

Date : 2025-04-24

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25D08-PTH11

Customer Identification : Organic Oregano - Spain - O50117R

Type : Essential Oil

Source : *Origanum vulgare* ct. *Carvacrol*

Customer : Plant Therapy

Checked and 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 : 2025-04-16

PHYSICOCHEMICAL DATA

Refractive index : 1.5095 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-04-09

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	tr	Aliphatic alcohol
Isobutyral	0.01	Aliphatic aldehyde
2-Butanone	tr	Aliphatic ketone
Acetic acid	tr	Aliphatic acid
Isobutanol	tr	Aliphatic alcohol
Isovaleral	0.02	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Methyl 2-methylbutyrate	0.05	Aliphatic ester
(2E)-Hexenal	0.01	Aliphatic aldehyde
(3Z)-Hexenol	0.01	Aliphatic alcohol
Heptan-3-one	0.01	Aliphatic ketone
Hashishene	0.01	Monoterpene
Tricyclene	0.01	Monoterpene
α -Thujene	1.10	Monoterpene
α -Pinene	1.16	Monoterpene
Unknown	0.01	Monoterpene
Camphene	0.15	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.01	Monoterpene
β -Pinene	0.12	Monoterpene
Octen-3-ol	0.35	Aliphatic alcohol
Octan-3-one	0.16	Aliphatic ketone
Myrcene	1.41	Monoterpene
Octan-3-ol	0.04	Aliphatic alcohol
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.15	Monoterpene
Δ^3 -Carene	0.06	Monoterpene
α -Terpinene	1.31	Monoterpene
<i>para</i> -Cymene	6.34	Monoterpene
β -Phellandrene	0.17	Monoterpene
1,8-Cineole	0.06	Monoterpenic ether
Limonene	0.20	Monoterpene
(Z)- β -Ocimene	0.04	Monoterpene
(E)- β -Ocimene	0.07	Monoterpene
γ -Terpinene	4.87	Monoterpene
<i>cis</i> -Sabinene hydrate	0.21	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol

<i>trans</i> -Linalool oxide (fur.)	0.04	Monoterpenic alcohol
Terpinolene	0.10	Monoterpene
<i>para</i> -Cymenene	0.01	Monoterpene
<i>trans</i> -Sabinene hydrate	0.10	Monoterpenic alcohol
Linalool	1.23	Monoterpenic alcohol
Hotrienol	0.03	Monoterpenic alcohol
endo-Fenchol	0.02	Monoterpenic alcohol
<i>cis-para</i> -Menth-2-en-1-ol	0.03	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
<i>trans-para</i> -Menth-2-en-1-ol	0.03	Monoterpenic alcohol
Isoborneol	0.01	Monoterpenic alcohol
Unknown	tr	Unknown
Borneol	0.47	Monoterpenic alcohol
Terpinen-4-ol	0.55	Monoterpenic alcohol
<i>meta</i> -Cymen-8-ol	0.01	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.02	Monoterpenic alcohol
Myrtenal	0.04	Monoterpenic aldehyde
α -Terpineol	0.18	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	0.05	Monoterpenic ketone
<i>trans</i> -Dihydrocarvone	0.02	Monoterpenic ketone
<i>trans</i> -Piperitol	0.04	Monoterpenic alcohol
Thymol methyl ether	0.01	Monoterpenic ether
Carvone	0.01	Monoterpenic ketone
Carvacrol methyl ether	0.14	Monoterpenic ether
Geraniol	0.01	Monoterpenic alcohol
Linalyl acetate	0.01	Monoterpenic ester
Geranial	0.01	Monoterpenic aldehyde
Bornyl acetate	0.01	Monoterpenic ester
Cuminol	0.01	Monoterpenic alcohol
Thymol analogue I (isothymol?)	0.03	Monoterpenic alcohol
Thymol	2.70	Monoterpenic alcohol
Thymol analogue II	0.04	Monoterpenic alcohol
Carvacrol	70.37	Monoterpenic alcohol
2-Methyl-6-propylphenol?	0.12	Miscellaneous
Eugenol	0.01	Phenylpropanoid
Carvacryl acetate	0.05	Monoterpenic ester
α -Copaene	0.03	Sesquiterpene
β -Bourbonene	0.02	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
β -Elemene	0.02	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
Methyleugenol	0.02	Phenylpropanoid
β -Caryophyllene	2.10	Sesquiterpene
β -Copaene	0.01	Sesquiterpene
Aromadendrene	0.07	Sesquiterpene

