

Date : 2023-11-24

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 23K17-PTH03

Customer Identification : Organic Rosemary - Tunesia - R50113R

Type : Essential Oil

Source : *Rosmarinus officinalis* ct. 1,8-Cineole

Customer : Plant Therapy

Checked an approved by:

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 : 2023-11-20

PHYSICOCHEMICAL DATA

Refractive index : 1.4667 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2023-11-20

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
Isovaleral	tr	Aliphatic aldehyde
Toluene	tr	Simple phenolic
(3Z)-Hexenol	0.02	Aliphatic alcohol
Bornylene	0.01	Monoterpene
Hashishene	0.02	Monoterpene
Tricyclene	0.16	Monoterpene
α -Thujene	0.33	Monoterpene
α -Pinene	11.37	Monoterpene
Camphene	4.47	Monoterpene
α -Fenchene	0.07	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.01	Monoterpene
Sabinene	0.12	Monoterpene
β -Pinene	7.29	Monoterpene
Octen-3-ol	0.02	Aliphatic alcohol
Dehydro-1,8-cineole	0.01	Monoterpenic ether
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Octan-3-one	0.06	Aliphatic ketone
Myrcene	1.31	Monoterpene
Pseudolimonene	0.03	Monoterpene
α -Phellandrene	0.15	Monoterpene
Δ^3 -Carene	0.29	Monoterpene
α -Terpinene	0.43	Monoterpene
<i>para</i> -Cymene	1.10	Monoterpene
Limonene	2.29	Monoterpene
1,8-Cineole	45.64	Monoterpenic ether
(Z)- β -Ocimene	0.05	Monoterpene
(E)- β -Ocimene	0.06	Monoterpene
γ -Terpinene	0.79	Monoterpene
<i>cis</i> -Sabinene hydrate	0.05	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
<i>trans</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.39	Monoterpene
<i>para</i> -Cymenene	0.03	Monoterpene
<i>trans</i> -Sabinene hydrate	0.04	Monoterpenic alcohol
Linalool	0.72	Monoterpenic alcohol
endo-Fenchol	0.05	Monoterpenic alcohol
<i>cis-para</i> -Menth-2-en-1-ol	0.01	Monoterpenic alcohol
α -Campholenal	0.02	Monoterpenic aldehyde
<i>cis</i> -Limonene oxide	0.01	Monoterpenic ether

Camphor	10.69	Monoterpenic ketone
<i>trans</i> -Pinocarveol	0.08	Monoterpenic alcohol
Camphene hydrate	0.07	Monoterpenic alcohol
Isoborneol	0.01	Monoterpenic alcohol
Pinocamphone	0.01	Monoterpenic ketone
Pinocarvone	0.02	Monoterpenic ketone
Borneol	2.68	Monoterpenic alcohol
δ -Terpineol	0.35	Monoterpenic alcohol
Isopinocamphone	0.01	Monoterpenic ketone
Terpinen-4-ol	0.75	Monoterpenic alcohol
Cryptone	0.01	Normonoterpenic ketone
<i>para</i> -Cymen-8-ol	0.03	Monoterpenic alcohol
α -Terpineol	1.57	Monoterpenic alcohol
Myrtenol	0.04	Monoterpenic alcohol
Verbenone	0.01	Monoterpenic ketone
Bornyl formate	0.02	Monoterpenic ester
Citronellol	0.01	Monoterpenic alcohol
<i>trans</i> -Ascaridole glycol	0.02	Monoterpenic alcohol
Bornyl acetate	0.67	Monoterpenic ester
<i>trans</i> -Sabinyl acetate	0.01	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
Unknown	0.01	Unknown
Unknown	0.02	Oxygenated monoterpene
α -Cubebene	0.05	Sesquiterpene
Eugenol	0.02	Phenylpropanoid
α -Ylangene	0.06	Sesquiterpene
α -Copaene	0.21	Sesquiterpene
Isocaryophyllene	0.02	Sesquiterpene
Methyleugenol	0.04	Phenylpropanoid
β -Caryophyllene	3.03	Sesquiterpene
β -Copaene	0.06	Sesquiterpene
Aromadendrene	0.05	Sesquiterpene
α -Humulene	0.31	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.02	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.01	Sesquiterpene
γ -Muurolene	0.17	Sesquiterpene
α -Amorphene	0.01	Sesquiterpene
β -Selinene	0.03	Sesquiterpene
Unknown	0.03	Unknown
α -Selinene	0.05	Sesquiterpene
α -Muurolene	0.05	Sesquiterpene
β -Bisabolene	0.04	Sesquiterpene
γ -Cadinene	0.11	Sesquiterpene
<i>trans</i> -Calamenene	0.03	Sesquiterpene

