

Date : 2023-09-14

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code :** 23107-PTH02

**Customer Identification :** Sage Dalmatian Essential Oil - Austria - S10107R

**Type :** Essential Oil

**Source :** *Salvia officinalis*

**Customer :** Plant Therapy

Checked and approved by:

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

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## GAS CHROMATOGRAPHIC ANALYSIS

**Method :** PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

**\*ISO**

**Results :** See analysis summary (next page)

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

**Date :** 2023-09-12

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.4666 \pm 0.0003$  (20 °C)

**Method :** PC-MAT-016 - Measure of the refractive index of a liquid.

**Analyst :** Cindy Caron B. Sc.

**Date :** 2023-09-08

## 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
Ethanol	0.01	Aliphatic alcohol
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Toluene	tr	Simple phenolic
(2E)-Hexenal	tr	Aliphatic aldehyde
(Z)-Salvene	0.06	Normonoterpene
(3Z)-Hexenol	0.04	Aliphatic alcohol
(E)-Salvene	0.02	Normonoterpene
(2E)-Hexenol	0.01	Aliphatic alcohol
Hexanol	0.03	Aliphatic alcohol
Hashishene	0.01	Monoterpene
Tricyclene	0.11	Monoterpene
$\alpha$ -Thujene	0.52	Monoterpene
$\alpha$ -Pinene	4.64	Monoterpene
Unknown	0.02	Monoterpene
$\alpha$ -Fenchene	0.25	Monoterpene
Camphene	5.27	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.20	Monoterpene
$\beta$ -Pinene	2.96	Monoterpene
Octen-3-ol	0.03	Aliphatic alcohol
Octan-3-one	0.01	Aliphatic ketone
Dehydro-1,8-cineole	0.01	Monoterpenic ether
Myrcene	0.73	Monoterpene
2-Carene	0.01	Monoterpene
6-Methyl-5-hepten-2-ol	0.01	Aliphatic alcohol
<i>cis</i> -Dehydroxylinalool oxide	tr	Monoterpenic ether
$\alpha$ -Phellandrene	0.02	Monoterpene
Pseudolimonene	0.02	Monoterpene
$\Delta^3$ -Carene	0.01	Monoterpene
$\alpha$ -Terpinene	0.19	Monoterpene
<i>para</i> -Cymene	0.35	Monoterpene
1,8-Cineole	10.73	Monoterpenic ether
Limonene	1.63	Monoterpene
(Z)- $\beta$ -Ocimene	0.11	Monoterpene
(E)- $\beta$ -Ocimene	0.02	Monoterpene
$\gamma$ -Terpinene	1.24	Monoterpene

<i>cis</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
Terpinolene	0.56	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
$\alpha$ -Thujone	25.25	Monoterpenic ketone
Linalool	0.49	Monoterpenic alcohol
$\beta$ -Thujone	5.74	Monoterpenic ketone
<i>cis-para</i> -Menth-2-en-1-ol	0.01	Monoterpenic alcohol
$\alpha$ -Campholenal	0.01	Monoterpenic aldehyde
Camphor	18.71	Monoterpenic ketone
neiso-Thujol	0.16	Monoterpenic alcohol
Camphene hydrate	0.02	Monoterpenic alcohol
Sabinaketone	0.02	Normonoterpenic ketone
Isoborneol	0.01	Monoterpenic alcohol
Pinocamphone	0.05	Monoterpenic ketone
Borneol	3.44	Monoterpenic alcohol
$\delta$ -Terpineol	0.03	Monoterpenic alcohol
Terpinen-4-ol	0.50	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.02	Monoterpenic alcohol
$\alpha$ -Terpineol	0.14	Monoterpenic alcohol
Myrtenol	0.05	Monoterpenic alcohol
4-Hydroxy- $\beta$ -thujone	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
<i>cis</i> -Carveol	0.01	Monoterpenic alcohol
Carvone	0.03	Monoterpenic ketone
Carvotanacetone	0.01	Monoterpenic ketone
Geraniol	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Isobornyl acetate	0.01	Monoterpenic ester
Bornyl acetate	1.37	Monoterpenic ester
<i>trans</i> -Sabinyl acetate	0.03	Monoterpenic ester
Thymol	0.01	Monoterpenic alcohol
Carvacrol	0.03	Monoterpenic alcohol
Myrtenyl acetate	0.01	Monoterpenic ester
Eugenol	0.01	Phenylpropanoid
$\alpha$ -Copaene	0.03	Sesquiterpene
$\beta$ -Bourbonene	0.01	Sesquiterpene
Isocaryophyllene	0.04	Sesquiterpene
$\alpha$ -Gurjunene	0.01	Sesquiterpene
$\beta$ -Caryophyllene	5.60	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.04	Sesquiterpene
Aromadendrene	0.03	Sesquiterpene
Unknown	0.01	Unknown