α -Humulene	0.13	Sesquiterpene
Thymohydroquinone isomer?	0.05	Simple phenolic
<i>cis</i> -Muurolo-4(15),5-diene	0.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.05	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.01	Sesquiterpene
γ -Muurolole	0.03	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
allo-Aromadendr-9-ene	0.02	Sesquiterpene
α -Selinene	0.04	Sesquiterpene
α -Muurolole	0.02	Sesquiterpene
β -Bisabolene	0.78	Sesquiterpene
γ -Cadinene	0.06	Sesquiterpene
<i>trans</i> -Calamenene	0.01	Sesquiterpene
δ -Cadinene	0.05	Sesquiterpene
β -Sesquiphellandrene	0.02	Sesquiterpene
(<i>E</i>)- γ -Bisabolene	0.01	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.02	Sesquiterpene
Salviadienol?	0.01	Sesquiterpenic alcohol
Spathulenol	0.06	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.25	Sesquiterpenic ether
Humulene epoxide II	0.03	Sesquiterpenic ether
1,10-diepi-Cubenol	0.01	Sesquiterpenic alcohol
Caryophylladienol II	0.02	Sesquiterpenic alcohol
τ -Cadinol	0.04	Sesquiterpenic alcohol
τ -Muurolol	0.02	Sesquiterpenic alcohol
Unknown	0.02	Unknown
Unknown	0.01	Oxygenated sesquiterpene
α -Cadinol	0.01	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	0.03	Sesquiterpenic alcohol
α -Bisabolol	0.02	Sesquiterpenic alcohol
Phytone	0.01	Terpenic ketone
Unknown	0.03	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.06	Unknown
Unknown	0.01	Unknown
Unknown	0.09	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.02	Unknown