δ -Cadinene	0.21	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.02	Sesquiterpene
α -Cadinene	0.01	Sesquiterpene
α -Calacorene	0.01	Sesquiterpene
Isocaryophyllene epoxide B	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.11	Sesquiterpenic ether
Humulene epoxide II	0.01	Sesquiterpenic ether
Caryophylladienol II	0.01	Sesquiterpenic alcohol
14-Hydroxy-(<i>Z</i>)-caryophyllene	0.02	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	0.01	Sesquiterpenic alcohol
<i>meta</i> -Camphorene	0.01	Diterpene
Consolidated total	99.41	

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

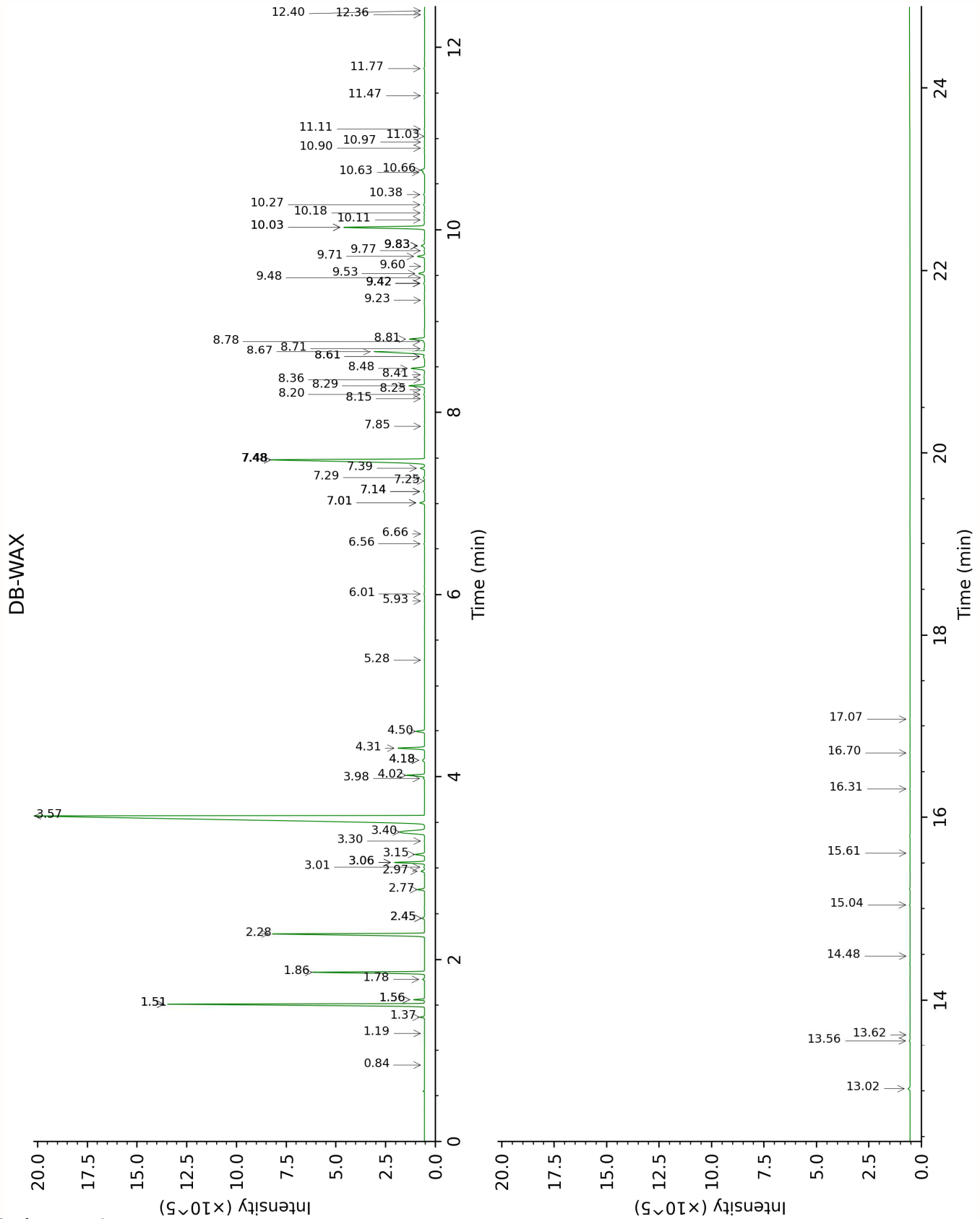
Note: no correction factor was applied

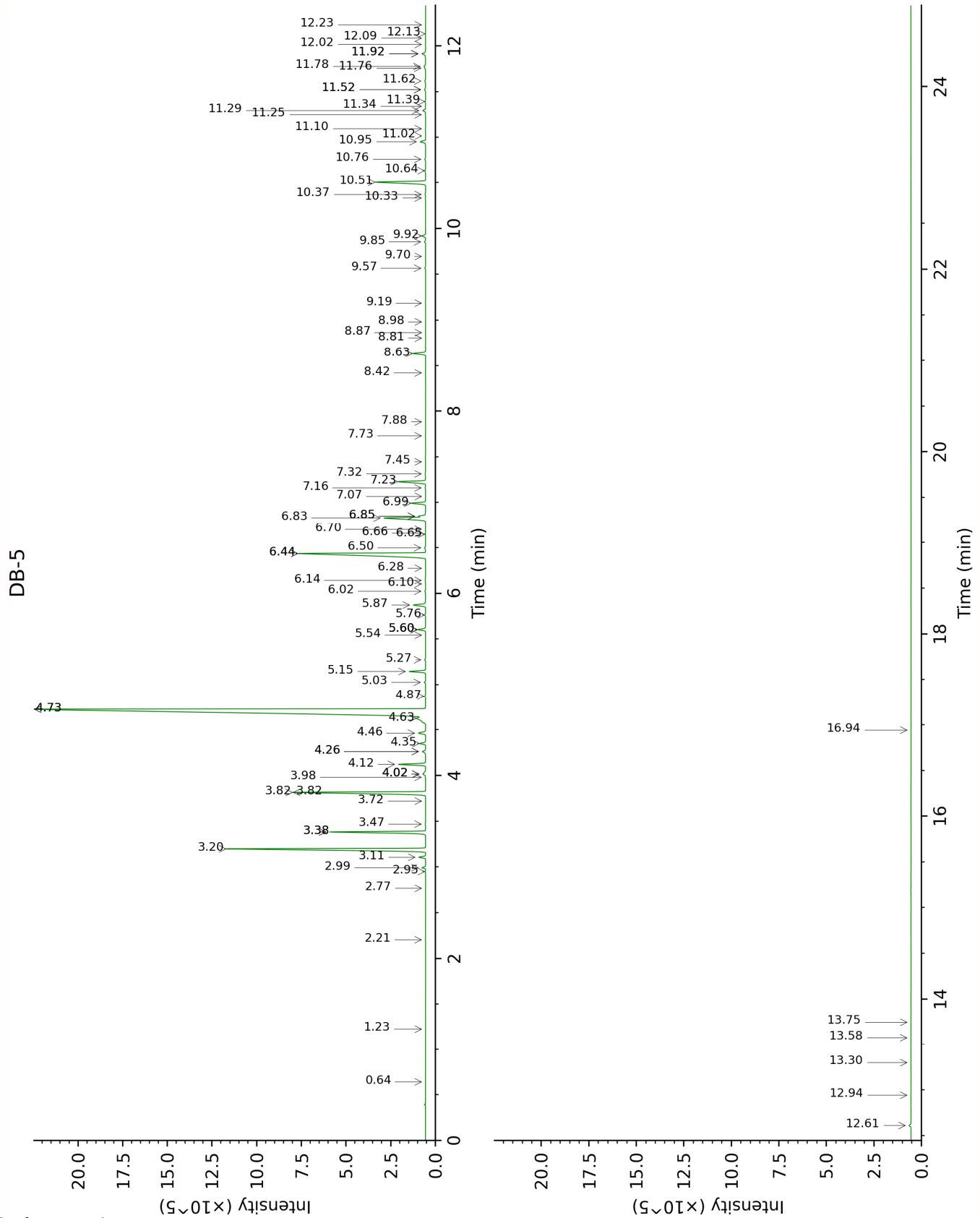
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Isovaleral	Column DB-WAX			Column DB-5		
	0.84	886.1	tr	0.64	642.4	tr
Toluene	1.56*	1000.8	[0.33]	1.23	760.2	tr
(3Z)-Hexenol	6.01	1348.8	0.03	2.21	858.6	0.02
Bornylene	1.19	946.7	0.01	2.77	904.6	0.01
Hashishene	1.51*	994.9	[11.36]	2.95	916.7	0.02
Tricyclene	1.37	973.4	0.16	2.99	919.5	0.16
α-Thujene	1.56*	1000.8	[0.33]	3.11	927.0	0.33
α-Pinene	1.51*	994.9	[11.36]	3.20	933.0	11.37
Camphene	1.86	1029.0	4.47	3.38*	945.2	[4.57]
α-Fenchene	1.78	1021.7	0.07	3.38*	945.2	[4.57]
Thuja-2,4(10)-diene	2.45*	1084.8	[0.12]	3.47	950.8	0.02
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.06*	1133.3	[1.31]	3.72	967.3	0.01
