

## GC/MS BATCH NUMBER: J20104

---

**ESSENTIAL OIL:** JUNIPER BERRY  
**BOTANICAL NAME:** JUNIPERUS COMMUNIS  
**ORIGIN:** HUNGARY

KEY CONSTITUENTS PRESENT IN THIS BATCH OF JUNIPER BERRY OIL	%
$\alpha$ -PINENE	40.7
$\beta$ -PINENE	9.3
MYRCENE	8.8
SABINENE	8.4
$\beta$ -CARYOPHYLLENE	4.5
$\alpha$ -HUMULENE	3.4
$\beta$ -PHELLANDRENE	3.3
p-CYMENE	3.0
GERMACRENE D + $\gamma$ -MUUROLENE	2.9
$\gamma$ -TERPINENE	2.5

Comments from Robert Tisserand: Characteristic, fruity-coniferous odor profile. Ten of eleven key ISO constituents are within range, with delta-cadinene marginally low - not a concern.

**Date :** December 20, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17L18-PTH2-1-CC

**Customer identification :** Juniper Berry - J2010476R

**Type :** Essential oil

**Source :** *Juniperus communis*

**Customer :** Plant Therapy

*ANALYSIS*

**Method :** PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

**Analyst :** Benoit Roger Ph. D.

**Analysis date :** 2017-12-18

Checked and approved by :



Alexis St-Gelais, M. Sc., chimiste 2013-174

*Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.*

*This report is digitally signed, it is only considered valid if the digital signature is intact.*

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Tricyclene	3.24	916	0.05	0.04	920	1.02	Monoterpene
α-Thujene	3.32	921	0.87	42.16	957	1.17*	Monoterpene
α-Pinene	3.49	931	40.67	[42.16]	957	1.17*	Monoterpene
α-Fenchene	3.70	943	0.03				Monoterpene
Camphene	3.72	944	0.36	0.22	1000	1.39	Monoterpene
Thuja-2,4(10)-diene	3.81	950	0.04	9.02	1054	1.92*	Monoterpene
Verbenene	3.99	960	0.02	[42.16]	957	1.17*	Monoterpene
Sabinene	4.17	971	8.44	[9.02]	1054	1.92*	Monoterpene
β-Pinene	4.24	975	9.25	8.65	1039	1.75	Monoterpene
Camphene analog II	4.34	981	0.08				Monoterpene
Myrcene	4.52	991	8.78	9.65	1116	2.49*	Monoterpene
2-Carene	4.63	998	0.03	0.11	1078	2.20*	Monoterpene
Pseudolimonene	4.71	1002	0.20	[9.65]	1116	2.49*	Monoterpene
α-Phellandrene	4.77*	1005	0.19	[9.65]	1116	2.49*	Monoterpene
Δ3-Carene	4.77*	1005	[0.19]	[0.11]	1078	2.20*	Monoterpene
α-Terpinene	4.95	1016	0.66	[9.65]	1116	2.49*	Monoterpene
meta-Cymene	5.06	1021	0.02	[9.65]	1116	2.49*	Monoterpene
para-Cymene	5.17*	1027	3.37	2.96	1206	3.66*	Monoterpene
Limonene	5.17*	1027	[3.37]	4.04	1139	2.79*	Monoterpene
β-Phellandrene	5.20	1029	3.26	[4.04]	1139	2.79*	Monoterpene
1,8-Cineole	5.23	1030	0.26	[4.04]	1139	2.79*	Monoterp. ether
cis-β-Ocimene	5.36	1038	tr	2.46	1186	3.41*	Monoterpene
trans-β-Ocimene	5.54	1048	0.03	[2.96]	1206	3.66*	Monoterpene
γ-Terpinene	5.74	1058	2.48	[2.46]	1186	3.41*	Monoterpene
cis-Linalool oxide (fur.)	6.02	1073	0.01	0.01	1375	6.23	Monoterp. alcohol
cis-Sabinene hydrate	6.08	1077	0.02	0.02	1398	6.60	Monoterp. alcohol
Terpinolene	6.21	1084	0.59	0.63	1221	3.89	Monoterpene
para-Cymenene	6.44	1096	0.06	0.07	1360	6.00	Monoterpene
α-Pinene oxide	6.54	1101	0.02	0.01	1294	4.97	Monoterp. ether
Linalool	6.72	1107	0.05	0.07	1484	8.56*	Monoterp. alcohol
cis-para-Menth-2-en-1-ol	7.26	1127	0.02	[0.07]	1484	8.56*	Monoterp. alcohol
trans-Pinocarveol	7.65	1141	0.03	0.04	1558	10.96	Monoterp. alcohol
Camphor	7.79	1146	0.02	0.02	1423	7.12	Monoterp. ketone
trans-Verbenol	7.87	1149	0.01	0.24	1610	12.87*	Monoterp. alcohol
Borneol	8.72	1180	0.03	[0.24]	1610	12.87*	Monoterp. alcohol
Terpinen-4-ol	8.89	1186	3.09	8.31	1521	9.60*	Monoterp. alcohol
α-Terpineol	9.54	1205	0.14	3.36	1620	13.37*	Monoterp. alcohol
Verbenone	9.89	1213	0.02	[0.24]	1610	12.87*	Monoterp. ketone
Methyl citronellate	11.94	1258	0.01	0.14	1500	8.94*	Monoterp. ester
Bornyl acetate	12.94	1280	0.11	[0.14]	1500	8.94*	Monoterp. ester
δ-Elemene	15.35	1322	0.03	0.05	1417	6.98*	Sesquiterpene