Unknown	0.01	Unknown
Unknown	0.02	Unknown
Consolidated total	99.20	

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

Note: no correction factor was applied

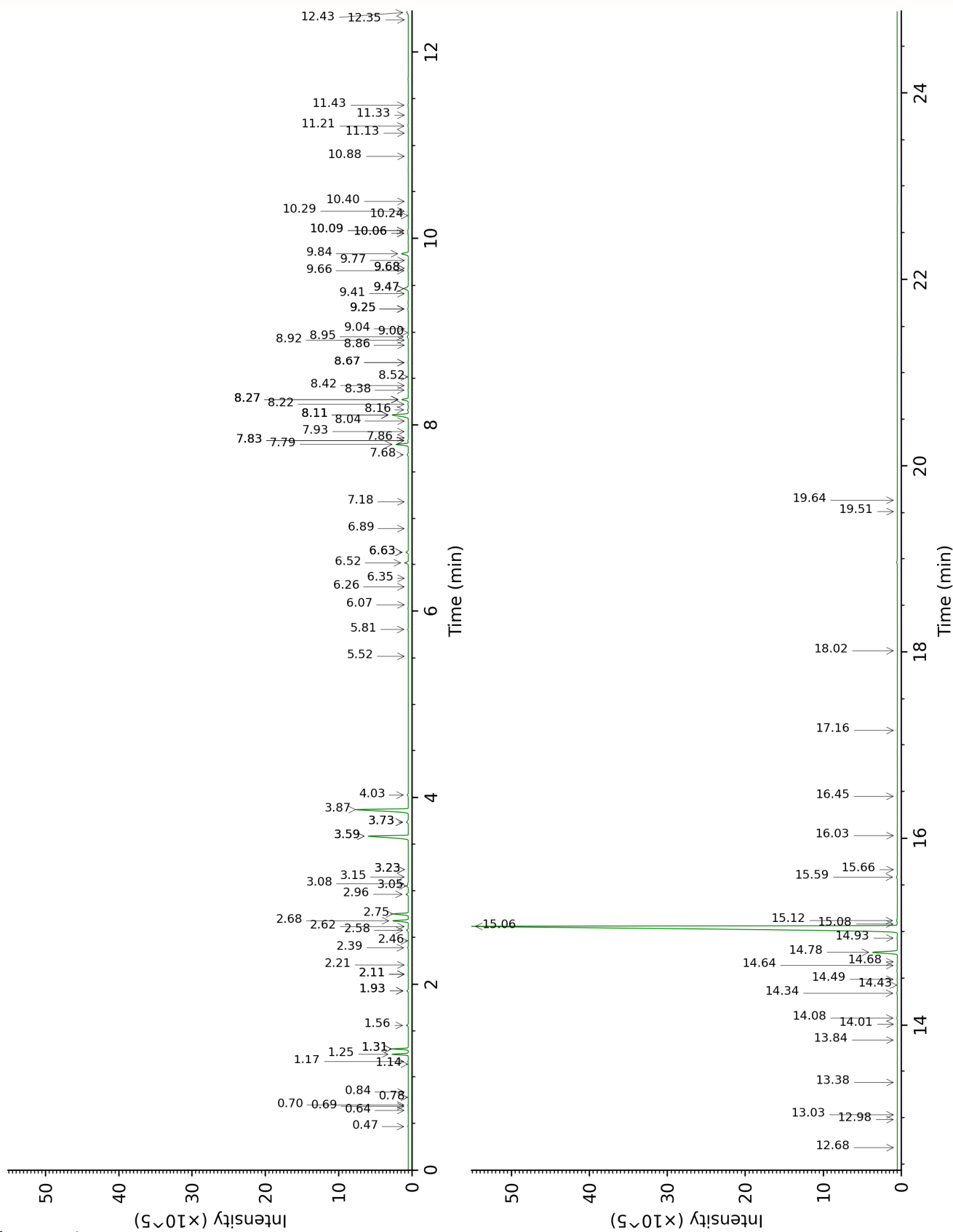
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

