerate	0.01	0.01
cis-para-Menth-2-en-1-ol	0.03	0.03
α -Campholenal	0.10	0.12*
Cosmene isomer I	0.01	0.01
trans-Pinocarveol	0.11	0.10*
Camphor	0.18	0.19*
Camphene hydrate	0.18	0.49*
Citronellal	0.13*	[0.12]*
Isoborneol	[0.13]*	0.12*
Pinocamphone	0.03	0.03
Pinocarvone	0.03	0.03
Borneol	0.82	2.29*
Unknown	0.04	0.04
Isopinocamphone	0.05	0.05
Terpinen-4-ol	0.36	0.36
Cryptone	0.03*	[0.10]*
meta-Cymen-8-ol	[0.03]*	0.02*
para-Cymen-8-ol	0.02	[0.02]*
α -Terpineol	1.48	[2.29]*
Myrtenol	0.07	0.06
Methylchavicol	0.02	0.08*
Verbenone	0.10*	0.08
Unknown	[0.10]*	0.04
endo-Fenchyl acetate	0.25*	0.27*
trans-Carveol	[0.25]*	0.02
cis-Isocarveol	0.02	0.02*
Citronellol	0.07	0.08
Thymol methyl ether	0.07	[0.49]*
Carvone	0.02	0.03
Piperitone	0.05	0.04
Geraniol	0.05	0.07
Geranial	0.05	0.03
Unknown	0.03	
Bornyl acetate	17.70*	17.43
Isobornyl acetate	[17.70]*	0.53
cis-Verbenyl acetate	[17.70]*	0.08
trans-Verbenyl acetate	[17.70]*	[0.08]*
Unknown	[17.70]*	0.16
Unknown	0.11	0.10
trans-Pinocarvyl acetate	0.11	0.08
Car-3-en-5-one	0.01	0.06*
Myrtenyl acetate	0.04	0.04*
Terpinyl acetate analog	0.06	0.16*
trans-Carvyl acetate	0.02	0.03*
exo-2-Hydroxycineole acetate	0.02	0.32*
Unknown	0.03	
α -Cubebene	0.02	[0.27]*
α -Terpinyl acetate	0.06	0.05

Citronellyl acetate	0.08
Longicyclene	0.02
Unknown	0.03
α -Copaene	0.04
β -Bourbonene	0.01
Geranyl acetate	0.21
β -Elemene	0.09
Longifolene	0.17
Methyleugenol	0.01
β -Caryophyllene	0.22
β -Copaene	0.01
<i>trans</i> -Muurolo-3,5-diene	0.02
α -Humulene	0.07
Unknown	0.09*
<i>cis</i> -Muurolo-4(15),5-diene	[0.09]*
(<i>E</i>)- β -Farnesene	[0.09]*
<i>trans</i> -Cadina-1(6),4-diene	0.11
γ -Muurolole	0.13
Germacrene D	0.12*
Dodecanol	[0.12]*
β -Selinene	0.06
<i>trans</i> -Muurolo-4(15),5-diene	0.02
Unknown	0.03
α -Selinene	0.07
α -Muurolole	0.35
β -Bisabolene	0.02
Cubebol	0.44*
γ -Cadinene	[0.44]*
δ -Cadinene	1.37*
<i>trans</i> -Calamenene	[1.37]*
Zonarene	[1.37]*
<i>trans</i> -Cadina-1,4-diene	0.06
α -Cadinene	0.08
α -Calacorene	0.05
(<i>E</i>)- α -Bisabolene	0.16
Unknown	0.04
(<i>E</i>)-Nerolidol	0.04
Caryophyllene oxide	0.02
Globulol	0.03
Unknown	0.02
10- <i>epi</i> -Cubenol	0.05
1- <i>epi</i> -Cubenol	0.07
τ -Cadinol	0.61*
τ -Muurolole	[0.61]*
Cubenol	[0.61]*
α -Muurolole	0.09
α -Cadinol	0.53
<i>cis</i> -Calamenen-10-ol	0.01
<i>trans</i> -Calamenen-10-ol	0.03
(1,8Z,11Z,14Z)-Heptadecatetraene	0.02
(8Z)-Heptadecene	0.01
Amorpha-4,9-dien-2-ol	0.05

(5Z)-Tetradecen-14-olide?	0.04
Unknown	0.07
Manool	0.09
Unknown	
Total identified	98.71%

*: 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.