

Date : 2026-01-29

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25K20-PTH01

Customer Identification : Oregano - USA - O40113R

Type : Essential Oil

Source : *Origanum vulgare* ct. *Carvacrol*

Customer : Plant Therapy

Checked and approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2025-11-24 to make a correction in the sample identification section.

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 : 2025-11-24

PHYSICOCHEMICAL DATA

Refractive index : 1.5072 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-11-24

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
Isobutyral	tr	Aliphatic aldehyde
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Methyl 2-methylbutyrate	tr	Aliphatic ester
(2E)-Hexenal	tr	Aliphatic aldehyde
Unknown	0.01	Unknown
Hashishene	0.01	Monoterpene
Tricyclene	0.02	Monoterpene
α -Thujene	0.80	Monoterpene
α -Pinene	1.67	Monoterpene
α -Fenchene	0.02	Monoterpene
Camphene	0.44	Monoterpene
Unknown	0.01	Unknown
Sabinene	0.09	Monoterpene
β -Pinene	0.28	Monoterpene
Octen-3-ol	0.23	Aliphatic alcohol
Unknown	0.02	Monoterpene
Octan-3-one	0.03	Aliphatic ketone
Myrcene	1.29	Monoterpene
2,7-Dimethyl-2,6-octadiene	0.02	Monoterpene
Octan-3-ol	tr	Aliphatic alcohol
Pseudolimonene	0.06	Monoterpene
α -Phellandrene	0.06	Monoterpene
Δ^3 -Carene	0.04	Monoterpene
α -Terpinene	1.06	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
<i>para</i> -Cymene	10.28	Monoterpene
β -Phellandrene	0.04	Monoterpene
1,8-Cineole	0.18	Monoterpenic ether
Limonene	0.64	Monoterpene
<i>ortho</i> -Cymene	0.01	Monoterpene
(Z)- β -Ocimene	0.02	Monoterpene
(E)- β -Ocimene	0.04	Monoterpene
γ -Terpinene	8.03	Monoterpene
<i>cis</i> -Sabinene hydrate	0.07	Monoterpenic alcohol
<i>para</i> -Mentha-3,8-diene	0.05	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Fenchone	0.03	Monoterpenic ketone
Terpinolene	0.06	Monoterpene

<i>para</i> -Cymenene	0.05	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	tr	Monoterpenic alcohol
<i>trans</i> -Sabinene hydrate	0.06	Monoterpenic alcohol
Linalool	4.15	Monoterpenic alcohol
Hotrienol	0.03	Monoterpenic alcohol
endo-Fenchol	0.04	Monoterpenic alcohol
<i>cis-para</i> -Menth-2-en-1-ol	0.02	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
<i>trans-para</i> -Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Camphor	0.15	Monoterpenic ketone
Isoborneol	0.01	Monoterpenic alcohol
Borneol	0.63	Monoterpenic alcohol
Terpinen-4-ol	0.23	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	tr	Monoterpenic alcohol
α -Terpineol	0.04	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	0.06	Monoterpenic ketone
<i>trans</i> -Piperitol	0.02	Monoterpenic alcohol
Thymol methyl ether analog I (isothymol methyl ether?)	0.01	Monoterpenic ether
Thymol methyl ether	0.02	Monoterpenic ether
Carvone	0.01	Monoterpenic ketone
Carvacrol methyl ether	0.24	Monoterpenic ether
Geraniol	0.02	Monoterpenic alcohol
Linalyl acetate	0.01	Monoterpenic ester
Thymol analogue I (isothymol?)	0.03	Monoterpenic alcohol
Thymol	3.33	Monoterpenic alcohol
Thymol analogue II	0.02	Monoterpenic alcohol
Carvacrol	61.15	Monoterpenic alcohol
2-Methyl-6-propylphenol?	0.02	Miscellaneous
Eugenol	0.01	Phenylpropanoid
α -Copaene	0.01	Sesquiterpene
Carvacryl acetate	0.04	Monoterpenic ester
β -Bourbonene	0.02	Sesquiterpene
β -Elemene	0.01	Sesquiterpene
Methyleugenol	0.05	Phenylpropanoid
β -Caryophyllene	1.36	Sesquiterpene
β -Copaene	0.01	Sesquiterpene
Aromadendrene	0.06	Sesquiterpene
α -Humulene	0.04	Sesquiterpene
Unknown	0.01	Oxygenated monoterpene
(<i>E</i>)- β -Farnesene	0.01	Sesquiterpene
γ -Murolene	0.01	Sesquiterpene
allo-Aromadendr-9-ene	0.01	Sesquiterpene
α -Selinene	0.02	Sesquiterpene
Viridiflorene	0.04	Sesquiterpene