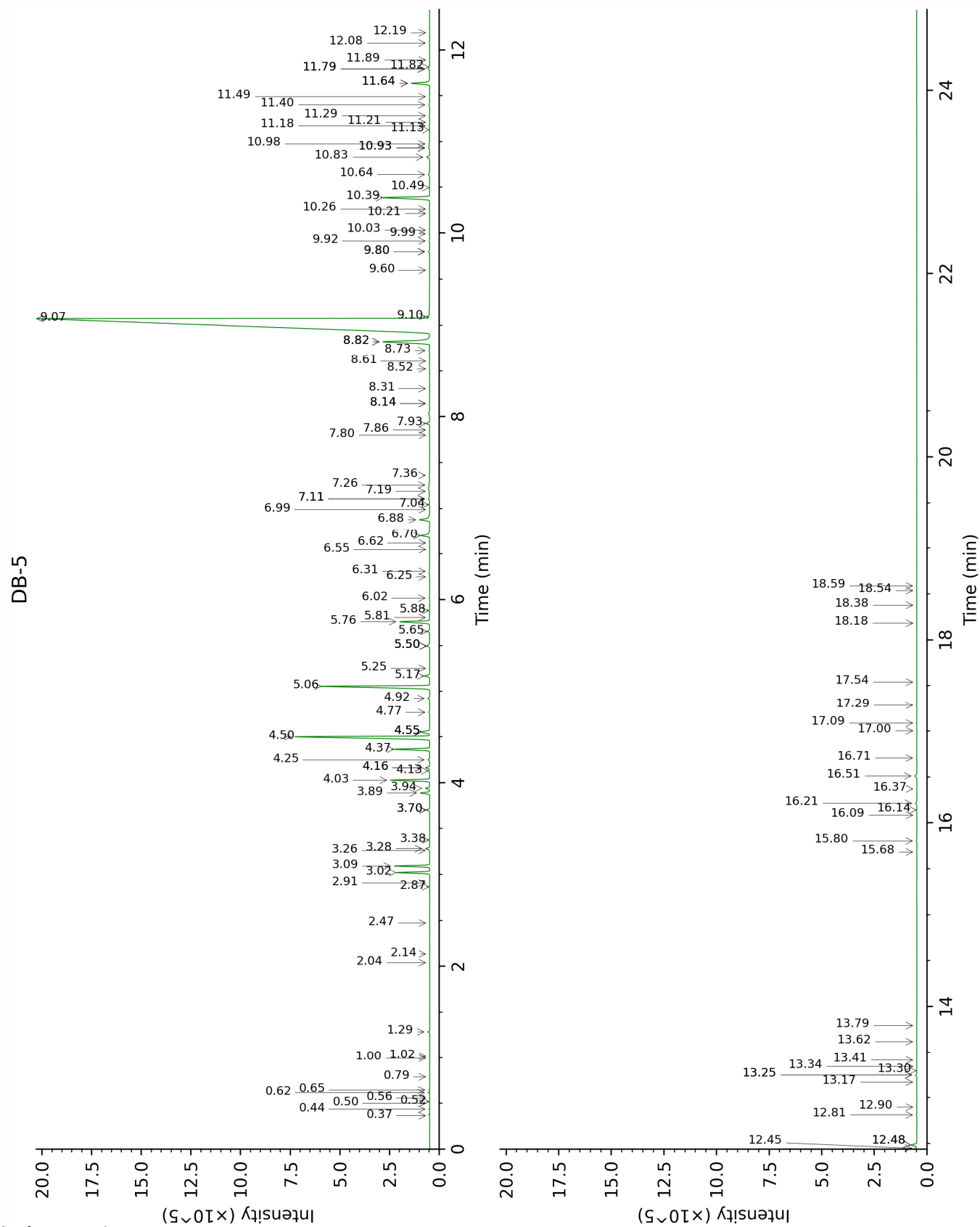
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