9-epi-Isocaryophyllene	0.49	Sesquiterpene
Unknown	0.01	Unknown
$\alpha$ -Humulene	5.93	Sesquiterpene
allo-Aromadendrene	0.06	Sesquiterpene
9-epi- $\beta$ -Caryophyllene	0.02	Sesquiterpene
$\gamma$ -Gurjunene	0.01	Sesquiterpene
$\gamma$ -Murolene	0.06	Sesquiterpene
$\alpha$ -Amorphene	0.05	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
$\beta$ -Selinene	0.03	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
$\alpha$ -Selinene	0.03	Sesquiterpene
5-Methyl-2,4-diisopropylphenol	0.02	Terpene derivative
$\gamma$ -Cadinene	0.01	Sesquiterpene
$\beta$ -Bisabolene	0.01	Sesquiterpene
<i>trans</i> -Calamenene	0.03	Sesquiterpene
$\delta$ -Cadinene	0.04	Sesquiterpene
Isocaryophyllene epoxide B	0.03	Sesquiterpenic ether
Caryophyllene oxide	0.13	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Viridiflorol	0.30	Sesquiterpenic alcohol
Humulene epoxide I	0.02	Sesquiterpenic ether
Ledol	0.01	Sesquiterpenic alcohol
Humulene epoxide II	0.16	Sesquiterpenic ether
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Caryophylladienol I	tr	Sesquiterpenic alcohol
Caryophylladienol II	0.01	Sesquiterpenic alcohol
Unknown	0.01	Sesquiterpene
Isopimara-9(11),15-diene	0.02	Diterpene
Manool	0.06	Diterpenic alcohol
<b>Consolidated total</b>	<b>99.58</b>	