$\alpha$ -Cubebene	16.02	1332	0.14	0.16	1409	6.77	Sesquiterpene
$\alpha$ -Terpinyl acetate	16.72	1342	0.03	[3.36]	1620	13.37*	Monoterp. ester
$\alpha$ -Ylangene	17.08	1348	0.02	[0.05]	1417	6.98*	Sesquiterpene
$\alpha$ -Copaene	17.75	1358	0.13	0.14	1430	7.30	Sesquiterpene
$\beta$ -Cubebene	18.74	1373	0.02	0.02	1473	8.30	Sesquiterpene
$\beta$ -Elemene	19.01	1377	0.50	[8.31]	1521	9.60*	Sesquiterpene
$\alpha$ -Gurjunene	19.61	1386	0.05	0.04	1461	8.01	Sesquiterpene
$\beta$ -Caryophyllene	20.77	1402	4.46	[8.31]	1521	9.60*	Sesquiterpene
Thujopsen	21.62	1412	0.04	0.05	1532	10.01	Sesquiterpene
$\gamma$ -Elemene	21.96	1416	0.14	0.23	1565	11.23	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	23.25*	1432	0.16	0.02	1549	10.64	Sesquiterpene
<i>cis</i> - $\beta$ -Farnesene	23.25*	1432	[0.16]	3.51	1579	11.76*	Sesquiterpene
$\alpha$ -Humulene	23.59	1436	3.43	[3.51]	1579	11.76*	Sesquiterpene
<i>trans</i> - $\beta$ -Farnesene	24.60	1448	0.15	[3.36]	1620	13.37*	Sesquiterpene
<i>trans</i> -Cadin-1(6),4-diene	25.16	1455	0.09	[3.51]	1579	11.76*	Sesquiterpene
Germacrene D	25.80*	1462	2.88	[3.36]	1620	13.37*	Sesquiterpene
$\gamma$ -Muurolole	25.80*	1462	[2.88]	[3.36]	1620	13.37*	Sesquiterpene
$\beta$ -Selinene	26.36	1469	0.13	[3.36]	1620	13.37*	Sesquiterpene
Viridiflorene	26.54	1471	0.04	[0.24]	1610	12.87*	Sesquiterpene
Bicyclogermacrene	26.98*	1476	0.24	0.18	1642	14.52	Sesquiterpene
$\alpha$ -Selinene	26.98*	1476	[0.24]	0.16	1630	13.91	Sesquiterpene
Valencene	27.78	1486	0.17	0.20	1664	15.72*	Sesquiterpene
$\alpha$ -Muurolole	27.91	1487	0.17	0.12	1638	14.28	Sesquiterpene
$\gamma$ -Cadinene	28.83	1498	0.23	0.72	1670	16.02	Sesquiterpene
$\delta$ -Cadinene	29.49*	1508	0.68	[0.20]	1664	15.72*	Sesquiterpene
Zonarene	29.49*	1508	[0.68]	0.11	1659	15.43	Sesquiterpene
<i>trans</i> -Calamenene	29.49*	1508	[0.68]	0.78	1717	18.52*	Sesquiterpene
Selina-3,7(11)-diene	30.34	1520	0.10	0.14	1674	16.24	Sesquiterpene
$\alpha$ -Cadinene	30.53	1522	0.09	0.08	1691	17.05	Sesquiterpene
Germacrene B	32.16	1545	0.75	[0.78]	1717	18.52*	Sesquiterpene
Caryophyllene oxide	33.93	1570	0.05	0.04	1840	26.80	Sesquiterp. ether
Spathulenol	34.13	1573	0.05	0.06	2016	37.00	Sesquiterp. alcohol
Humulene epoxide II	35.06	1586	0.02	0.04	1891	30.60	Sesquiterp. ether
1,10-diepi-Cubenol	36.50	1612	0.02	0.07	1947	33.87*	Sesquiterp. alcohol
Cubenol	37.14	1628	0.04	[0.07]	1947	33.87*	Sesquiterp. alcohol
$\tau$ -Muurolol	37.63	1640	0.05	0.06	2076	38.93	Sesquiterp. alcohol
$\alpha$ -Muurolol	37.74	1643	0.06	0.26	2113	40.09*	Sesquiterp. alcohol
$\alpha$ -Cadinol	38.19	1654	0.18	[0.26]	2113	40.09*	Sesquiterp. alcohol
meta-Camphorene	46.95	1940	0.08	0.08	2134	40.68	Diterpene
para-Camphorene	47.84	1975	0.03	0.03	2178	41.83	Diterpene
<b>Total identified</b>			<b>98.77%</b>	<b>99.58%</b>			