Sabinene	2.45*	1084.8	[0.12]	3.82*	973.6	[7.41]
β-Pinene	2.28	1068.6	7.29	3.82*	973.6	[7.41]
Octen-3-ol	7.01*	1420.7	[0.22]	3.98	984.4	0.02
Dehydro-1,8-cineole	3.30	1151.0	0.01	4.02*	986.7	[0.24]
6-Methyl-5-hepten-2-one	5.28	1294.3	0.01	4.02*	986.7	[0.24]
Octan-3-one	4.18*	1216.4	[0.12]	4.02*	986.7	[0.24]
Myrcene	3.06*	1133.3	[1.31]	4.12	993.7	1.31
Pseudolimonene	3.01	1129.4	0.03	4.26*	1002.9	[0.20]
α-Phellandrene	2.97	1126.0	0.15	4.26*	1002.9	[0.20]
Δ ³ -Carene	2.77	1110.9	0.29	4.35	1008.5	0.29
α-Terpinene	3.15	1140.0	0.44	4.46	1015.6	0.43
para-Cymene	4.31	1225.7	1.16	4.63	1025.7	1.10
Limonene	3.40	1158.5	2.29	4.73*	1031.9	[48.11]
1,8-Cineole	3.57	1171.7	45.64	4.73*	1031.9	[48.11]
(Z)-β-Ocimene	3.98	1202.3	0.05	4.87	1041.0	0.05
(E)-β-Ocimene	4.18*	1216.4	[0.12]	5.03	1050.7	0.06
γ-Terpinene	4.02	1204.7	0.79	5.15	1058.1	0.79
cis-Sabinene hydrate	7.14*	1429.8	[0.06]	5.27	1066.0	0.05
Fenchone	5.93	1343.3	0.01	5.54	1082.8	0.01
trans-Linalool oxide (fur.)	7.14*	1429.8	[0.06]	5.60*	1086.6	[0.41]
Terpinolene	4.50	1238.7	0.39	5.60*	1086.6	[0.41]
para-Cymenene	6.56	1387.6	0.03	5.60*	1086.6	[0.41]
trans-Sabinene hydrate	8.20	1508.1	0.04	5.76	1096.6	0.04
Linalool	8.29	1515.4	0.71	5.87	1103.4	0.72
endo-Fenchol	8.61*	1539.8	[0.08]	6.02	1113.0	0.05
cis-para-Menth-2-en-	8.36	1520.4	0.02	6.10	1118.1	0.01