Ethanol	Column DB-WAX			Column DB-5		
	0.78	903.3	0.01	0.37	494.7	tr
Isobutylal	0.47	776.4	0.02	0.44	532.5	0.01
2-Butanone	0.64	857.2	0.01	0.50	591.0	tr
Acetic acid	6.35	1407.6	0.01	0.52	602.6	tr
Isobutanol	1.93*	1062.7	[0.12]	0.56	616.3	tr
Isovaleral	0.70	881.5	0.02	0.62	637.6	0.02
2-Methylbutylal	0.68	875.0	0.01	0.65	648.0	0.01
2-Ethylfuran	0.84	913.7	tr	0.79	699.4	tr
Isoamyl alcohol	3.23*	1175.3	[0.01]	1.00	730.0	tr
2-Methylbutanol	3.23*	1175.3	[0.01]	1.02	732.9	tr
Methyl 2-methylbutyrate	1.17	973.0	0.04	1.29	772.0	0.05
(2E)-Hexenal	3.15	1168.9	0.01	2.04	848.1	0.01
(3Z)-Hexenol	5.52	1346.0	0.01	2.14	856.1	0.01
Heptan-3-one	2.46	1113.7	0.01	2.47	884.6	0.01
Hashishene	1.31*	997.4	[1.10]	2.87	914.7	0.01
Tricyclene	1.14	967.9	0.01	2.91	917.4	0.01
α -Thujene	1.31*	997.4	[1.10]	3.02	925.1	1.10
α -Pinene	1.25	988.5	1.18	3.09	929.8	1.16
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.21	1091.8	0.02	3.26	941.2	0.01
Camphene	1.56	1023.9	0.14	3.28	942.5	0.15
Thuja-2,4(10)-diene	2.11*	1081.4	[0.01]	3.38	948.9	0.01
Sabinene	2.11*	1081.4	[0.01]	3.70*	970.7	[0.13]
β -Pinene	1.93*	1062.7	[0.12]	3.70*	970.7	[0.13]
Octen-3-ol	6.52	1420.1	0.36	3.89	983.1	0.35
Octan-3-one	3.74*	1214.6	[0.22]	3.94	986.5	0.16
Myrcene	2.68	1131.1	1.40	4.03	992.5	1.41
Octan-3-ol	5.81	1367.1	0.05	4.13	999.3	0.04
Pseudolimonene	2.62	1126.1	0.01	4.16*	1001.5	[0.16]
α -Phellandrene	2.58	1122.9	0.15	4.16*	1001.5	[0.16]
Δ 3-Carene	2.39	1107.7	0.06	4.25	1007.1	0.06
α -Terpinene	2.75	1137.0	1.32	4.36	1014.3	1.31
<i>para</i> -Cymene	3.87	1224.5	6.35	4.50	1022.9	6.34
β -Phellandrene	3.05	1161.1	0.17	4.55*	1026.3	[0.43]
1,8-Cineole	3.08	1163.1	0.06	4.55*	1026.3	[0.43]
Limonene	2.96	1153.9	0.20	4.55*	1026.3	[0.43]
(Z)- β -Ocimene	3.59*	1203.6	[4.90]	4.77	1039.8	0.04
(E)- β -Ocimene	3.74*	1214.6	[0.22]	4.92	1049.7	0.07
γ -Terpinene	3.59*	1203.6	[4.90]	5.06	1058.1	4.87
<i>cis</i> -Sabinene hydrate	6.63*	1428.6	[0.22]	5.17	1065.2	0.21
<i>cis</i> -Linalool oxide	6.26	1400.7	0.01	5.25	1070.5	0.01

(fur.)						
<i>trans</i> -Linalool oxide (fur.)	6.63*	1428.6	[0.22]	5.50*	1085.8	[0.15]
Terpinolene	4.03	1236.0	0.10	5.50*	1085.8	[0.15]
<i>para</i> -Cymenene	6.07	1386.5	0.01	5.50*	1085.8	[0.15]
<i>trans</i> -Sabinene hydrate	7.68	1508.5	0.12	5.65	1095.8	0.10
Linalool	7.79	1517.2	1.23	5.76	1102.6	1.23
Hotrienol	8.52	1574.2	0.02	5.81	1105.5	0.03
endo-Fenchol	8.11*	1542.1	[2.11]	5.88	1110.3	0.02
<i>cis-para</i> -Menth-2-en-1-ol	7.84*	1520.4	[0.06]	6.02	1119.0	0.03
<i>trans</i> -Pinocarveol	8.86	1601.5	0.02	6.25	1133.9	0.01
<i>trans-para</i> -Menth-2-en-1-ol	8.67*	1586.2	[0.04]	6.31	1137.8	0.03
Isoborneol	9.04	1615.9	0.02	6.55	1153.1	0.01
Unknown RHGR XVIII [m/z 123, 81 (46), 43 (45), 95 (34), 166 (30)]	8.67*	1586.2	[0.04]	6.62	1157.7	tr
Borneol	9.47*	1651.1	[0.61]	6.70	1162.9	0.47
Terpinen-4-ol	8.27*	1555.1	[0.68]	6.88	1174.3	0.55
<i>meta</i> -Cymen-8-ol	11.13	1792.2	tr	6.99	1181.4	0.01
<i>para</i> -Cymen-8-ol	11.21	1798.7	0.05	7.04	1184.9	0.02
Myrtenal	8.38	1563.0	0.04	7.11*†	1188.9	[0.08]
α-Terpineol	9.47*	1651.1	[0.61]	7.11*†	1188.9	[0.08]
<i>cis</i> -Dihydrocarvone	8.22	1551.1	0.05	7.19*†	1194.2	[0.02]
<i>trans</i> -Dihydrocarvone	8.42	1566.9	0.02	7.26*†	1198.7	[0.06]
<i>trans</i> -Piperitol	10.06*	1699.7	[0.06]	7.36	1205.5	0.04
Thymol methyl ether	8.16	1546.4	0.08	7.80	1234.8	0.01
Carvone	9.68*	1669.0	[0.03]	7.86	1238.7	0.01
Carvacrol methyl ether	8.27*	1555.1	[0.68]	7.93	1243.4	0.14
Geraniol	11.33	1809.1	0.01	8.14*	1258.0	[0.03]
Linalyl acetate	7.86	1522.7	0.01	8.14*	1258.0	[0.03]
Geranial	9.77	1675.9	0.01	8.31	1268.9	0.01
Bornyl acetate	7.93	1528.1	0.04	8.52	1283.4	0.01
Cuminol	13.84	2041.6	0.03	8.61	1289.1	0.01
Thymol analogue I (isothymol?)	14.64	2119.9	0.03	8.73	1297.2	0.03
Thymol	14.78	2134.1	2.70	8.82*	1303.6	[2.75]
Thymol analogue II	14.93	2149.5	0.04	8.82*	1303.6	[2.75]
Carvacrol	15.06	2162.1	69.99	9.07	1321.4	70.37
2-Methyl-6-				9.10	1323.0	0.12