α -Murolene	0.01	Sesquiterpene
β -Bisabolene	0.50	Sesquiterpene
γ -Cadinene	0.04	Sesquiterpene
<i>trans</i> -Calamenene	0.01	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.01	Sesquiterpene
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.34	Sesquiterpenic ether
Caryophyllene oxide isomer	0.03	Sesquiterpenic ether
Humulene epoxide II	0.01	Sesquiterpenic ether
Caryophylladienol II	0.01	Sesquiterpenic alcohol
τ -Cadinol	0.05	Sesquiterpenic alcohol
Unknown	0.01	Unknown
Unknown	0.01	Oxygenated sesquiterpene
14-Hydroxy-(<i>Z</i>)-caryophyllene	0.01	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	0.01	Sesquiterpenic alcohol
α -Bisabolol	0.01	Sesquiterpenic alcohol
Phytone	0.01	Terpenic ketone
Unknown	0.11	Unknown
Unknown	0.02	Unknown
Unknown	0.21	Unknown
Unknown	0.09	Unknown
Unknown	0.01	Unknown
<i>meta</i> -Camphorene	0.01	Diterpene
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Consolidated total	99.37	

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

Note: no correction factor was applied

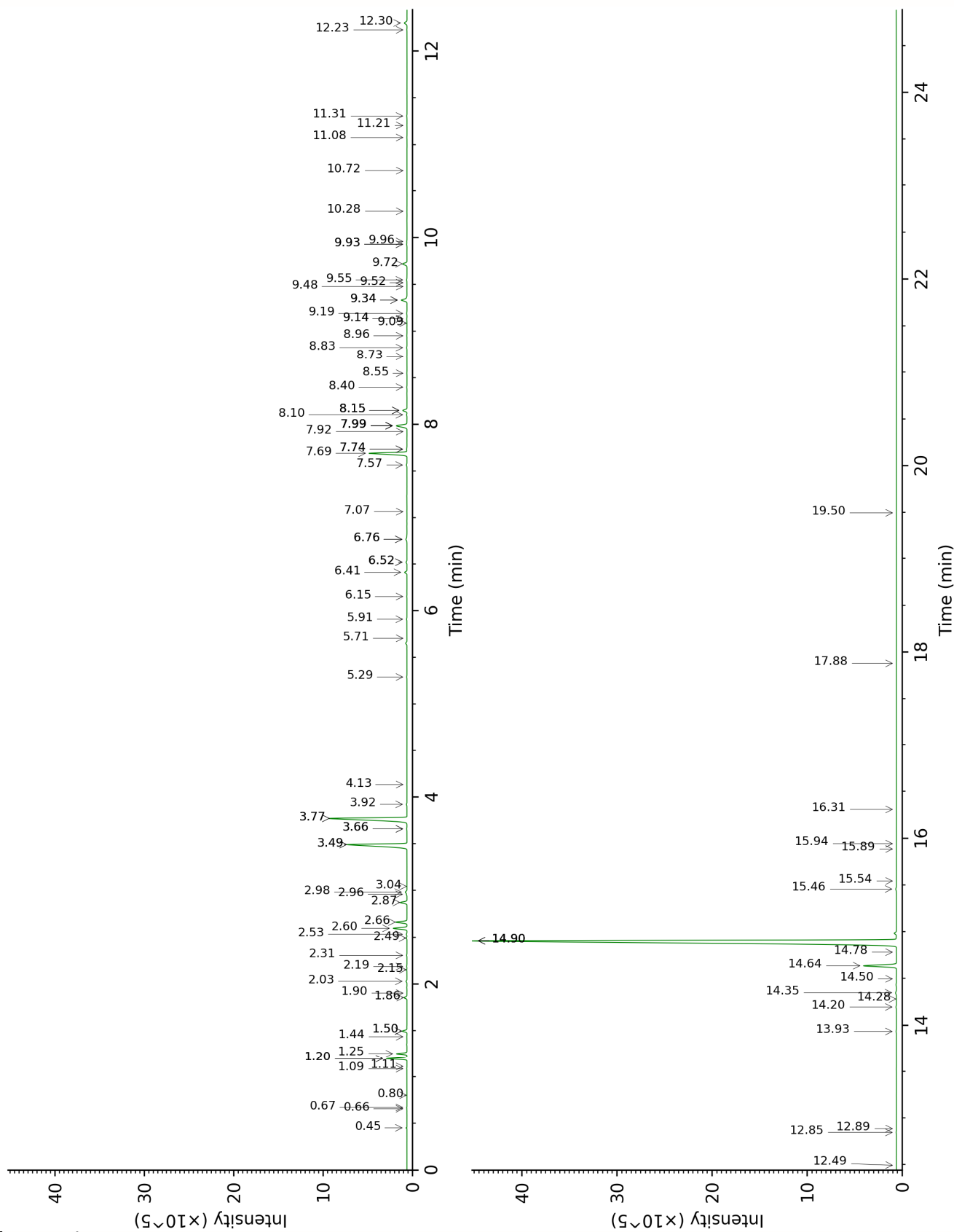
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

