

Date : July 23, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

**Internal code** : 21G13-PTH02

**Customer identification** : Balm Mint Bush - Australia - BP0103207R

**Type** : Essential oil

**Source** : *Prostanthera melissifolia*

**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** : Alexis St-Gelais, M. Sc., Chimiste 2013-174

**Analysis date** : July 23, 2021

Checked and approved by :

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

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#### PHYSICOCHEMICAL DATA

**Physical aspect:** Faintly yellow liquid

**Refractive index:**  $1.4710 \pm 0.0003$  (20 °C; method PC-MAT-016)

#### CONCLUSION

No clear adulterant, contaminant or diluent has been detected using this method. However, the sample contains linalol isomer, which is considered by some authors as being indicative of addition of foreign linalool. We recommend this observation is considered when evaluating this batch. Phytochemia can make no guarantee that this oil corresponds to the stated species, as there is yet no scientific reference about the expected composition for this species.

## ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

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

Identification	%	Class
Isovaleral	tr	Aliphatic aldehyde
Isoamyl alcohol	0.01	Aliphatic alcohol
Toluene	tr	Simple phenolic
Hashishene	0.01	Monoterpene
Tricyclene	0.03	Monoterpene
$\alpha$ -Thujene	0.26	Monoterpene
$\alpha$ -Pinene	18.93	Monoterpene
Camphene	0.06	Monoterpene
$\alpha$ -Fenchene	0.02	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.02	Monoterpene
$\beta$ -Pinene	0.06	Monoterpene
6-Methyl-5-hepten-2-one	tr	Aliphatic ketone
Unknown	tr	Unknown
Myrcene	0.14	Monoterpene
$\alpha$ -Phellandrene	0.35	Monoterpene
$\Delta^3$ -Carene	0.01	Monoterpene
$\alpha$ -Terpinene	0.08	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
para-Cymene	1.08	Monoterpene
Limonene	1.70	Monoterpene
1,8-Cineole	22.79	Monoterpenic ether
(Z)- $\beta$ -Ocimene	0.03	Monoterpene
(E)- $\beta$ -Ocimene	0.06	Monoterpene
$\gamma$ -Terpinene	0.79	Monoterpene
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
para-Cymenene	0.01	Monoterpene
Terpinolene	0.45	Monoterpene
trans-Linalool oxide (fur.)	0.03	Monoterpenic alcohol
$\alpha$ -Pinene oxide	0.02	Monoterpenic ether
Linalool	15.41	Monoterpenic alcohol
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
Plinol (C?)	0.02	Monoterpenic alcohol
allo-Ocimene	0.01	Monoterpene
trans-Pinocarveol	0.01	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.05	Monoterpenic alcohol
$\delta$ -Terpineol	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Terpinen-4-ol	3.01	Monoterpenic alcohol
Unknown	0.09	Unknown
Cryptone	0.01	Normonoterpenic ketone
para-Cymen-8-ol	0.05	Monoterpenic alcohol
$\alpha$ -Terpineol	1.19	Monoterpenic alcohol
cis-Piperitol	0.01	Monoterpenic alcohol

