

**Date :** October 30, 2019

**CERTIFICATE OF ANALYSIS – GC PROFILING**

**SAMPLE IDENTIFICATION**

**Internal code :** 19J16-MPE03-1-SCC

**Customer identification :** Cedarwood - USA - 103

**Type :** Essential oil

**Source :** *Juniperus virginiana*

**Customer :** My Pure Earth Pte Ltd

**ANALYSIS**

**Method:** PC-PA-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

**Analysis date :** October 25, 2019

Checked and approved by :

---

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

*Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The results only describe the samples that were submitted to the assays.*

*PHYSICOCHEMICAL DATA*

**Physical aspect:** Faintly yellow liquid

**Refractive index:**  $1.5054 \pm 0.0003$  (20 °C)

*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	%	Classe
Unknown	0.01	Monoterpene
$\alpha$ -Pinene	0.07	Monoterpene
Camphene	tr	Monoterpene
$\alpha$ -Fenchene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	tr	Monoterpene
$\beta$ -Pinene	0.01	Monoterpene
$\Delta^3$ -Carene	0.01	Monoterpene
para-Cymene	0.01	Monoterpene
Limonene	0.01	Monoterpene
1,8-Cineole	0.01	Monoterpenic ether
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
Citronellal	0.01	Monoterpenic aldehyde
Borneol	0.01	Monoterpenic alcohol
$\alpha$ -Phellandren-8-ol	tr	Monoterpenic alcohol
Terpinen-4-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
$\alpha$ -Terpineol	0.02	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
Carvacrol methyl ether	0.03	Monoterpenic ether
Bornyl acetate	0.01	Monoterpenic ester
Brasila-1,10-diene	0.04	Sesquiterpene
Carvacrol	0.02	Monoterpenic alcohol
$\alpha$ -Terpinyl acetate	0.05	Monoterpenic ester
African-1-ene	0.06	Sesquiterpene
Cyclosativene II	0.02	Sesquiterpene
2-epi- $\alpha$ -Funebrene	0.51	Sesquiterpene
$\alpha$ -Duprezianene	0.69	Sesquiterpene
Isolongifolene	0.07	Sesquiterpene
$\beta$ -Elemene	0.15	Sesquiterpene
$\alpha$ -Funebrene	0.30	Sesquiterpene
$\alpha$ -Chamipinene	0.02	Sesquiterpene
Unknown	0.25	Sesquiterpene
$\beta$ -Funebrene	0.08	Sesquiterpene
$\alpha$ -Cedrene	23.97	Sesquiterpene
$\beta$ -Caryophyllene	0.79	Sesquiterpene
$\beta$ -Cedrene	4.53	Sesquiterpene
$\beta$ -Duprezianene	0.54	Sesquiterpene
<i>cis</i> -Thujopsene	22.20	Sesquiterpene
Isobazzanene	0.17	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	0.09	Sesquiterpene
Prezizaene	0.20	Sesquiterpene
$\alpha$ -Himachalene	0.27	Sesquiterpene
7,8-Dehydro- $\alpha$ -acoradiene?	0.22	Sesquiterpene
$\alpha$ -Humulene	0.18	Sesquiterpene

α-Acoradiene	0.16	Sesquiterpene
(E)-β-Farnesene	0.44	Sesquiterpene
β-Acoradiene	0.43	Sesquiterpene
Thujopsene isomer	0.23	Sesquiterpene
γ-Himachalene	0.67	Sesquiterpene
Unknown	0.22	Sesquiterpene
Unknown	0.19	Sesquiterpene
β-Chamigrene	0.20	Sesquiterpene
Widdra-2,4(14)-diene?	0.09	Sesquiterpene
ar-Curcumene	0.17	Sesquiterpene
Unknown	0.13	Sesquiterpene
Pseudowiddrene	1.00	Sesquiterpene
Unknown	0.07	Unknown
β-Himachalene	0.14	Sesquiterpene
α-Chamigrene	0.80	Sesquiterpene
α-Cuprenene	1.28	Sesquiterpene
Cuparene	1.51	Sesquiterpene
1,2-Dihydrocuparene	0.16	Sesquiterpene
α-Alaskene	0.30	Sesquiterpene
β-Curcumene	0.34	Sesquiterpene
α-Dehydro-ar-himachalene	0.02	Sesquiterpene
1,4-Dihydrocuparene	0.09	Sesquiterpene
Unknown	0.11	Sesquiterpene
7-epi-α-Selinene	0.19	Sesquiterpene
γ-Dehydro-ar-himachalene	0.04	Sesquiterpene
δ-Cadinene	0.03	Sesquiterpene
β-Sesquiphellandrene	0.34	Sesquiterpene
γ-Cuprenene	0.58	Sesquiterpene
Unknown	0.33	Oxygenated sesquiterpene
ar-Himachalene	0.02	Sesquiterpene
δ-Cuprenene epimer I	0.11	Sesquiterpene
Unknown	0.27	Oxygenated sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
δ-Cuprenene epimer II	0.11	Sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Caryophyllenyl alcohol	0.14	Sesquiterpenic alcohol
Caryophyllene oxide	0.04	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
allo-Cedrol	0.17	Sesquiterpenic alcohol
α-Cedrol	20.73	Sesquiterpenic alcohol
Widdrol	2.55	Sesquiterpenic alcohol
epi-Cedrol	0.42	Sesquiterpenic alcohol
β-Himachalene oxide	0.01	Sesquiterpenic ether
Unknown	0.13	Oxygenated sesquiterpene
10-epi-Cubenol	0.08	Sesquiterpenic alcohol
Unknown	0.15	Oxygenated sesquiterpene
α-Acorenol	0.37	Sesquiterpenic alcohol
2-epi-α-Cedren-3-one	0.07	Sesquiterpenic ketone
β-Acorenol	0.18	Sesquiterpenic alcohol
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.34	Oxygenated sesquiterpene

