

Date : December 09, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22L02-PTH01

Customer identification : Juniper Berry - Serbia - J20112R

Type : Essential oil

Source : *Juniperus communis*

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sylvain Mercier, M. Sc., Chimiste 2014-005

Analysis date : December 07, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4751 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Toluene	tr	Simple phenolic
Unknown	tr	Alkene
(4E)-2,6-Dimethyloctene	0.02	Monoterpene
Hashishene	0.01	Monoterpene
Tricyclene	0.13	Monoterpene
α -Thujene	0.18	Monoterpene
α -Pinene	42.15	Monoterpene
Camphene	0.26	Monoterpene
α -Fenchene	0.05	Monoterpene
Thuja-2,4(10)-diene	0.06	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.01	Monoterpene
β -Pinene	7.64	Monoterpene
Sabinene	13.27	Monoterpene
Unknown	0.03	Monoterpene
Octen-3-ol	0.01	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.03	Aliphatic ketone
Myrcene	4.40	Monoterpene
Menthatriene isomer I	0.02	Monoterpene
α -Phellandrene	0.13	Monoterpene
Δ^3 -Carene	0.16	Monoterpene
α -Terpinene	0.03	Monoterpene
para-Cymene	0.27	Monoterpene
Limonene	7.52	Monoterpene
β -Phellandrene	0.21	Monoterpene
(E)- β -Ocimene	0.01	Monoterpene
γ -Terpinene	0.93	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
meta-Cymenene	0.01	Monoterpene
Terpinolene	0.61	Monoterpene
para-Cymenene	0.03	Monoterpene
α -Pinene oxide	0.06	Monoterpenic ether
trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	0.08	Monoterpenic alcohol
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
α -Campholenal	0.02	Monoterpenic aldehyde
cis-Limonene oxide	0.02	Monoterpenic ether
trans-Pinocarveol	0.13	Monoterpenic alcohol
Camphor	0.02	Monoterpenic ketone
cis-Verbenol	0.02	Monoterpenic alcohol
trans-Verbenol	0.12	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.01	Monoterpenic alcohol
Pinocamphone	0.01	Monoterpenic ketone
Pinocarvone	0.01	Monoterpenic ketone
Borneol	0.03	Monoterpenic alcohol

α-Phellandren-8-ol	0.03	Monoterpenic alcohol
Terpinen-4-ol	4.34	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	0.81	Monoterpenic alcohol
Myrtenal	0.08	Monoterpenic aldehyde
Myrtenol	0.05	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
<i>trans</i> -Carveol	0.05	Monoterpenic alcohol
<i>cis</i> -Carveol	0.01	Monoterpenic alcohol
Citronellol	0.02	Monoterpenic alcohol
Methyl citronellate	0.01	Monoterpenic ester
<i>trans</i> -Ascaridole glycol	0.01	Monoterpenic alcohol
Decanol	0.01	Aliphatic alcohol
Bornyl acetate	0.11	Monoterpenic ester
2-Undecanone	0.01	Aliphatic ketone
Terpinyl acetate analog	0.01	Monoterpenic ester
Bicycloelemene	0.03	Sesquiterpene
α-Terpinyl acetate	0.40	Monoterpenic ester
α-Cubebene	tr	Sesquiterpene
α-Copaene	0.03	Sesquiterpene
β-Cubebene	0.01	Sesquiterpene
β-Elemene	0.07	Sesquiterpene
α-Funebrene	0.01	Sesquiterpene
β-Funebrene	0.25	Sesquiterpene
α-Gurjunene	0.01	Sesquiterpene
β-Caryophyllene	3.59	Sesquiterpene
β-Cedrene	0.04	Sesquiterpene
β-Copaene	0.08	Sesquiterpene
γ-Elemene	0.05	Sesquiterpene
Aromadendrene	0.01	Sesquiterpene
<i>trans</i> -Muurolo-3,5-diene	0.09	Sesquiterpene
α-Humulene	2.92	Sesquiterpene
allo-Aromadendrene	0.03	Sesquiterpene
(<i>E</i>)-β-Farnesene	0.06	Sesquiterpene
β-Acoradiene	0.03	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.04	Sesquiterpene
γ-Muurolole	0.05	Sesquiterpene
Germacrene D	1.69	Sesquiterpene
β-Selinene	0.04	Sesquiterpene
α-Selinene	0.07	Sesquiterpene
α-Muurolole	0.05	Sesquiterpene
Cuparene	0.03	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
β-Bisabolene	0.04	Sesquiterpene
Cubebol	0.01	Sesquiterpenic alcohol
β-Curcumene	0.01	Sesquiterpene
δ-Cadinene	1.58	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.01	Sesquiterpene
Selina-4(15),7(11)-diene	0.04	Sesquiterpene
α-Cadinene	0.02	Sesquiterpene
α-Calacorene	0.03	Sesquiterpene
α-Elemol	0.08	Sesquiterpenic alcohol