Verbenone	0.08	Monoterpenic ketone
Unknown	0.07	Unknown
Unknown	0.01	Oxygenated monoterpene
Cuminal	0.01	Monoterpenic aldehyde
Carvotanacetone	0.09	Monoterpenic ketone
Geraniol	0.04	Monoterpenic alcohol
Piperitone	30.67	Monoterpenic ketone
Phellandral	0.01	Monoterpenic aldehyde
para-Cymen-7-ol	0.01	Monoterpenic alcohol
Unknown	0.03	Unknown
Thymol	0.02	Monoterpenic alcohol
Carvacrol	0.01	Monoterpenic alcohol
para-Menth-5-en-1,2-diol isomer III	0.03	Monoterpenic alcohol
Unknown	0.01	Unknown
Bicycloelemene	0.18	Sesquiterpene
$\alpha$ -Terpinyl acetate	0.07	Monoterpenic ester
Eugenol	0.03	Phenylpropanoid
Isoledene	0.01	Sesquiterpene
$\alpha$ -Copaene	tr	Sesquiterpene
Methyl ( <i>E</i> )-cinnamate	0.01	Phenylpropanoid ester
$\beta$ -Cubebene	0.01	Sesquiterpene
$\beta$ -Elemene	0.03	Sesquiterpene
( <i>Z</i> )-Jasmone	0.01	Jasmonate
$\alpha$ -Gurjunene	0.03	Sesquiterpene
$\beta$ -Caryophyllene	0.65	Sesquiterpene
$\alpha$ -Maaliene	0.02	Sesquiterpene
Aromadendrene	0.08	Sesquiterpene
$\alpha$ -Humulene	0.01	Sesquiterpene
allo-Aromadendrene	0.05	Sesquiterpene
Eremophilene	0.01	Sesquiterpene
Viridiflorene	0.03	Sesquiterpene
Bicyclogermacrene	0.07	Sesquiterpene
Isocaryophyllene epoxide B	0.01	Sesquiterpenic ether
Palustrol	0.01	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Globulol	0.01	Sesquiterpenic alcohol
Viridiflorol	0.01	Sesquiterpenic alcohol
$\gamma$ -Eudesmol	0.01	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
<b>Consolidated total</b>	<b>99.39%</b>	