1-ol						
α -Campholenal	7.25	1438.2	0.02	6.14	1120.5	0.02
<i>cis</i> -Limonene oxide	6.66	1395.2	0.01	6.28	1128.9	0.01
Camphor	7.48*	1455.2	[10.70]	6.44*	1139.2	[10.77]
<i>trans</i> -Pinocarveol	9.42*	1601.8	[0.05]	6.44*	1139.2	[10.77]
Camphene hydrate	8.71	1547.0	0.04	6.50	1143.2	0.07
Isoborneol	9.60	1616.7	0.01	6.65	1152.6	0.01
Pinocamphone	7.48*	1455.2	[10.70]	6.66	1153.4	0.01
Pinocarvone	8.15	1504.6	0.02	6.70	1156.1	0.02
Borneol	10.03*	1650.8	[4.22]	6.83	1164.4	2.68
δ -Terpineol	9.71	1625.4	0.35	6.85*	1165.6	[0.32]
Isopinocamphone	7.85	1482.0	0.01	6.85*	1165.6	[0.32]
Terpinen-4-ol	8.81	1555.0	0.76	6.99	1174.7	0.75
Cryptone	9.42*	1601.8	[0.05]	7.07	1179.4	0.01
<i>para</i> -Cymen-8-ol	11.77	1795.3	0.03	7.16	1185.4	0.03
α -Terpineol	10.03*	1650.8	[4.22]	7.23	1189.7	1.57
Myrtenol	11.11	1739.6	0.02	7.32	1195.1	0.04
Verbenone	9.83*	1634.7	[0.18]	7.45	1203.5	0.01
Bornyl formate	8.25	1511.9	0.02	7.73	1222.4	0.02
Citronellol	10.97	1727.6	0.02	7.88	1232.6	0.01
<i>trans</i> -Ascaridole glycol	14.48	2042.0	0.01	8.42	1268.3	0.02
Bornyl acetate	8.48	1529.9	0.68	8.63	1282.5	0.67
<i>trans</i> -Sabinyl acetate	9.42*	1601.8	[0.05]	8.81	1294.1	0.01
Unknown MISC IX [m/z 43, 93 (66), 91 (44), 41 (38), 69 (35)... 152? (1)]				8.87	1298.1	0.01
Unknown MISC X [m/z 69, 41 (79), 91 (56), 92 (54), 79 (50), 77 (35)...]				8.98	1306.0	0.01
Unknown MISC XI [m/z 91, 79 (94), 77 (72), 41 (37), 93 (31)... 152 (1)]				9.19	1320.4	0.02
α -Cubebene	7.01*	1420.7	[0.22]	9.57	1347.2	0.05
Eugenol	15.04	2095.8	0.03	9.70	1356.2	0.02
α -Ylangene	7.29	1440.9	0.06	9.85	1367.3	0.06
α -Copaene	7.39	1448.4	0.21	9.92	1371.9	0.21
Isocaryophyllene	8.41	1524.6	0.02	10.33	1401.0	0.02
Methyleugenol	13.56	1954.8	0.03	10.37	1403.7	0.04
β -Caryophyllene	8.67	1544.0	3.01	10.50	1413.6	3.03
β -Copaene	8.61*	1539.8	[0.08]	10.64	1423.5	0.06
Aromadendrene	8.78	1552.9	0.03	10.76	1432.7	0.05