Germacrene B	0.23	Sesquiterpene
Caryophyllenyl alcohol	0.02	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.09	Sesquiterpenic ether
allo-Cedrol	0.11	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
Humulene epoxide I	0.01	Sesquiterpenic ether
α -Cedrol	1.40	Sesquiterpenic alcohol
Humulene epoxide II	0.07	Sesquiterpenic ether
epi-Cedrol	0.01	Sesquiterpenic alcohol
10-epi-Cubenol	0.02	Sesquiterpenic alcohol
β -Acorenol	0.04	Sesquiterpenic alcohol
Unknown	0.08	Unknown
τ -Cadinol	0.02	Sesquiterpenic alcohol
τ -Muurolol	0.02	Sesquiterpenic alcohol
α -Muurolol	0.02	Sesquiterpenic alcohol
β -Eudesmol	0.02	Sesquiterpenic alcohol
α -Eudesmol	0.03	Sesquiterpenic alcohol
α -Cadinol	0.03	Sesquiterpenic alcohol
Cedrenol analog	0.01	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5 β -ol	0.01	Sesquiterpenic alcohol
Germacra-4(15),5,10(14)-trien-1-ol isomer	0.01	Sesquiterpenic alcohol
Mayurone?	0.02	Norsesquiterpenic ketone
Germacra-4(15),5,10(14)-trien-1 β -ol?	0.01	Sesquiterpenic alcohol
Aromadendrane-4,10-diol	0.02	Sesquiterpenic alcohol
Thujopsenal analog	0.01	Sesquiterpenic aldehyde
Cedryl acetate	0.02	Sesquiterpenic ester
meta-Camphorene	0.07	Diterpene
Trachylobane?	0.02	Diterpene
para-Camphorene	0.03	Diterpene
18-Norabieta-8,11,13-triene?	0.06	Norditerpene
ar-Abietatriene	0.04	Diterpene
7,13-Abietadiene	0.23	Diterpene
Unknown	0.01	Unknown
Sandaracopimarinal?	0.01	Diterpenic aldehyde
Abietol	0.02	Diterpenic alcohol
Consolidated total	98.83%	