propylphenol?						
Eugenol	14.43	2098.8	0.01	9.60	1358.5	0.01
Carvacryl acetate	11.43	1818.6	0.05	9.80*	1372.7	[0.06]
α -Copaene	6.89	1448.4	0.03	9.80*	1372.7	[0.06]
β -Bourbonene	7.18	1470.1	0.02	9.92	1381.0	0.02
Geranyl acetate	10.24	1715.9	0.02	10.00	1386.5	0.02
β -Elemene	8.11*	1542.1	[2.11]	10.03	1389.2	0.02
Isocaryophyllene	7.84*	1520.4	[0.06]	10.21	1402.0	0.01
Methyleugenol	12.98	1959.7	0.02	10.26	1405.5	0.02
β -Caryophyllene	8.11*	1542.1	[2.11]	10.39	1414.7	2.10
β -Copaene	8.04	1536.9	0.01	10.49	1422.8	0.01
Aromadendrene	8.27*	1555.1	[0.68]	10.64	1434.0	0.07
α -Humulene	8.95	1608.9	0.13	10.83	1448.1	0.13
Thymohydroquinone isomer?				10.93*	1455.6	[0.06]
<i>cis</i> -Muurolo-4(15),5-diene	9.00	1612.6	0.01	10.93*	1455.6	[0.06]
(<i>E</i>)- β -Farnesene	9.25*	1633.4	[0.08]	10.98	1458.9	0.05
<i>trans</i> -Cadina-1(6),4-diene	8.92	1605.9	0.01	11.13	1470.4	0.01
γ -Muurolole	9.25*	1633.4	[0.08]	11.18	1473.7	0.03
Germacrene D	9.41	1646.7	0.02	11.21	1476.4	0.01
allo-Aromadendr-9-ene	9.25*	1633.4	[0.08]	11.28	1481.8	0.02
α -Selinene	9.66	1666.9	0.05	11.40	1490.6	0.04
α -Muurolole	9.68*	1669.0	[0.03]	11.49	1497.3	0.02
β -Bisabolene	9.84	1681.8	0.78	11.64*	1508.3	[0.84]
γ -Cadinene	10.06*	1699.7	[0.06]	11.64*	1508.3	[0.84]
<i>trans</i> -Calamenene	10.88	1770.8	0.01	11.79*	1520.6	[0.06]
δ -Cadinene	10.08*	1702.1	[0.07]	11.79*	1520.6	[0.06]
β -Sesquiphellandrene	10.29	1720.0	0.03	11.82	1522.3	0.02
(<i>E</i>)- γ -Bisabolene	10.08*	1702.1	[0.07]	11.89	1528.2	0.01
(<i>E</i>)- α -Bisabolene	10.40	1728.8	0.02	12.08	1542.8	0.02
Salviadienol?	14.01	2058.1	0.01	12.19	1551.6	0.01
Spathulenol	14.08	2064.5	0.06	12.45	1572.0	0.06
Caryophyllene oxide isomer	12.35	1900.5	0.01	12.48*	1574.8	[0.26]
Caryophyllene oxide	12.43	1908.1	0.25	12.48*	1574.8	[0.26]
Humulene epoxide II	13.03	1964.5	0.02	12.81	1600.7	0.03
1,10-diepi-Cubenol	13.38	1996.9	0.02	12.90	1607.5	0.01
Caryophylladienol II	15.66	2224.2	0.01	13.17	1630.1	0.02
τ -Cadinol	14.49	2105.0	0.04	13.25*	1636.5	[0.06]
τ -Muurolol	14.68	2123.9	0.02	13.25*	1636.5	[0.06]
Unknown LYUN IV	12.68	1931.7	0.01	13.30	1640.4	0.02