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

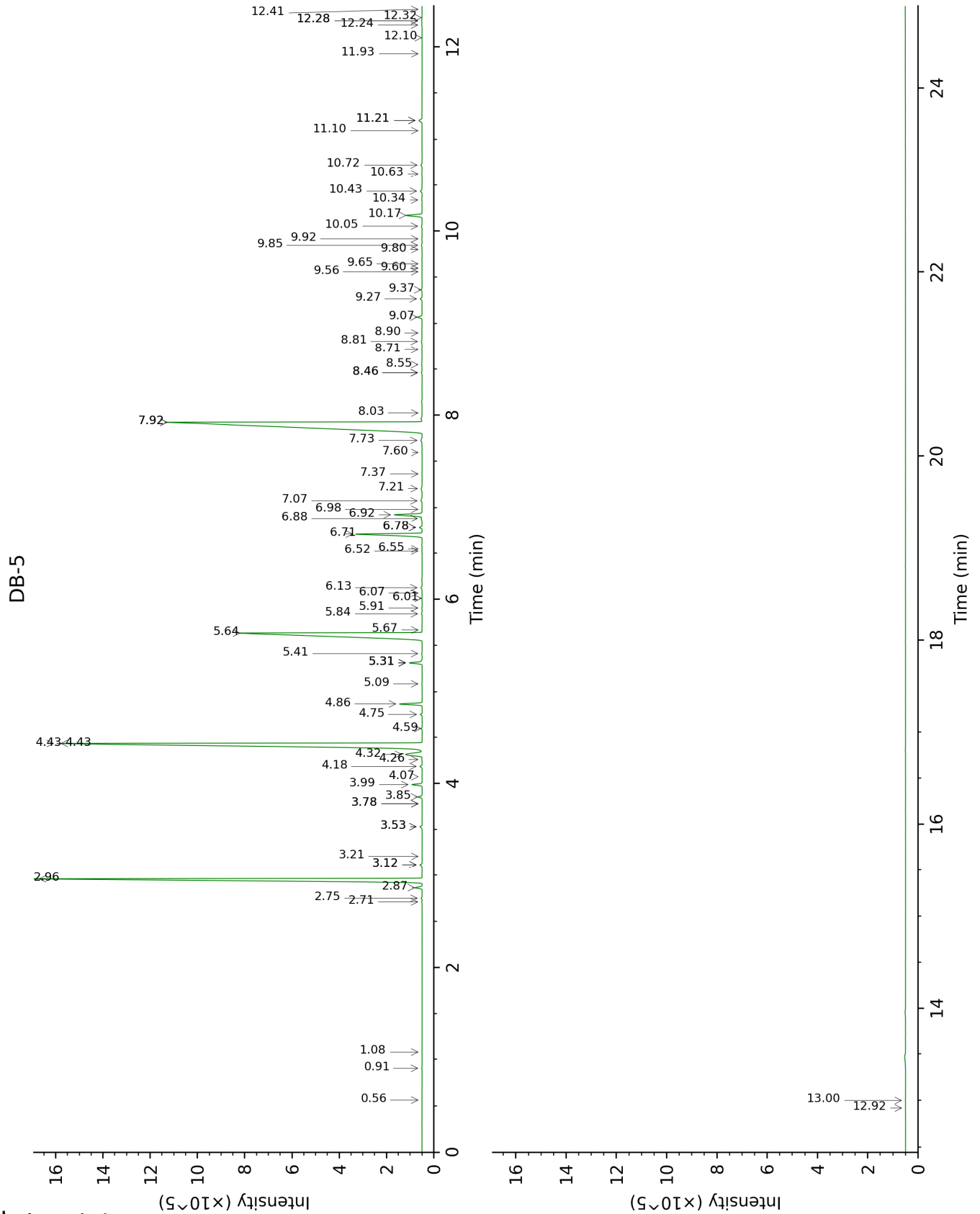
Note: no correction factor was applied

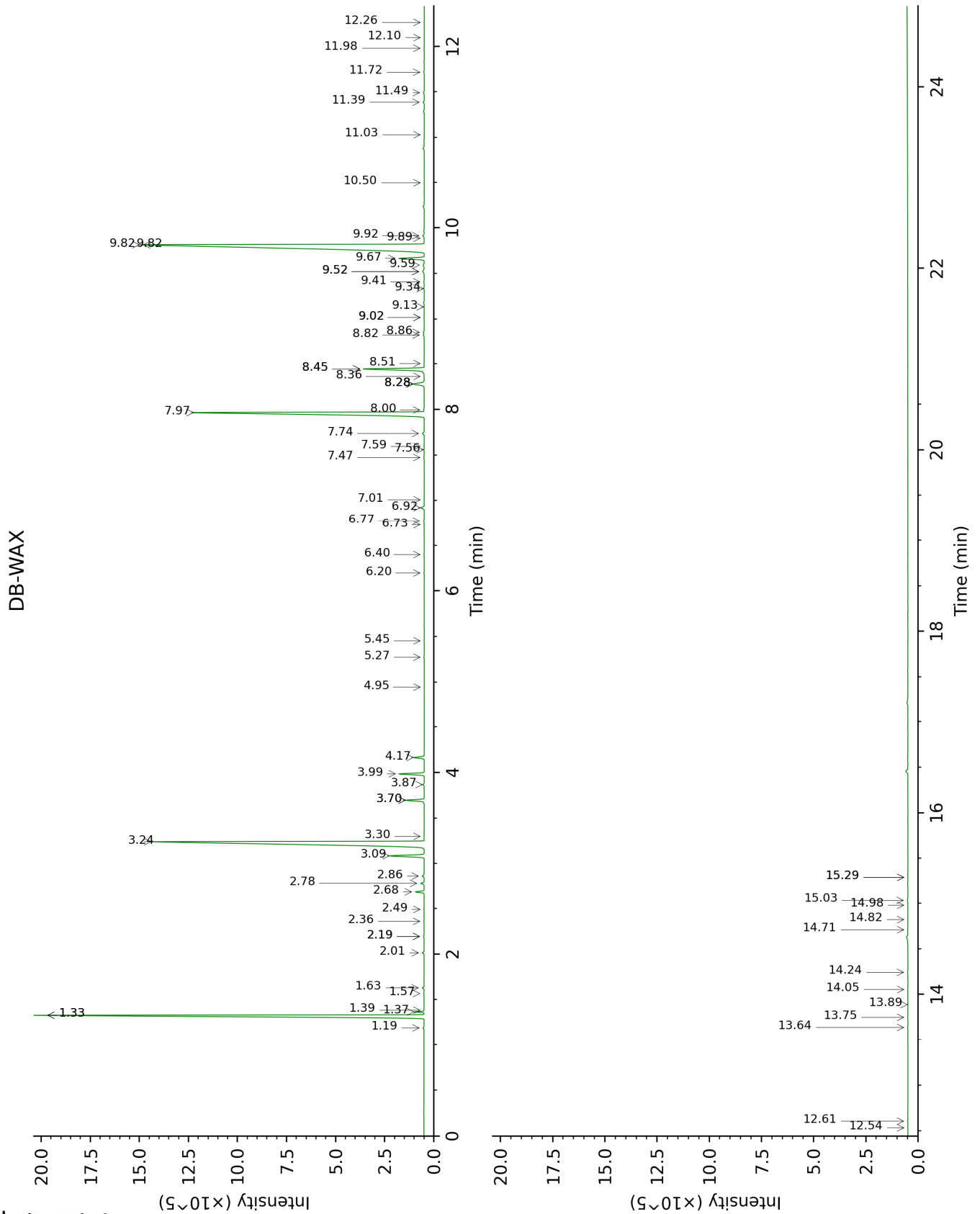
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.