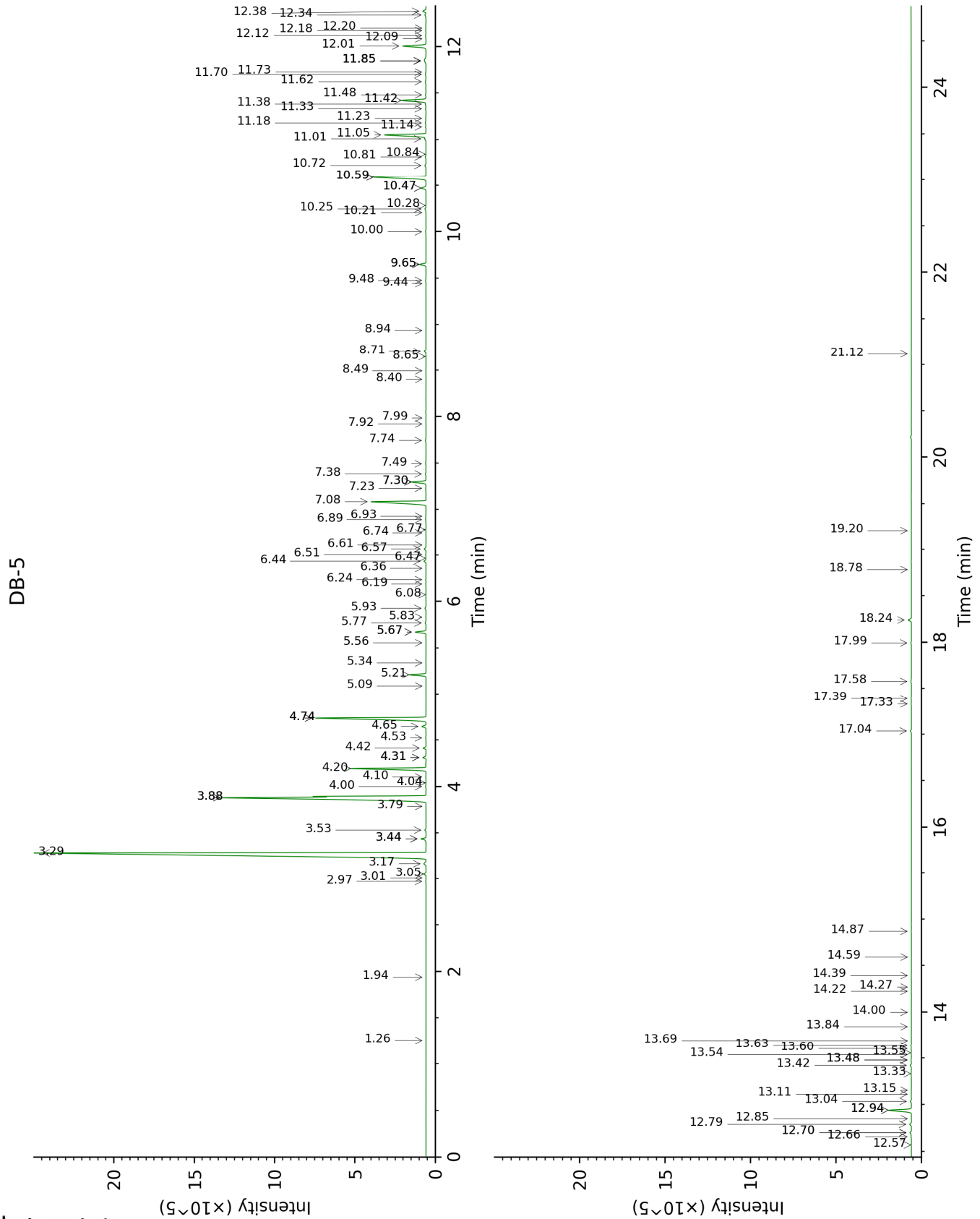
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

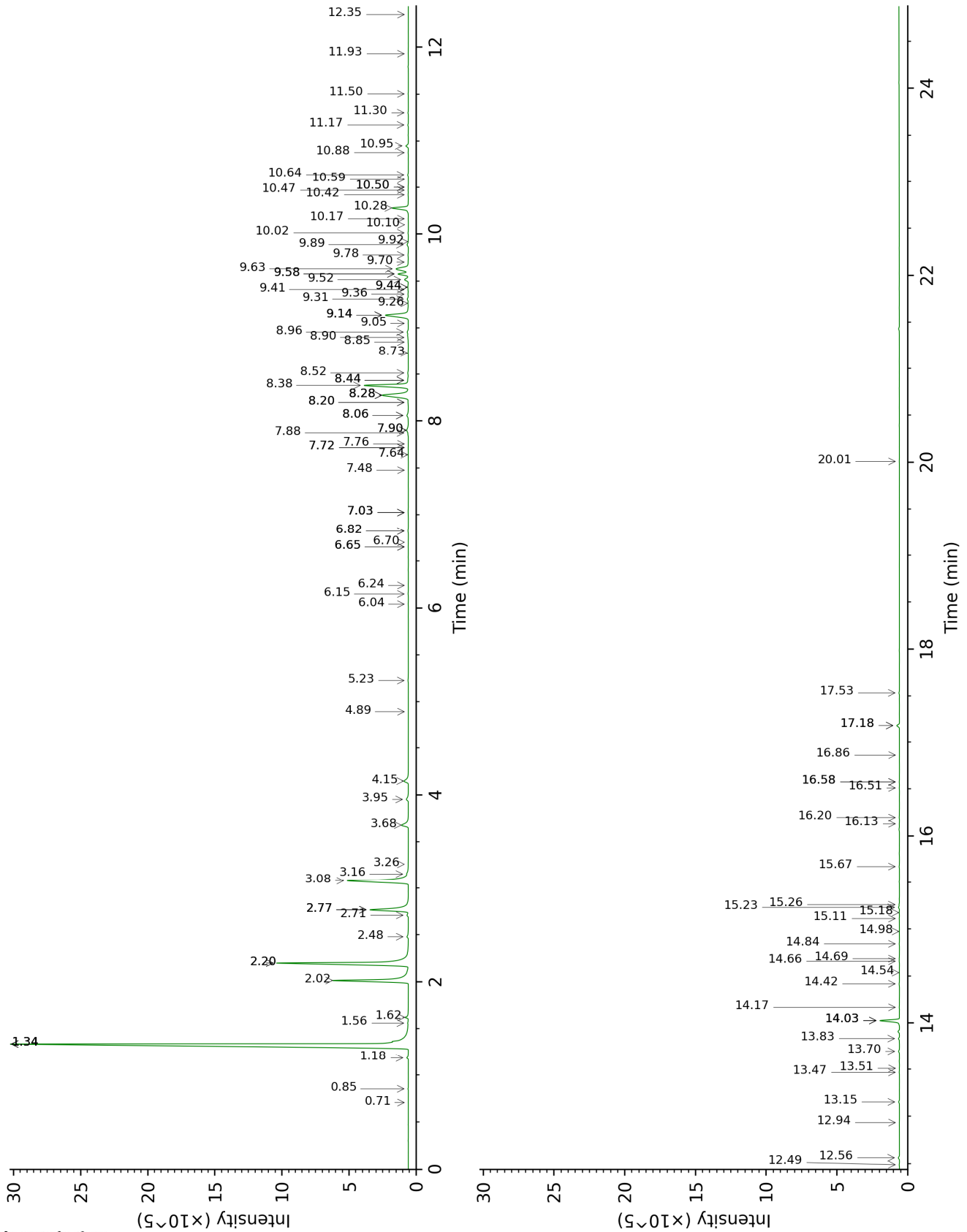
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm is set to prioritize data from the most standard DB-5 column, and smallest values so as to avoid overestimating individual content. This process is semi-automatic. Advanced users are invited to consult the "Full analysis data" table after the chromatograms in this report to access the full untreated data and perform their own calculations if needed.

Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

This page was intentionally left blank. The following pages present the complete data of the analysis.



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.26	759	tr	1.34*	999	42.36
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.94	832	tr	0.71	885	tr
(4E)-2,6-Dimethyloctene	2.97	914	0.02	0.86	919	0.02
Hashishene	3.01	916	0.01	1.34*	999	[42.36]
Tricyclene	3.05	919	0.13	1.18	974	0.11
α -Thujene	3.17	926	0.18	1.34*	999	[42.36]
α -Pinene	3.28	934	42.15	1.34*	999	[42.36]
Camphene	3.44*	944	0.29	1.62	1028	0.26
α -Fenchene	3.44*	944	[0.29]	1.56	1022	0.05
Thuja-2,4(10)-diene 3,7,7-	3.53	950	0.06	2.20*	1087	13.36
Trimethylcyclohepta-1,3,5-triene	3.79	967	0.01	2.77*	1135	4.46
β -Pinene	3.88*	973	20.91	2.02	1068	7.64
Sabinene	3.88*	973	[20.91]	2.20*	1087	[13.36]
Unknown [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	4.00	981	0.03			
Octen-3-ol	4.04	983	0.01	6.65*	1423	0.02
6-Methyl-5-hepten-2-one	4.10	988	0.03	4.89	1300	0.01
Myrcene	4.20	993	4.40	2.77*	1135	[4.46]
Menthatriene isomer I	4.31*	1001	0.19	3.26	1175	0.02
α -Phellandrene	4.31*	1001	[0.19]	2.71	1130	0.13
Δ^3 -Carene	4.42	1008	0.16	2.48	1112	0.15
α -Terpinene	4.52	1014	0.03	2.77*	1135	[4.46]
para-Cymene	4.65	1022	0.27	3.95	1229	0.26
Limonene	4.74*	1028	7.77	3.08	1160	7.52
β -Phellandrene	4.74*	1028	[7.77]	3.16	1166	0.21
(E)- β -Ocimene	5.09	1050	0.01			
γ -Terpinene	5.21	1057	0.93	3.68	1208	0.95
cis-Sabinene hydrate	5.34	1065	0.01	6.70	1426	0.01
meta-Cymenene	5.56	1079	0.01	6.04	1378	0.02
Terpinolene	5.67*	1086	0.63	4.15	1244	0.61
para-Cymenene	5.67*	1086	[0.63]	6.15	1385	0.03
α -Pinene oxide	5.77	1092	0.06	5.23	1318	0.05
trans-Sabinene hydrate	5.83	1096	0.01	7.76	1506	0.01
Linalool	5.93	1102	0.08	7.88	1515	0.05
endo-Fenchol	6.08	1111	0.01	8.20*	1540	0.05
cis-para-Menth-2-en-1-ol	6.19	1118	0.02	7.90*	1517	0.27
α -Campholenal	6.24	1121	0.02	6.82*	1436	0.05
cis-Limonene oxide	6.36	1129	0.02	6.24	1392	0.01