α -Humulene	9.52	1610.5	0.32	10.95	1447.0	0.31
allo-Aromadendrene	9.23	1587.4	0.01	11.02	1451.7	0.01
(E)- β -Farnesene	9.77	1630.4	0.03	11.10	1457.6	0.02
<i>trans</i> -Cadina-1(6),4-diene	9.48	1606.7	0.02	11.25	1468.9	0.01
γ -Muurolene	9.83*	1634.7	[0.18]	11.30	1472.3	0.17
α -Amorphene	9.83*	1634.7	[0.18]	11.34	1475.8	0.01
β -Selinene	10.11	1657.3	0.04	11.39	1479.6	0.03
Unknown MISC CCII [m/z 59, 94 (67), 95 (50), 79 (44), 43 (41), 73 (16)...]				11.52*	1489.3	[0.08]
α -Selinene	10.18	1663.4	0.05	11.52*	1489.3	[0.08]
α -Muurolene	10.27	1670.5	0.05	11.62	1496.2	0.05
β -Bisabolene	10.38	1679.4	0.05	11.76	1506.8	0.04
γ -Cadinene	10.63	1699.8	0.10	11.78	1508.3	0.11
<i>trans</i> -Calamenene	11.47	1770.2	0.03	11.92*	1519.2	[0.25]
δ -Cadinene	10.66	1701.9	0.21	11.92*	1519.2	[0.25]
<i>trans</i> -Cadina-1,4-diene	10.90	1722.0	0.02	12.02	1527.1	0.02
α -Cadinene	11.03	1732.9	0.02	12.09	1532.6	0.01
α -Calacorene	12.36	1847.0	0.02	12.13	1536.3	0.01
Isocaryophyllene epoxide B	12.40	1850.9	0.01	12.23	1543.9	0.01
Caryophyllene oxide	13.02	1906.1	0.11	12.61	1573.5	0.11
Humulene epoxide II	13.62	1960.8	0.01	12.94	1599.5	0.01
Caryophylladienol II	16.31	2223.8	0.01	13.30	1628.7	0.01
14-Hydroxy-(Z)-caryophyllene	16.70	2264.5	0.02	13.58	1651.7	0.02
(3Z)-Caryophylla-3,8(13)-dien-5 β -ol	17.07	2303.5	0.01	13.75	1665.7	0.01
<i>meta</i> -Camphorene	15.61	2152.3	0.01	16.94	1949.1	0.01
Total reported		99.38%			99.73%	

*: 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