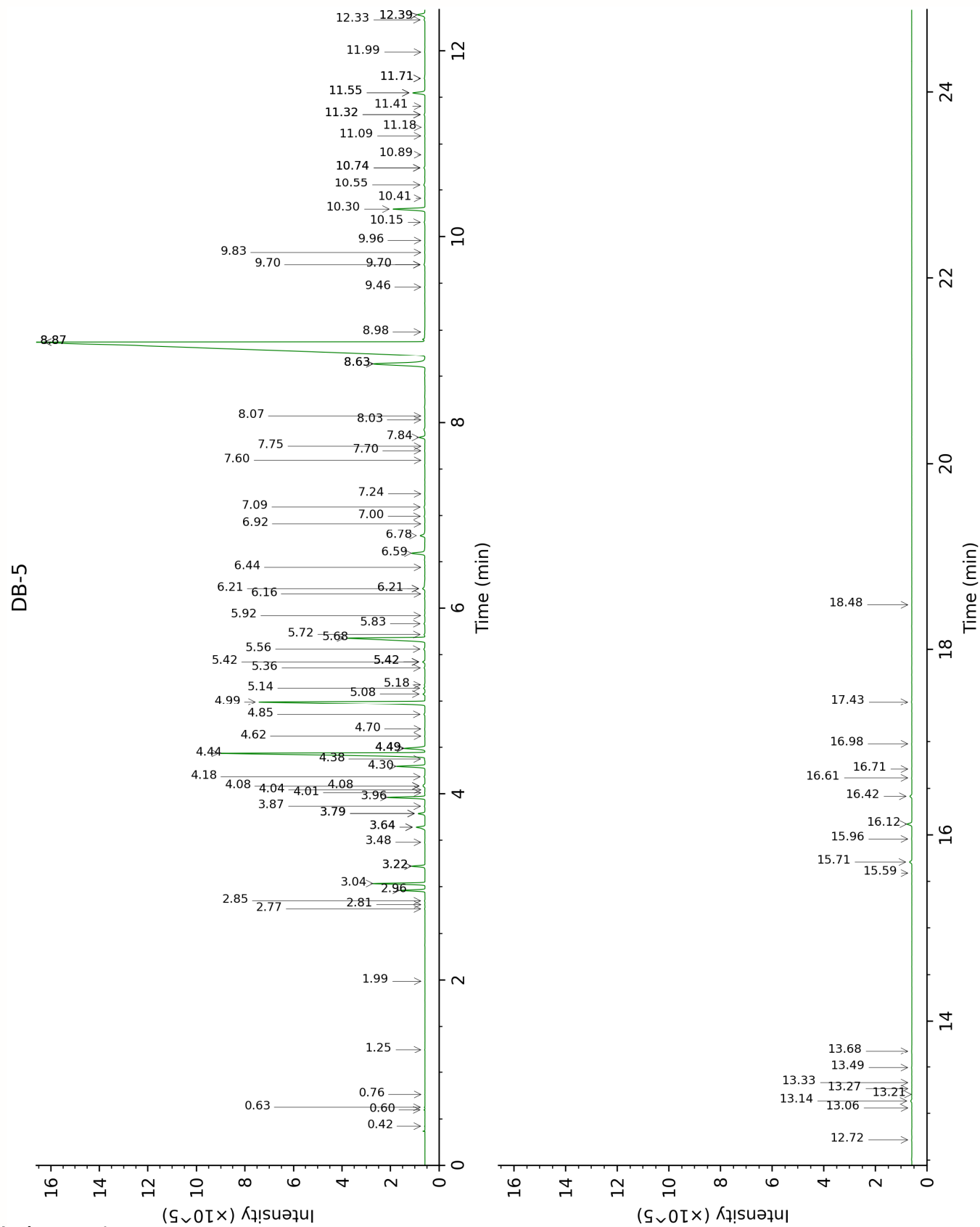
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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.