Unknown	0.43	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Himachalol	0.05	Sesquiterpenic alcohol
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Cedrenol analog	0.11	Sesquiterpenic alcohol
1,7-diepi- $\alpha$ -Cedrenal?	0.11	Sesquiterpenic aldehyde
Cedr-8-en-13-ol	0.11	Sesquiterpenic alcohol
$\alpha$ -Bisabolol	0.09	Sesquiterpenic alcohol
$\alpha$ -Cedrenol	0.10	Sesquiterpenic alcohol
Unknown	0.37	Oxygenated sesquiterpene
Mayurone?	0.01	Norsesquiterpenic ketone
Thujopsenal	0.19	Sesquiterpenic aldehyde
Unknown	0.06	Oxygenated sesquiterpene
Thujopsenal analog	0.09	Sesquiterpenic aldehyde
Unknown	0.03	Oxygenated sesquiterpene
Cuparenal	0.05	Sesquiterpenic aldehyde
Unknown	0.07	Oxygenated sesquiterpene
Cedryl acetate	0.07	Sesquiterpenic ester
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Unknown	0.14	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
Nootkatone analog	0.03	Sesquiterpenic ketone
Manool	0.01	Diterpenic alcohol
7,13-Abietadiene	0.01	Diterpene
<b>Consolidated total</b>	<b>95.02%</b>	

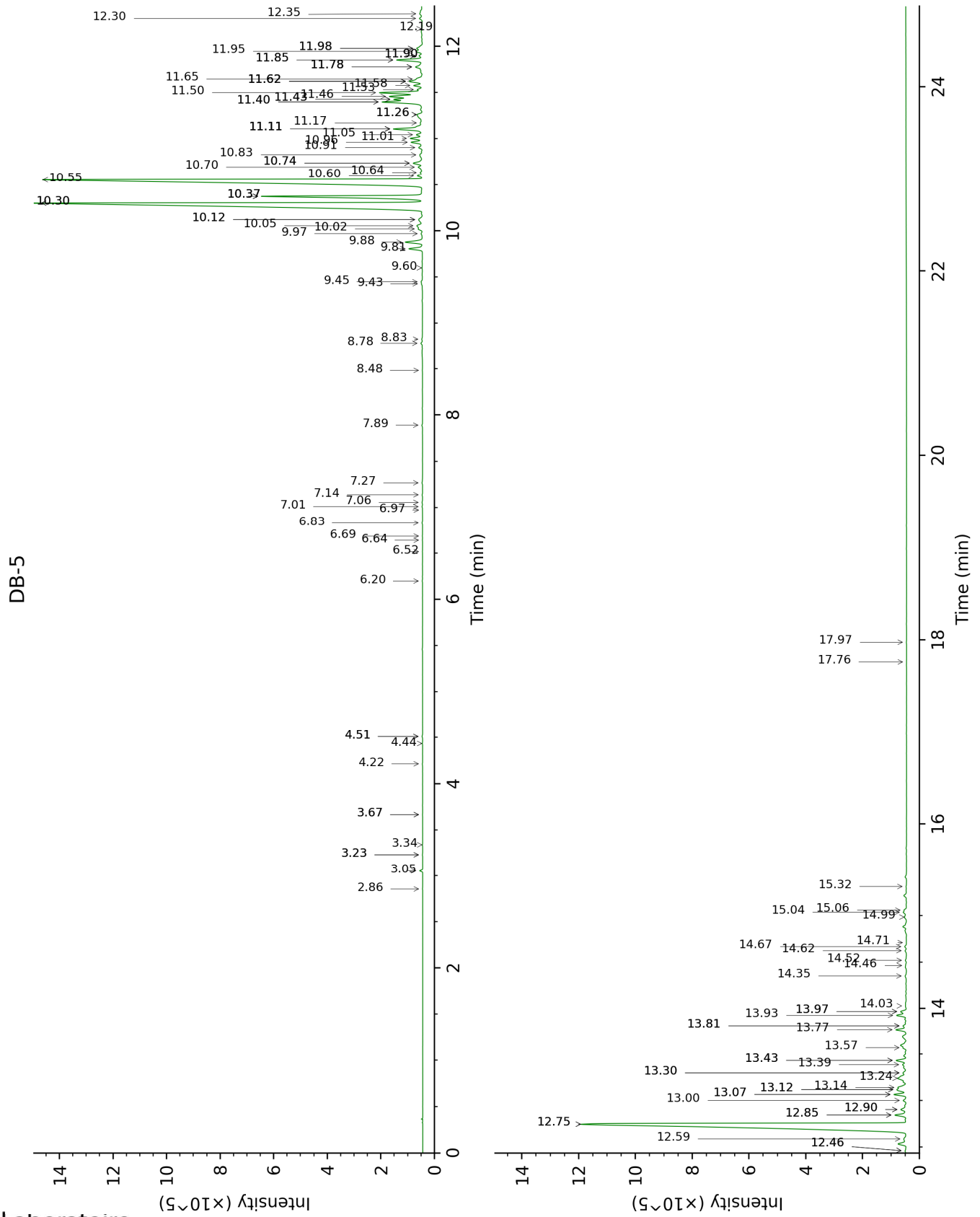
tr: The compound has been detected below 0.005% of total signal.