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

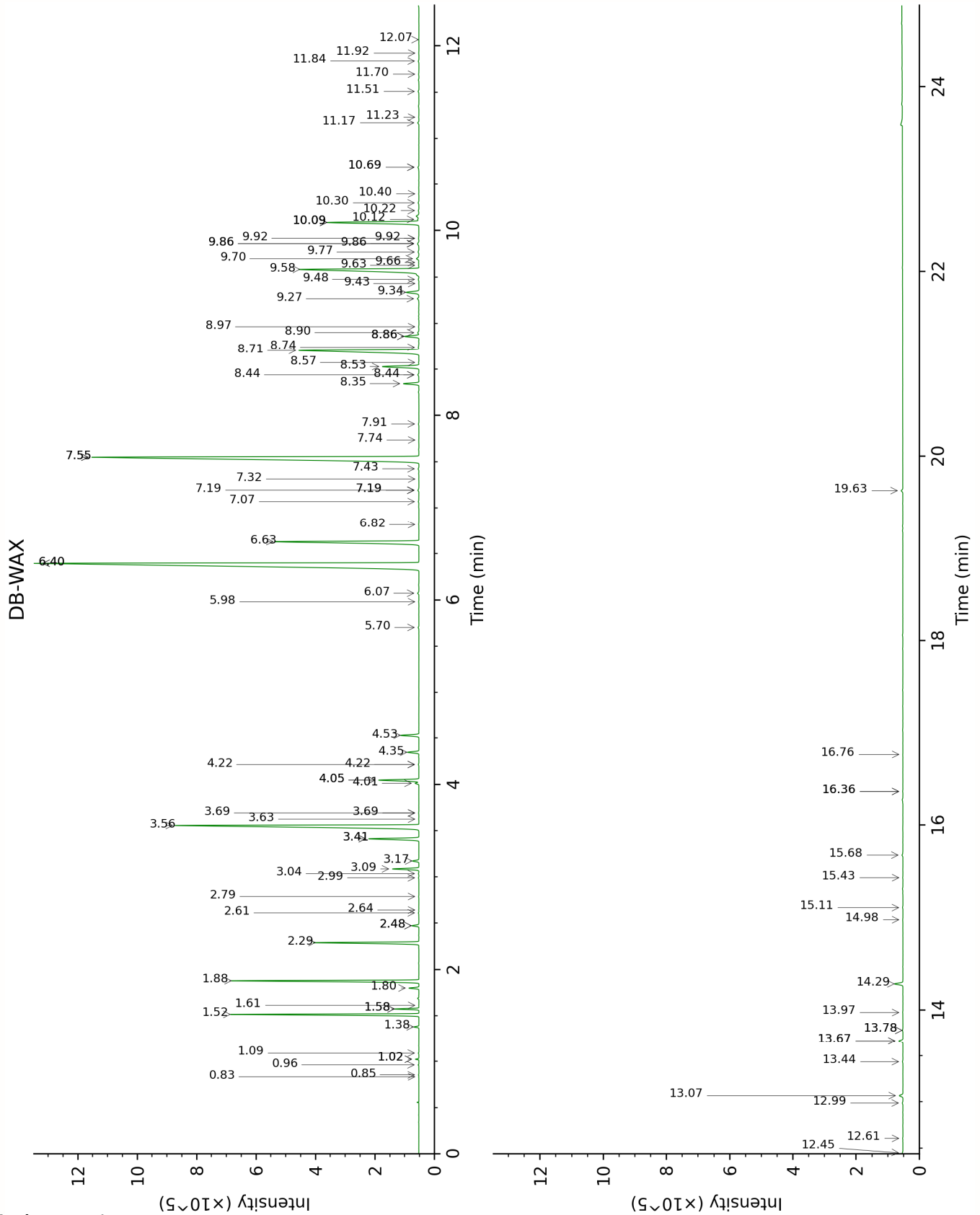
Note: no correction factor was applied

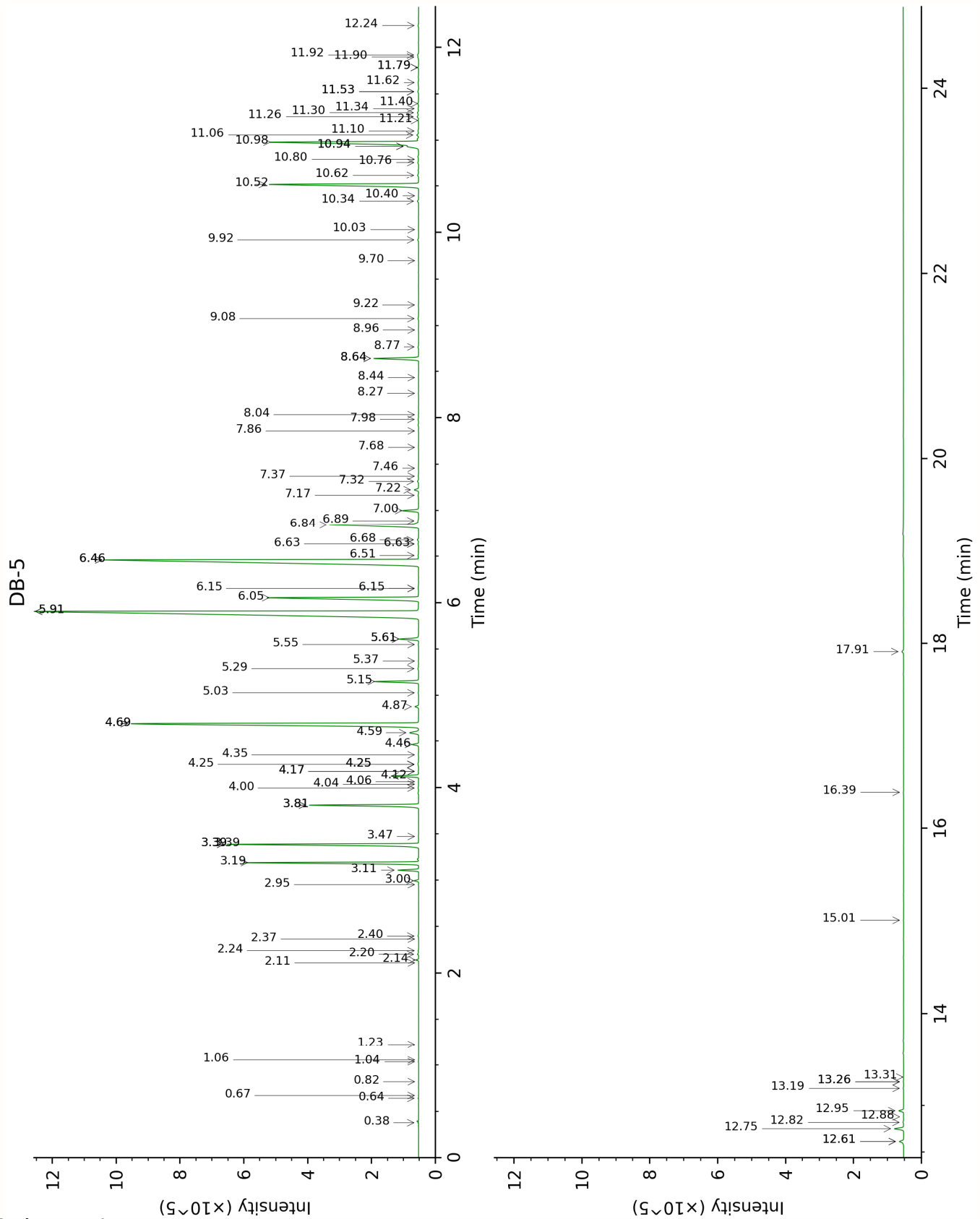
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