<i>trans</i> -Pinocarveol	6.44	1134	0.13	8.96	1600	0.14
Camphor	6.47	1136	0.02	7.02*	1451	0.05
<i>cis</i> -Verbenol	6.51	1138	0.02	9.05	1607	0.02
<i>trans</i> -Verbenol	6.57	1142	0.12	9.31	1628	0.12
meta-Mentha-4,6-dien-8-ol	6.61	1145	0.01	9.14*	1614	2.97
Pinocamphone	6.74	1153	0.01	7.02*	1451	[0.05]
Pinocarvone	6.77	1155	0.01	7.72*	1503	0.03
Borneol	6.89	1163	0.03	9.58*	1650	0.92
α -Phellandren-8-ol	6.93	1165	0.03	9.92	1679	0.02
Terpinen-4-ol	7.08	1175	4.34	8.38	1555	4.40
para-Cymen-8-ol	7.23	1184	0.03	11.30	1796	0.03
α -Terpineol	7.30*	1189	0.89	9.58*	1650	[0.92]
Myrtenal	7.30*	1189	[0.89]	8.52	1565	0.08
Myrtenol	7.38	1194	0.05	10.64	1739	0.06
Verbenone	7.49	1201	0.03	9.41	1637	0.03
<i>trans</i> -Carveol	7.74	1218	0.05	11.17	1785	0.04
<i>cis</i> -Carveol	7.92	1230	0.01	11.50	1814	0.02
Citronellol	7.99	1234	0.02	10.50*	1727	0.03
Methyl citronellate	8.40	1262	0.01	8.06*	1530	0.24
<i>trans</i> -Ascaridole glycol	8.50	1268	0.01	14.03*	2047	1.53
Decanol	8.65	1278	0.01	10.50*	1727	[0.03]
Bornyl acetate	8.71	1282	0.11	8.06*	1530	[0.24]
2-Undecanone	8.94	1297	0.01	8.44*	1559	0.08
Terpinyl acetate analog	9.44	1332	0.01	9.36	1633	0.04
Bicycloelemene	9.48	1335	0.03	6.82*	1436	[0.05]
α -Terpinyl acetate	9.65*	1347	0.41	9.52	1646	0.40
α -Cubebene	9.65*	1347	[0.41]	6.65*	1423	[0.02]
α -Copaene	10.00	1371	0.03	7.02*	1451	[0.05]
β -Cubebene	10.21	1386	0.01	7.64	1497	0.01
β -Elemene	10.25	1389	0.07	8.28*	1546	3.74
α -Funebrene	10.28	1391	0.01	7.72*	1503	[0.03]
β -Funebrene	10.47*	1405	0.32	7.90*	1517	[0.27]
α -Gurjunene	10.47*	1405	[0.32]	7.48	1485	0.01
β -Caryophyllene	10.59*	1414	3.80	8.28*	1546	[3.74]
β -Cedrene	10.59*	1414	[3.80]	8.20*	1540	[0.05]
β -Copaene	10.72	1423	0.08	8.28*	1546	[3.74]
γ -Elemene	10.81	1430	0.05	8.90	1595	0.04
Aromadendrene	10.84	1432	0.01	8.44*	1559	[0.08]
<i>trans</i> -Muurola-3,5-diene	11.01	1444	0.09	8.73	1582	0.04
α -Humulene	11.05	1448	2.92	9.14*	1614	[2.97]
allo-Aromadendrene	11.14	1454	0.03	8.85	1591	0.03
(<i>E</i>)- β -Farnesene	11.18	1457	0.06	9.44*	1639	0.09
β -Acoradiene	11.23	1461	0.03	9.26	1625	0.05
<i>trans</i> -Cadina-1(6),4-diene	11.33	1469	0.04	9.14*	1614	[2.97]
γ -Muurolene	11.38	1472	0.05	9.44*	1639	[0.09]
Germacrene D	11.42	1475	1.69	9.63	1655	1.71
β -Selinene	11.48	1480	0.04	9.70	1661	0.02