[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)]	16.03	2262.2	0.01	13.34	1644.3	0.01
α -Cadinol	15.12	2168.3	0.08	13.41	1650.1	0.01
(3Z)-Caryophylla-3,8(13)-dien-5 β -ol	16.45	2306.5	0.03	13.62	1666.9	0.03
α -Bisabolol	15.08	2164.7	0.03	13.79	1681.5	0.02
Phytone	14.34	2090.3	0.07	15.68	1845.9	0.01
Unknown ORVU II [m/z 81, 150 (90), 136 (88), 135 (74), 93 (54), 121 (41)...]				15.80	1856.8	0.03
Unknown ORVU XIII [m/z 93, 135 (57), 43 (41), 91 (39), 150 (22)...]				16.08	1882.3	0.01
Unknown ORVU XII [m/z 133, 150 (34), 105 (22), 135 (16), 134 (12)...]				16.14	1887.4	0.01
Unknown ORVU III [m/z 81, 150 (83), 136 (81), 135 (67), 93 (48), 121 (36)...]				16.21	1894.0	0.06
Unknown ORVU XIV [m/z 93, 149 (98), 150 (85), 135 (55), 43 (29)...]				16.37	1908.5	0.01
Unknown ORVU X [m/z 136, 81 (81), 150 (74), 135 (52), 93 (46), 121 (42)...]	15.58	2215.8	0.09	16.51	1921.8	0.09
Unknown ORVU XV [m/z 81, 136 (71), 150 (57), 93 (47), 135 (42)...]				16.71	1940.3	0.02
Unknown ORVU IV [m/z 151, 135 (46), 109 (41), 43 (26), 150 (26)...]				17.00	1968.4	0.01

(24), 107 (23)...						
Unknown ORVU XVI [m/z 150, 135 (59), 81 (32), 136 (26), 257 (21)...				17.09	1976.4	0.02
Unknown MOFI III [m/z 99, 43 (43), 69 (37), 71 (37), 41 (28)...	17.16	2382.9	0.01	17.28	1995.0	0.02
Unknown ORVU VI [m/z 135, 150 (66), 43 (38), 109 (27), 93 (25), 137 (20)...	18.02	2479.0	0.01	17.54	2020.0	0.01
Unknown ORVU XVIII [m/z 135, 150 (71), 43 (55), 93 (36), 109 (36), 91 (28)...				18.18	2083.4	0.01
Unknown ORVU XVII [m/z 255, 270 (52), 119 (31), 122 (26), 91 (22), 256 (22)...				18.38	2102.8	0.02
Unknown MOFI V [m/z 69, 41 (81), 91 (37), 166 (35), 105 (33), 43 (30)...	19.51	2654.1	0.01	18.54	2119.2	0.01
Unknown MOFI VI [m/z 69, 41 (74), 166 (36), 91 (32), 105 (28), 43 (25)...	19.64	2668.7	0.01	18.59	2124.5	0.02
Total reported	98.59%			99.21%		

*: 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