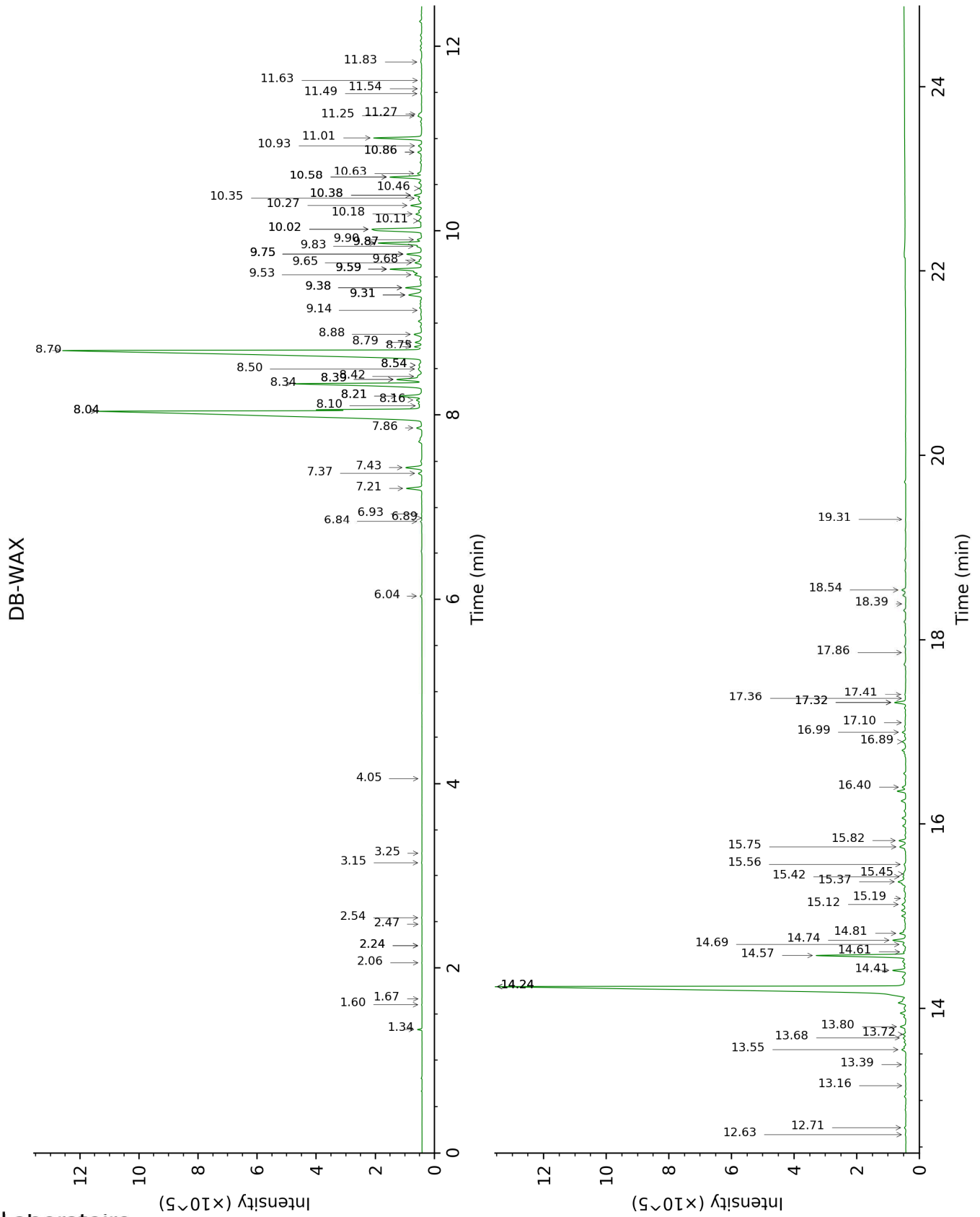
Note: no correction factor was applied

**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.







FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Unknown [m/z 105, 79 (80), 91 (78), 77 (69), 78 (56), 93 (46), 120 (44)... 136 (4)]	2.86	916	0.01	2.47	1104	0.01
$\alpha$ -Pinene	3.05	929	0.07	1.34	990	0.07
Camphene	3.23*	940	0.01	1.67	1027	tr
$\alpha$ -Fenchene	3.23*	940	[0.01]	1.60	1020	0.01
Thuja-2,4(10)-diene	3.34	948	0.01	2.24*	1083	0.01
Sabinene	3.67*	969	0.01	2.24*	1083	[0.01]
$\beta$ -Pinene	3.67*	969	[0.01]	2.06	1065	0.01
$\Delta$ 3-Carene	4.22	1005	0.01	2.54	1110	0.01
para-Cymene	4.44	1019	0.01	4.06	1225	0.01
Limonene	4.51*	1024	0.02	3.15	1156	0.01
1,8-Cineole	4.51*	1024	[0.02]	3.25	1164	0.01
<i>trans</i> -Pinocarveol	6.20	1132	0.01	9.14	1601	0.02
Citronellal	6.52	1153	0.01	6.93	1434	0.01
Borneol	6.64	1161	0.01	9.75*	1650	0.49
$\alpha$ -Phellandren-8-ol	6.69	1164	tr	10.11	1679	0.14
Terpinen-4-ol	6.83	1173	0.02	8.54*	1555	0.14
para-Cymen-8-ol	6.97	1183	0.01	11.49	1795	0.04