DB-WAX





FULL ANALYSIS DATA

Isobutyral	Column DB-WAX			Column DB-5		
	0.45	785.0	0.03	0.42	540.0	tr
Isovaleral	0.67	887.8	0.01	0.60	642.9	0.01
2-Methylbutyral	0.66	882.3	0.01	0.63	653.2	0.01
2-Ethylfuran	0.80	923.9	tr	0.76	702.8	tr
Methyl 2-methylbutyrate	1.11	977.5	0.01	1.25	775.3	tr
(2E)-Hexenal	3.04	1171.4	0.01	1.99	849.9	tr
Unknown FRAG XC [m/z 69, 93 (91), 41 (88), 79 (22), 40 (20), 91 (17)...]	1.50*	1029.9	[0.43]	2.76	913.3	0.01
Hashishene	1.20*	992.4	[1.67]	2.81	916.3	0.01
Tricyclene	1.09	973.1	0.01	2.85	919.1	0.02
α -Thujene	1.25	1001.9	0.79	2.96	926.6	0.80
α -Pinene	1.20*	992.4	[1.67]	3.04	931.5	1.67
α -Fenchene	1.44	1023.7	0.02	3.22*	944.0	[0.45]
Camphene	1.50*	1029.9	[0.43]	3.22*	944.0	[0.45]
Unknown FRAG XCIV [m/z 93, 79 (62), 121 (37), 67 (35), 107 (34), 91 (33)...]				3.48	961.1	0.01
Sabinene	2.03	1084.6	0.09	3.64*	972.0	[0.38]
β -Pinene	1.86	1066.7	0.28	3.64*	972.0	[0.38]
Octen-3-ol	6.41	1421.6	0.23	3.79*	981.8	[0.26]
Unknown ORVU I [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	2.15	1097.3	0.02	3.79*	981.8	[0.26]
Octan-3-one	3.66*	1220.1	[0.05]	3.87	987.1	0.03
Myrcene	2.60	1135.3	1.27	3.96	993.4	1.29
2,7-Dimethyl-2,6-octadiene	1.90	1071.5	0.01	4.01	996.7	0.02
Octan-3-ol	5.71	1369.1	0.01	4.04	998.9	tr
Pseudolimonene	2.53	1130.2	0.06	4.08*	1001.6	[0.11]
α -Phellandrene	2.49	1127.0	0.06	4.08*	1001.6	[0.11]
Δ^3 -Carene	2.31	1112.2	0.03	4.18	1008.1	0.04
α -Terpinene	2.66	1140.7	1.04	4.30	1015.2	1.06
Carvomenthene	2.19	1101.0	0.03	4.38	1020.2	0.02
<i>para</i> -Cymene	3.77*	1228.5	[10.30]	4.44	1024.1	10.28
β -Phellandrene	2.96	1164.5	0.04	4.49*	1027.4	[0.88]
1,8-Cineole	2.98	1166.5	0.18	4.49*	1027.4	[0.88]