**Bracketed value (xx):** A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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







FULL ANALYSIS DATA

Ethanol	Column DB-WAX			Column DB-5		
	0.96	909.4	0.01	0.38	501.8	0.01
Isovaleral	0.86	889.2	0.01	0.64	642.0	0.01
2-Methylbutyral	0.83	882.4	tr	0.67	652.1	tr
2-Ethylfuran	1.02*	918.5	[0.06]	0.82	702.0	tr
Isoamyl alcohol	3.69*	1178.8	[0.02]	1.04	733.9	tr
2-Methylbutanol	3.69*	1178.8	[0.02]	1.06	736.6	tr
Toluene	1.61	1001.9	tr	1.23	759.9	tr
(2E)-Hexenal	3.63	1173.6	0.01	2.11	850.4	tr
(Z)-Salvene	1.02*	918.5	[0.06]	2.14	853.0	0.06
(3Z)-Hexenol	6.07	1349.4	0.05	2.20	858.1	0.04
(E)-Salvene	1.09	928.4	0.01	2.24	861.2	0.02
(2E)-Hexenol	6.40*	1372.4	[25.19]	2.37	871.5	0.01
Hexanol	5.70	1322.9	0.03	2.40	874.1	0.03
Hashishene	1.58*	998.4	[0.52]	2.95	916.6	0.01
Tricyclene	1.38	971.6	0.11	3.00	919.3	0.11
α-Thujene	1.58*	998.4	[0.52]	3.11	926.8	0.52
α-Pinene	1.52	991.7	4.64	3.19	932.2	4.64
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.61	1095.9	0.02	3.39*	945.1	[5.54]
α-Fenchene	1.80	1019.6	0.25	3.39*	945.1	[5.54]
Camphene	1.88	1026.9	5.27	3.39*	945.1	[5.54]
Thuja-2,4(10)- diene	2.48*	1083.2	[0.20]	3.47	950.7	0.01
Sabinene	2.48*	1083.2	[0.20]	3.81*	972.8	[3.16]
β-Pinene	2.29	1065.9	2.96	3.81*	972.8	[3.16]
Octen-3-ol	7.07	1421.4	0.03	4.00	984.9	0.03
Octan-3-one	4.22*	1217.8	[0.02]	4.04	987.6	0.01
Dehydro-1,8- cineole	3.41*	1157.3	[1.62]	4.06	989.4	0.01
Myrcene	3.09	1132.2	0.73	4.12	993.4	0.73
2-Carene	2.64	1098.2	0.01	4.18*	996.7	[0.02]
6-Methyl-5- hepten-2-ol	7.19*	1430.5	[0.04]	4.18*	996.7	[0.02]
cis- Dehydroxylinalool oxide	4.05*	1205.5	[1.24]	4.25*	1001.6	[0.04]
α-Phellandrene	2.99	1124.8	0.02	4.25*	1001.6	[0.04]
Pseudolimonene	3.04	1128.3	0.02	4.25*	1001.6	[0.04]
Δ3-Carene	2.79	1109.4	0.01	4.35	1008.2	0.01
α-Terpinene	3.17	1138.8	0.19	4.46	1015.2	0.19
para-Cymene	4.35	1227.4	0.35	4.59	1023.1	0.35
1,8-Cineole	3.56	1168.3	10.73	4.69*	1029.1	[12.36]