Unknown [m/z 93, 59 (85), 81 (36), 92 (35), 43 (34), 121 (20), 136 (16)...]	7.01	1185	0.02			
$\alpha$ -Terpineol	7.06	1188	0.02	9.75*	1650	[0.49]
Myrtenol	7.14	1194	0.02	10.86*	1742	0.14
Verbenone	7.27	1202	0.03	9.59*†	1637	1.14
Carvacrol methyl ether	7.89	1246	0.03	8.54*	1555	[0.14]
Bornyl acetate	8.48	1284	0.01	8.21*†	1529	[0.89]
Brasila-1,10-diene	8.78	1304	0.04	6.04	1369	0.05
Carvacrol	8.83	1307	0.02	15.37	2157	0.31
$\alpha$ -Terpinyl acetate	9.43	1349	0.05	9.68	1645	0.08
African-1-ene	9.45	1350	0.06	6.84	1428	0.04
Cyclosativene II	9.60	1361	0.02	6.89	1431	0.01
2-epi- $\alpha$ -Funebrene	9.81	1375	0.51	7.21	1454	0.46
$\alpha$ -Duprezianene	9.88	1380	0.69	7.43	1471	0.53
Isolongifolene	9.97	1387	0.07	7.37	1466	0.10
$\beta$ -Elemene	10.02	1390	0.15	8.42	1546	0.14
$\alpha$ -Funebrene	10.06	1393	0.30	7.86	1503	0.15
$\alpha$ -Chamipinene	10.12*	1397	0.27	8.04*†	1517	23.99
Unknown [m/z 107, 91 (86), 93 (83), 79 (81), 162 (74), 41 (73), 133 (72)... 204 (13)]	10.12*	1397	[0.27]	8.21*†	1529	[0.89]
$\beta$ -Funebrene	10.30*	1410	24.05	8.10	1521	0.08
$\alpha$ -Cedrene	10.30*	1410	[24.05]	8.04*†	1517	[23.99]