Limonene	2.87	1157.5	0.64	4.49*	1027.4	[0.88]
ortho-Cymene	4.13	1255.4	0.01	4.62	1035.7	0.01
(Z)-β-Ocimene	3.49*	1207.5	[7.95]	4.70	1040.7	0.02
(E)-β-Ocimene	3.66*	1220.1	[0.05]	4.85	1050.6	0.04
γ-Terpinene	3.49*	1207.5	[7.95]	4.99	1059.4	8.03
cis-Sabinene hydrate	6.52*	1429.8	[0.09]	5.08	1064.9	0.07
para-Mentha-3,8-diene	3.77*	1228.5	[10.30]	5.14	1068.9	0.05
cis-Linalool oxide (fur.)	6.15	1402.1	0.02	5.18	1071.2	0.02
Fenchone	5.29	1338.5	0.03	5.36	1082.7	0.03
Terpinolene	3.92	1239.6	0.06	5.42*	1086.8	[0.09]
para-Cymenene	5.91	1384.2	0.05	5.42*	1086.8	[0.09]
trans-Linalool oxide (fur.)	6.52*	1429.8	[0.09]	5.42*	1086.8	[0.09]
trans-Sabinene hydrate	7.57	1509.5	0.07	5.56	1095.6	0.06
Linalool	7.69	1519.4	4.02	5.68	1103.1	4.15
Hotrienol	8.40	1575.6	0.03	5.72	1105.6	0.03
endo-Fenchol	7.99*	1542.8	[1.38]	5.84	1113.1	0.04
cis-para-Menth-2-en-1-ol	7.74*	1522.9	[0.05]	5.92	1118.7	0.02
trans-Pinocarveol	8.73	1601.9	0.01	6.16	1133.8	0.01
trans-para-Menth-2-en-1-ol	8.55	1587.3	0.02	6.21*	1137.5	[0.17]
Camphor	6.76*	1448.4	[0.17]	6.21*	1137.5	[0.17]
Isoborneol	8.96	1619.9	0.02	6.44	1152.3	0.01
Borneol	9.34*	1651.5	[0.70]	6.59	1162.2	0.63
Terpinen-4-ol	8.15*	1555.8	[0.45]	6.78	1174.5	0.23
para-Cymen-8-ol	11.08	1799.5	0.02	6.92	1183.2	tr
α-Terpineol	9.34*	1651.5	[0.70]	7.00	1188.4	0.04
cis-Dihydrocarvone	8.10	1552.1	0.05	7.10	1194.9	0.06
trans-Piperitol	9.93*	1700.8	[0.04]	7.24	1204.1	0.02
Thymol methyl ether analog I (isothymol methyl ether?)	7.92	1537.8	tr	7.60	1228.5	0.01
Thymol methyl ether	7.99*	1542.8	[1.38]	7.70	1235.6	0.02
Carvone	9.52	1666.9	0.01	7.75	1238.9	0.01
Carvacrol methyl ether	8.15*	1555.8	[0.45]	7.84	1245.3	0.24
Geraniol	11.21	1810.7	0.02	8.03	1258.2	0.02