Limonene	3.41*	1157.3	[1.62]	4.69*	1029.1	[12.36]
(Z)-β-Ocimene	4.01	1203.0	0.11	4.87	1040.6	0.11
(E)-β-Ocimene	4.22*	1217.8	[0.02]	5.03	1050.3	0.02
γ-Terpinene	4.05*	1205.5	[1.24]	5.15	1057.9	1.24
cis-Sabinene hydrate	7.19*	1430.5	[0.04]	5.29	1066.6	0.03
cis-Linalool oxide (fur.)	6.82	1402.7	0.01	5.37	1071.7	0.01
Fenchone	5.98	1342.8	0.01	5.55	1082.8	0.01
Terpinolene	4.53	1240.8	0.56	5.61*	1086.5	[0.57]
trans-Linalool oxide (fur.)	7.19*	1430.5	[0.04]	5.61*	1086.5	[0.57]
α-Thujone	6.40*	1372.4	[25.19]	5.91*	1105.1	[25.74]
Linalool	8.35	1516.4	0.49	5.91*	1105.1	[25.74]
β-Thujone	6.63	1389.1	5.73	6.06	1114.5	5.74
cis-para-Menth-2-en-1-ol	8.44*	1523.7	[0.04]	6.15*	1120.8	[0.01]
α-Campholenal	7.32	1439.4	0.01	6.15*	1120.8	[0.01]
Camphor	7.55*	1456.8	[18.76]	6.46*	1140.4	[18.87]
neoiso-Thujol	9.86*	1634.7	[0.07]	6.46*	1140.4	[18.87]
Camphene hydrate	8.74	1547.0	0.03	6.51	1143.4	0.02
Sabinaketon	8.97	1564.1	0.02	6.63*	1151.3	[0.02]
Isoborneol	9.66	1618.4	0.01	6.63*	1151.3	[0.02]
Pinocamphone	7.55*	1456.8	[18.76]	6.68	1154.2	0.05
Borneol	10.09*	1653.0	[3.48]	6.84	1164.7	3.44
δ-Terpineol	9.77	1627.5	0.04	6.89	1167.6	0.03
Terpinen-4-ol	8.86*	1556.2	[0.49]	7.00	1174.7	0.50
para-Cymen-8-ol	11.84	1798.4	0.03	7.17	1185.2	0.02
α-Terpineol	10.09*	1653.0	[3.48]	7.22	1188.9	0.14
Myrtenol	11.17	1742.1	0.04	7.32	1194.6	0.05
4-Hydroxy-β-thujone	12.61	1865.8	0.01	7.37	1198.2	0.02
Unknown PIMA 7 [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	11.23	1747.2	0.01	7.46	1203.8	0.01
trans-Carveol	11.70	1786.2	0.01	7.68	1218.7	0.01
cis-Carveol	12.07	1818.7	0.01	7.86	1230.5	0.01
Carvone	10.30	1669.9	0.03	7.98	1238.8	0.03
Carvotanacetone	9.70	1621.7	0.11	8.04	1242.2	0.01
Geraniol	11.92	1806.0	0.01	8.26	1257.5	0.01
Unknown BOSE VI [m/z 109, 41 (22),				8.44	1268.9	0.01