\*: Two or more compounds are coeluting on this column

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

Note: no correction factor was applied

*OTHER DATA*

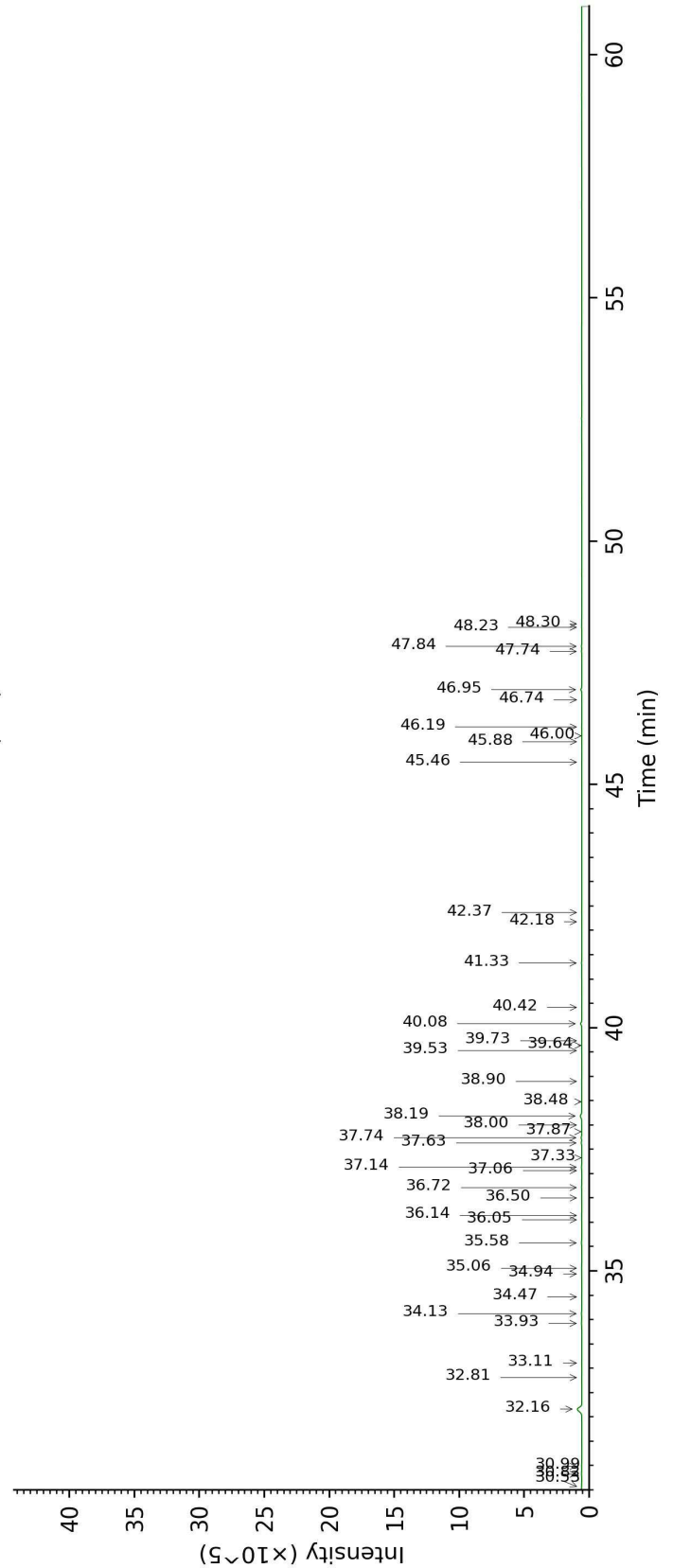
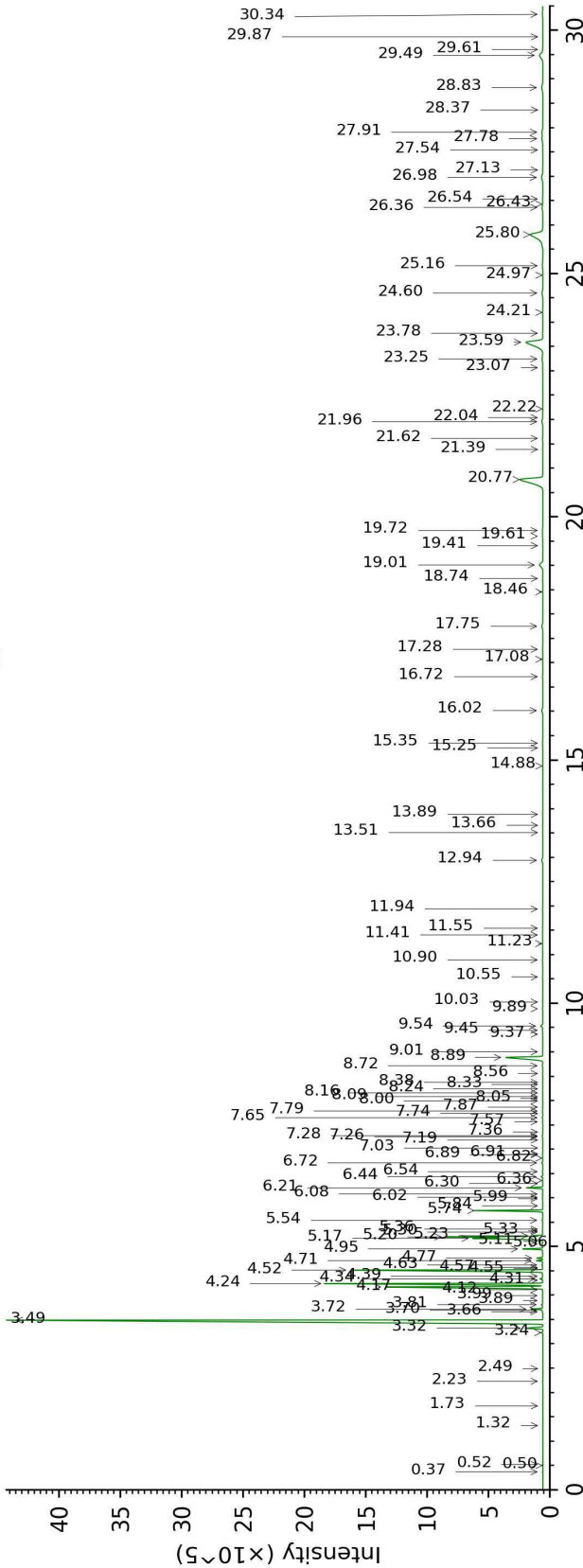
**Physical aspect :** Faintly yellow liquid

**Refractive index :**  $1.4750 \pm 0.0003$  (20 °C)

*CONCLUSION*

No adulterant, contaminant or diluent were detected using this method.

17L18-PTH2-1-CC\_BP5



17L18-PTH2-1-CC\_WAX