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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.56	643	tr			
Isoamyl alcohol	0.90	732	0.01	3.30	1175	0.01
Toluene	1.08	758	tr	1.38	1001	tr
Hashishene	2.71	916	0.01	1.33*	995	18.80
Tricyclene	2.75	918	0.03	1.19	971	0.03
$\alpha$ -Thujene	2.86	926	0.26	1.37	999	0.26
$\alpha$ -Pinene	2.96	932	18.93	1.33*	995	[18.80]
Camphene	3.12*	943	0.08	1.63	1026	0.06
$\alpha$ -Fenchene	3.12*	943	[0.08]	1.57	1019	0.02
Thuja-2,4(10)-diene	3.21	949	0.01	2.19*	1084	0.02
Sabinene	3.53*	971	0.09	2.19*	1084	[0.02]
$\beta$ -Pinene	3.53*	971	[0.09]	2.01	1065	0.06
6-Methyl-5-hepten-2-one	3.78*	988	0.01	4.95	1301	tr
Unknown [m/z 67, 68 (95), 43 (73), 94 (65), 79 (54), 41 (50)...]	3.78*	988	[0.01]			
Myrcene	3.86	993	0.14	2.78	1133	0.13
$\alpha$ -Phellandrene	3.99	1002	0.35	2.68	1126	0.34
$\Delta$ 3-Carene	4.07	1008	0.01	2.49	1110	tr
$\alpha$ -Terpinene	4.18	1015	0.08	2.86	1140	0.08
Carvomenthene	4.26	1020	0.02	2.36	1100	0.02
para-Cymene	4.32	1023	1.08	3.99	1229	1.08
Limonene	4.43*	1031	24.52	3.09	1158	1.70
1,8-Cineole	4.43*	1031	[24.52]	3.24	1171	22.79
(Z)- $\beta$ -Ocimene	4.60	1041	0.03	3.70*	1207	0.82
(E)- $\beta$ -Ocimene	4.75	1051	0.06	3.87	1220	0.06
$\gamma$ -Terpinene	4.86	1058	0.79	3.70*	1207	[0.82]
cis-Linalool oxide (fur.)	5.09	1072	0.02	6.40	1402	0.02
para-Cymenene	5.31*	1087	0.49	6.20	1387	0.01
Terpinolene	5.31*	1087	[0.49]	4.17	1242	0.45
trans-Linalool oxide (fur.)	5.31*	1087	[0.49]	6.77	1429	0.03
$\alpha$ -Pinene oxide	5.41	1093	0.02	5.27	1320	0.01
Linalool	5.64	1107	15.41	7.97	1519	15.32
endo-Fenchol	5.67	1110	0.01	8.28*	1543	0.68
cis-para-Menth-2-en-1-ol	5.84	1121	0.03	8.00	1521	0.04
Plinol (C?)	5.91	1125	0.02	8.36	1550	0.01
allo-Ocimene	6.01	1132	0.01	5.45	1333	0.01
trans-Pinocarveol	6.07	1135	0.01	9.02*	1601	0.01
trans-para-Menth-2-en-1-ol	6.13	1139	0.05	8.82	1585	0.05
$\delta$ -Terpineol	6.52	1165	0.01	9.34	1626	0.02