Linalyl acetate	7.74*	1522.9	[0.05]	8.07	1261.0	0.01
Thymol analogue I (isothymol?)	14.50	2120.5	0.03	8.63*	1299.3	[3.36]
Thymol	14.64	2134.8	3.33	8.63*	1299.3	[3.36]
Thymol analogue II	14.78	2149.6	0.02	8.87*	1312.7	[61.17]
Carvacrol	14.90*	2162.0	[61.17]	8.87*	1312.7	[61.17]
2-Methyl-6-propylphenol?				8.98	1320.4	0.02
Eugenol	14.28	2099.3	0.01	9.46	1354.6	0.01
α -Copaene	6.76*	1448.4	[0.17]	9.70*	1371.8	[0.05]
Carvacryl acetate	11.31	1819.7	0.04	9.70*	1371.8	[0.05]
β -Bourbonene	7.07	1471.5	0.01	9.83	1381.0	0.02
β -Elemene	7.99*	1542.8	[1.38]	9.96	1390.1	0.01
Methyleugenol	12.85	1960.8	0.03	10.15	1404.1	0.05
β -Caryophyllene	7.99*	1542.8	[1.38]	10.30	1414.5	1.36
β -Copaene	7.99*	1542.8	[1.38]	10.41	1423.2	0.01
Aromadendrene	8.15*	1555.8	[0.45]	10.55	1433.9	0.06
α -Humulene	8.83	1609.6	0.04	10.74*	1448.3	[0.05]
Unknown THVU I [m/z 151, 166 (40), 105 (26)...]				10.74*	1448.3	[0.05]
(E)- β -Farnesene	9.09	1631.1	0.01	10.89	1458.8	0.01
γ -Murolene	9.14*	1634.9	[0.04]	11.09	1474.0	0.01
allo-Aromadendrene	9.14*	1634.9	[0.04]	11.18	1481.0	0.01
α -Selinene	9.48	1663.5	0.02	11.32*	1491.2	[0.04]
Viridiflorene	9.19	1639.7	0.04	11.32*	1491.2	[0.04]
α -Murolene	9.55	1669.3	0.06	11.41	1498.0	0.01
β -Bisabolene	9.72	1683.5	0.50	11.55*	1508.8	[0.54]
γ -Cadinene	9.93*	1700.8	[0.04]	11.55*	1508.8	[0.54]
trans-Calamenene	10.72	1768.8	0.01	11.70*	1521.0	[0.04]
δ -Cadinene	9.96	1703.3	0.02	11.70*	1521.0	[0.04]
(E)- α -Bisabolene	10.28	1730.7	0.01	11.99	1543.4	0.01
Spathulenol	13.93	2065.2	0.04	12.33	1570.8	0.04
Caryophyllene oxide	12.30	1909.7	0.34	12.39*	1575.3	[0.37]
Caryophyllene oxide isomer	12.23	1902.9	0.03	12.39*	1575.3	[0.37]
Humulene epoxide II	12.89	1964.6	0.01	12.72	1601.2	0.01
Caryophylladienol II	15.54	2227.5	0.02	13.06	1629.4	0.01
τ -Cadinol	14.35	2105.9	0.11	13.14	1635.6	0.05
Unknown LYUN	12.49	1927.5	0.01	13.21	1641.5	0.01

IV [m/z 123, 43 (86), 81 (75), 95 (73), 82 (68), 161 (64), 105 (63)... 220 (6)]						
Unknown CASA XXVI [m/z 81, 93 (84), 41 (70), 79 (61), 55 (56), 123 (55), 95 (54), 107 (50)... 220 (t)]	15.89	2263.6	0.01	13.27	1646.7	0.01
14-Hydroxy-(Z)-caryophyllene	15.94	2269.6	0.01	13.33	1652.1	0.01
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	16.31	2308.1	0.02	13.50	1665.5	0.01
α-Bisabolol	14.90*	2162.0	[61.17]	13.68	1680.7	0.01
Phytone	14.20	2090.8	0.06	15.59	1847.9	0.01
Unknown ORVU II [m/z 81, 150 (90), 136 (88), 135 (74), 93 (54), 121 (41)...]				15.71	1858.8	0.11
Unknown ORVU XIII [m/z 93, 135 (57), 43 (41), 91 (39), 150 (22)...]				15.96	1881.4	0.02
Unknown ORVU III [m/z 81, 150 (83), 136 (81), 135 (67), 93 (48), 121 (36)...]				16.12	1896.0	0.21
Unknown ORVU X [m/z 136, 81 (81), 150 (74), 135 (52), 93 (46), 121 (42)...]	15.46	2218.5	0.09	16.42	1923.9	0.09
Unknown ORVU XV [m/z 81, 136 (71), 150 (57), 93 (47), 135 (42)...]				16.61	1942.8	0.01
meta-Camphorene	14.90*	2162.0	[61.17]	16.71	1951.8	0.01
Unknown ORVU XVI [m/z 150, 135 (59), 81 (32), 136 (26), 257 (21)...]				16.98	1977.7	0.01
Unknown ORVU	17.88	2481.5	0.02	17.43	2021.6	0.02

VI [m/z 135, 150 (66), 43 (38), 109 (27), 93 (25), 137 (20)...]						
Unknown MOFI VI [m/z 69, 41 (74), 166 (36), 91 (32), 105 (28), 43 (25)...]	19.50	2671.7	0.01	18.48	2126.3	0.01
Total reported	98.81%			99.39%		

*: 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