81 (14), 43 (11)...						
152 (4)]						
Isobornyl acetate	8.58	1534.0	0.01	8.64*	1282.7	[1.39]
Bornyl acetate	8.53	1530.6	1.37	8.64*	1282.7	[1.39]
<i>trans</i> -Sabinyl acetate	9.48	1603.8	0.03	8.77	1291.4	0.03
Thymol	15.43	2129.8	0.01	8.96	1303.6	0.01
Carvacrol	15.68	2153.9	0.04	9.08	1312.1	0.03
Myrtenyl acetate	9.92*	1639.3	[0.03]	9.22	1322.4	0.01
Eugenol	15.11	2097.9	0.01	9.70	1355.9	0.01
$\alpha$ -Copaene	7.43	1447.6	0.03	9.92	1371.6	0.03
$\beta$ -Bourbonene	7.74	1470.5	0.01	10.03	1379.3	0.01
Isocaryophyllene	8.44*	1523.7	[0.04]	10.34	1400.8	0.04
$\alpha$ -Gurjunene	7.91	1483.3	0.02	10.40	1405.0	0.01
$\beta$ -Caryophyllene	8.71	1544.1	5.59	10.52	1414.0	5.60
Caryophylla-4(12),8(13)-diene	8.90	1559.2	0.05	10.62	1421.8	0.04
Aromadendrene	8.86*	1556.2	[0.49]	10.76	1432.1	0.03
Unknown SAOF III [m/z 153, 43 (57), 107 (56), 108 (44)... 204 (11)...]	13.78*	1972.1	[0.02]	10.80	1434.7	0.01
9-epi-Isocaryophyllene	9.34	1592.6	0.49	10.94*	1445.1	[0.39]
Unknown SAOF IV [m/z 153, 43 (55), 168 (33), 41 (28)... 207 (3)...]	13.98	1989.8	0.01	10.94*	1445.1	[0.39]
$\alpha$ -Humulene	9.58	1612.5	5.78	10.98	1448.4	5.93
allo-Aromadendrene	9.27	1587.3	0.06	11.06	1454.1	0.06
9-epi- $\beta$ -Caryophyllene	9.63	1615.9	0.02	11.10	1457.3	0.02
$\gamma$ -Gurjunene	9.43	1600.2	0.01	11.21	1465.7	0.01
$\gamma$ -Murolene	9.86*	1634.7	[0.07]	11.26	1468.8	0.06
$\alpha$ -Amorphene	9.86*	1634.7	[0.07]	11.30	1472.0	0.05
Germacrene D	10.09*	1653.0	[3.48]	11.34	1475.2	0.02
$\beta$ -Selinene	10.12	1655.7	0.04	11.40	1479.2	0.03
Viridiflorene	9.92*	1639.3	[0.03]	11.52*	1488.8	[0.04]
$\alpha$ -Selinene	10.22	1663.3	0.03	11.52*	1488.8	[0.04]
5-Methyl-2,4-diisopropylphenol	16.76	2264.2	tr	11.62	1496.1	0.02
$\gamma$ -Cadinene	10.69*	1701.9	[0.05]	11.78*	1508.4	[0.02]
$\beta$ -Bisabolene	10.40	1677.7	0.01	11.78*	1508.4	[0.02]
<i>trans</i> -Calamenene	11.51	1770.6	0.03	11.90	1517.2	0.03

δ-Cadinene	10.69*	1701.9	[0.05]	11.92	1518.9	0.04
Isocaryophyllene epoxide B	12.45	1851.8	0.04	12.24	1543.8	0.03
Caryophyllene oxide	13.07	1907.0	0.13	12.61*	1573.3	[0.16]
Caryophyllene oxide isomer	12.99	1899.7	0.02	12.61*	1573.3	[0.16]
Viridiflorol	14.28	2019.2	0.30	12.75	1584.1	0.30
Humulene epoxide I	13.44	1940.6	0.02	12.82	1589.5	0.02
Ledol	13.67*	1961.5	[0.15]	12.88	1594.2	0.01
Humulene epoxide II	13.67*	1961.5	[0.15]	12.95	1599.3	0.16
Unknown SAOF V [m/z 81, 41 (55), 79 (45), 67 (4), 93 (38)...]	13.78*	1972.1	[0.02]	13.19	1619.0	0.02
Unknown SAOF VI [m/z 41, 91 (78), 67 (76), 119 (70), 55 (61)... 220 (7)]				13.26*	1624.9	[0.01]
Caryophylladienol I	16.36*	2223.2	[0.01]	13.26*	1624.9	[0.01]
Caryophylladienol II	16.36*	2223.2	[0.01]	13.31	1629.1	0.01
Unknown SAOF X [m/z 133, 148 (97), 43 (50), 93 (47), 91 (41), 147 (40)...204 (8)]				15.01	1772.4	0.01
Isopimara-9(11),15-diene	14.98	2084.9	0.01	16.39	1896.2	0.02
Manool	19.63	2578.0	0.06	17.91	2042.5	0.06
Total reported		99.00%			99.45%	

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

[xx]: Duplicate percentage due to coelutions, only the first one is 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