Unknown [m/z 95, 110 (43), 81 (28), 41 (15)... 152 (8)]	6.55	1166	0.01	7.56	1488	0.02
Terpinen-4-ol	6.71	1177	3.01	8.45*	1556	3.04
Unknown [m/z 69, 68 (65), 110 (51), 67 (39), 41 (27), 83 (26)...]	6.78*	1182	0.10	7.74	1501	0.09
Cryptone	6.78*	1182	[0.10]	9.02*	1601	[0.01]
para-Cymen-8-ol	6.88	1188	0.05	11.39	1797	0.06
α-Terpineol	6.92	1191	1.19	9.67	1653	1.19
cis-Piperitol	6.98	1195	0.01	9.41	1632	0.03
Verbenone	7.07	1201	0.08	9.52*	1641	0.11
Unknown [m/z 43, 71 (51), 55 (48), 41 (37), 56 (33), 83 (24), 111 (23)...]	7.21	1210	0.07			
Unknown [m/z 43, 111 (88), 126 (74), 125 (61)... 168? (2)]	7.37	1221	0.01	11.03	1767	0.01
Cuminal	7.60	1236	0.01	10.50	1722	0.01
Carvotanacetone	7.73	1245	0.09			
Geraniol	7.92*	1259	30.78	11.49	1806	0.04
Piperitone	7.92*	1259	[30.78]	9.82*	1665	30.68
Phellandral	8.02	1266	0.01	9.89	1671	0.01
para-Cymen-7-ol	8.46*	1295	0.03	14.05	2040	0.01
Unknown [m/z 124, 68 (35), 40 (35), 96 (34), 123 (29), 95 (20)...]	8.46*	1295	[0.03]	11.72	1826	0.03
Thymol	8.55	1301	0.02	14.98	2130	0.01
Carvacrol	8.71	1309	0.01	15.28*	2161	0.01
para-Menth-5-en-1,2-diol isomer III	8.81	1316	0.03	15.03	2136	0.04
Unknown [m/z 69, 41 (58), 114 (29), 43 (25), 83 (24), 123 (20)...]	8.90	1322	0.01			
Bicycloelemene	9.07	1334	0.18	6.92	1440	0.17
α-Terpinyl acetate	9.27	1349	0.07	9.59	1647	0.07
Eugenol	9.37	1356	0.03	14.71	2104	0.03
Isoledene	9.56	1369	0.01	6.73	1426	0.01
α-Copaene	9.60	1372	tr	7.01	1447	tr
Methyl (E)-cinnamate	9.65	1376	0.01	13.64	2000	0.02
β-Cubebene	9.80	1386	0.01	7.60	1490	0.01
β-Elemene	9.85	1390	0.03	8.28*	1543	[0.68]
(Z)-Jasmone	9.92	1395	0.01	12.26	1874	0.01
α-Gurjunene	10.05	1404	0.03	7.47	1481	0.02
β-Caryophyllene	10.17	1413	0.65	8.28*	1543	[0.68]
α-Maaliene	10.34	1426	0.02	8.50	1561	0.01
Aromadendrene	10.43	1433	0.08	8.45*	1556	[3.04]

α-Humulene	10.63	1447	0.01	9.13	1610	0.01
allo-Aromadendrene	10.72	1454	0.05	8.86	1588	0.05
Eremophilene	11.10	1482	0.01	9.82*	1665	[30.68]
Viridiflorene	11.21*	1491	0.16	9.52*	1641	[0.11]
Bicyclogermacrene	11.21*	1491	[0.16]	9.92	1673	0.07
Isocaryophyllene epoxide B	11.93	1547	0.01	11.98	1849	0.02
Palustrol	12.10	1561	0.01	12.10	1860	0.01
Spathulenol	12.24	1572	0.02	14.24	2058	0.03
Caryophyllene oxide	12.28*	1575	0.03	12.61	1905	0.02
Caryophyllene oxide isomer	12.28*	1575	[0.03]	12.54	1899	0.01
Globulol	12.32	1578	0.01	13.75	2011	0.02
Viridiflorol	12.41	1585	0.01	13.89	2024	0.01
γ-Eudesmol	12.92	1626	0.01	14.82	2115	0.01
Isospathulenol	13.00	1633	0.01	15.28*	2161	[0.01]
<b>Total identified</b>		<b>99.46%</b>			<b>98.79%</b>	
<b>Total reported</b>		<b>99.56%</b>			<b>98.94%</b>	

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

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

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