α-Selinene	11.62	1490	0.07	9.78	1667	0.06
α-Muurolene	11.70	1496	0.05	9.89	1676	0.14
Cuparene	11.73	1498	0.03	10.88	1760	0.02
γ-Cadinene	11.85*†	1507	0.23	10.17	1699	0.02
β-Bisabolene	11.85*†	1507	[0.23]	10.02	1686	0.04
Cubebol	11.85*†	1507	[0.23]	12.35	1889	0.01
β-Curcumene	11.85*†	1507	[0.23]	10.10	1693	0.01
δ-Cadinene	12.01	1520	1.58	10.28	1708	1.64
<i>trans</i> -Cadina-1,4-diene	12.09	1526	0.01	10.47	1725	0.03
Selina-4(15),7(11)-diene	12.12	1528	0.04	10.42	1720	0.03
α-Cadinene	12.18	1533	0.02	10.59	1735	0.01
α-Calacorene	12.20	1535	0.03	11.93	1852	0.02
α-Elemol	12.34	1546	0.08	13.83	2028	0.07
Germacrene B	12.38	1549	0.23	10.95	1766	0.22
Caryophyllenyl alcohol	12.57	1563	0.02	13.47	1993	0.02
Spathulenol	12.66	1570	0.02	14.17	2061	0.02
Caryophyllene oxide isomer	12.70*	1574	0.12	12.49	1902	0.02
Caryophyllene oxide	12.70*	1574	[0.12]	12.56	1909	0.09
allo-Cedrol	12.79	1581	0.11	14.03*	2047	[1.53]
Unknown [m/z 159, 83 (88), 55 (53), 93 (50), 121 (48)... 220 (9)]	12.85	1585	0.01			
Humulene epoxide I	12.94*	1592	1.55	12.94	1943	0.01
α-Cedrol	12.94*	1592	[1.55]	14.03*	2047	[1.53]
Humulene epoxide II	13.04	1600	0.07	13.15	1964	0.06
epi-Cedrol	13.11	1606	0.01	14.54	2096	0.01
10-epi-Cubenol	13.15	1610	0.02	13.51	1997	0.01
β-Acorenol	13.33	1624	0.04	14.66	2109	0.02
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.42	1631	0.08	13.70	2015	0.08
τ-Cadinol	13.48*	1636	0.04	14.69	2111	0.02
τ-Muurolol	13.48*	1636	[0.04]	14.84	2127	0.02
α-Muurolol	13.54	1641	0.02	14.98	2141	0.01
β-Eudesmol	13.56	1642	0.02	15.18	2161	0.02
α-Eudesmol	13.60	1646	0.03	15.11	2155	0.02
α-Cadinol	13.64	1649	0.03	15.26	2170	0.03
Cedrenol analog	13.69	1654	0.01	16.20	2267	0.03
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	13.84	1666	0.01	16.58*	2307	0.02
Germacra-4(15),5,10(14)-trien-1-ol isomer	14.00	1679	0.01	16.51	2300	0.02
Mayurone?	14.22	1698	0.02	16.86	2338	0.01
Germacra-4(15),5,10(14)-trien-1β-ol?	14.27	1701	0.01			

Aromadendrane-4,10-diol	14.39	1712	0.02	16.58*	2307	[0.02]
Thujopsenal analog	14.59	1729	0.01	17.18*	2372	0.22
Cedryl acetate	14.87	1753	0.02	14.42	2085	0.03
meta-Camphorene	17.04	1949	0.07	15.23	2167	0.08
Trachylobane?	17.33	1977	0.02	16.13	2260	0.02
para-Camphorene	17.39	1982	0.03	15.67	2212	0.04
18-Norabieta-8,11,13-triene?	17.58	2000	0.06			
ar-Abietatriene	17.99	2041	0.04	17.53	2412	0.04
7,13-Abietadiene	18.24	2066	0.23	17.18*	2372	[0.22]
Unknown [m/z 93, 81 (88), 79 (69), 107 (65), 95 (61)...]	18.78	2120	0.01			
Sandaracopimarinal?	19.20	2163	0.01	20.01	2701	0.01
Abietol	21.12	2370	0.02			
Total identified		99.25%			98.94%	
Total reported		99.39%			99.02%	

*: Two or more compounds are coeluting on this column

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

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index