

Date : 2025-07-31

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25G23-PTH05

Customer Identification : Organic Citronella - CD0110R

Type : Essential Oil

Source : *Cymbopogon winterianus*

Customer : Plant Therapy

Checked and approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

This report is an update from the first version issued on 2025-07-25 to correct the customer identification.

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 : 2025-07-25

PHYSICOCHEMICAL DATA

Refractive index : 1.4697 ± 0.0003 (20 °C)

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

Analyst : Dany Massé B. Sc. Chimiste

Date : 2025-07-23

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
Methylcyclopentane ?	0.01	Alkane
Isovaleral	tr	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	tr	Unknown
Tricyclene	0.04	Monoterpene
α -Thujene	0.01	Monoterpene
α -Pinene	0.20	Monoterpene
Camphene	0.11	Monoterpene
α -Fenchene	tr	Monoterpene
Sabinene	0.02	Monoterpene
β -Pinene	0.01	Monoterpene
6-Methyl-5-hepten-2-one	0.07	Aliphatic ketone
Myrcene	0.10	Monoterpene
α -Phellandrene	0.02	Monoterpene
Octanal	0.02	Aliphatic aldehyde
Δ^3 -Carene	0.02	Monoterpene
α -Terpinene	0.01	Monoterpene
<i>para</i> -Cymene	0.02	Monoterpene
β -Phellandrene	0.06	Monoterpene
Limonene	3.47	Monoterpene
Unknown	0.01	Unknown
(Z)- β -Ocimene	0.14	Monoterpene
(E)- β -Ocimene	0.09	Monoterpene
2,6-Dimethyl-5-heptenal (melonal)	0.10	Aliphatic aldehyde
γ -Terpinene	0.02	Monoterpene
<i>cis</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
Octanol	0.03	Aliphatic alcohol
Terpinolene	0.07	Monoterpene
Linalool	0.75	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
Unknown	0.01	Oxygenated monoterpene
<i>cis</i> -Rose oxide	0.02	Monoterpenic ether
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
<i>trans</i> -Rose oxide	0.01	Monoterpenic ether
Melonol ?	0.08	Normonoterpene
Isopulegol	1.04	Monoterpenic alcohol
Menthone	0.03	Monoterpenic ketone
Citronellal	36.68	Monoterpenic aldehyde

iso-Isopulegol	0.35	Monoterpenic alcohol
Isomenthone	0.02	Monoterpenic ketone
Borneol	0.03	Monoterpenic alcohol
neoiso-Isopulegol	0.03	Monoterpenic alcohol
Unknown	0.06	Unknown
Isopulegol isomer	0.01	Monoterpenic alcohol
Terpinen-4-ol	[0.03]	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Rosefuran oxide	[0.03]	Monoterpenic ether
Isogeranial	0.01	Monoterpenic aldehyde
Myrtenal	0.01	Monoterpenic aldehyde
α -Terpineol	0.07	Monoterpenic alcohol
Unknown	0.01	Unknown
(4Z)-Decenal	0.05	Aliphatic aldehyde
<i>trans</i> -Isopiperitenol	0.01	Monoterpenic alcohol
Decanal	0.14	Aliphatic aldehyde
2,3-Epoxyneral?	0.02	Monoterpenic aldehyde
Nerol	0.19	Monoterpenic alcohol
Citronellol	10.46	Monoterpenic alcohol
Neral	0.40	Monoterpenic aldehyde
Piperitone	0.02	Monoterpenic ketone
Geraniol	24.46	Monoterpenic alcohol
Geranial	0.66	Monoterpenic aldehyde
Citronellyl formate	0.04	Monoterpenic ester
Bornyl acetate	0.02	Monoterpenic ester
Geranyl formate	0.03	Monoterpenic ester
Unknown	0.02	Norsesquiterpene
Citronellic acid	0.24	Monoterpenic acid
8-Hydroxy-neo-menthol	0.22	Monoterpenic alcohol
α -Cubebene	0.02	Sesquiterpene
Eugenol	0.74	Phenylpropanoid
Citronellyl acetate	1.44	Monoterpenic ester
8-Hydroxy-iso-menthol	0.05	Monoterpenic alcohol
Neryl acetate	0.04	Monoterpenic ester
α -Copaene	0.03	Sesquiterpene
β -Bourbonene	0.10	Sesquiterpene
<i>cis</i> - β -Elemene	0.05	Sesquiterpene
β -Cubebene	0.01	Sesquiterpene
Geranyl acetate	2.46	Monoterpenic ester
β -Elemene	1.16	Sesquiterpene
Methyleugenol	0.04	Phenylpropanoid
Dodecanal	0.04	Aliphatic aldehyde
β -Caryophyllene	0.43	Sesquiterpene
β -Copaene	0.03	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.06	Sesquiterpene

Isogermacrene D	0.03	Sesquiterpene
(E)-Isoeugenol	0.02	Phenylpropanoid
α -Humulene	0.12	Sesquiterpene
(E)- β -Farnesene	0.05	Sesquiterpene
Methyl (Z)-isoeugenol	0.02	Phenylpropanoid
<i>trans</i> -Cadina-1(6),4-diene	0.03	Sesquiterpene
γ -Murolene	0.11	Sesquiterpene
Germacrene D	1.61	Sesquiterpene
β -Selinene	0.03	Sesquiterpene
epi-Cubebol	0.09	Sesquiterpenic alcohol
α -Selinene	0.05	Sesquiterpene
α -Murolene	0.08	Sesquiterpene
Methyl (E)-isoeugenol	0.01	Phenylpropanoid
Germacrene A	0.43	Sesquiterpene
Cubebol	0.10	Sesquiterpenic alcohol
γ -Cadinene	0.78	Sesquiterpene
<i>trans</i> -Calamenene	0.02	Sesquiterpene
δ -Cadinene	1.19	Sesquiterpene
Unknown	0.02	Sesquiterpene
α -Cadinene	0.10	Sesquiterpene
α -Elemol	1.97	Sesquiterpenic alcohol
Germacrene B	0.03	Sesquiterpene
Geranyl butyrate	0.09	Monoterpenic ester
(E)-Nerolidol	0.01	Sesquiterpenic alcohol
Germacrene D-4-ol	1.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.03	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
1,10-diepi-Cubenol	0.04	Sesquiterpenic alcohol
1-epi-Cubenol	0.05	Sesquiterpenic alcohol
γ -Eudesmol	0.17	Sesquiterpenic alcohol
τ -Murolol	0.27	Sesquiterpenic alcohol
τ -Cadinol	0.15	Sesquiterpenic alcohol
Cubenol	0.02	Sesquiterpenic alcohol
β -Eudesmol	0.20	Sesquiterpenic alcohol
α -Murolol	0.06	Sesquiterpenic alcohol
α -Eudesmol	0.16	Sesquiterpenic alcohol
α -Cadinol	0.47	Sesquiterpenic alcohol
Unknown	0.66	Oxygenated sesquiterpene
(2E,6Z)-Farnesal	0.03	Sesquiterpenic aldehyde
(2E,6E)-Farnesol	0.06	Sesquiterpenic alcohol
(2E,6E)-Farnesal	0.03	Sesquiterpenic aldehyde
Geranyl caproate	0.02	Monoterpenic ester
Cryptomeridiol	0.03	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated diterpene
Unknown	0.06	Oxygenated diterpene

Unknown	0.03	Unknown
Unknown	0.08	Unknown
Unknown	0.10	Unknown
Consolidated total	98.41	

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

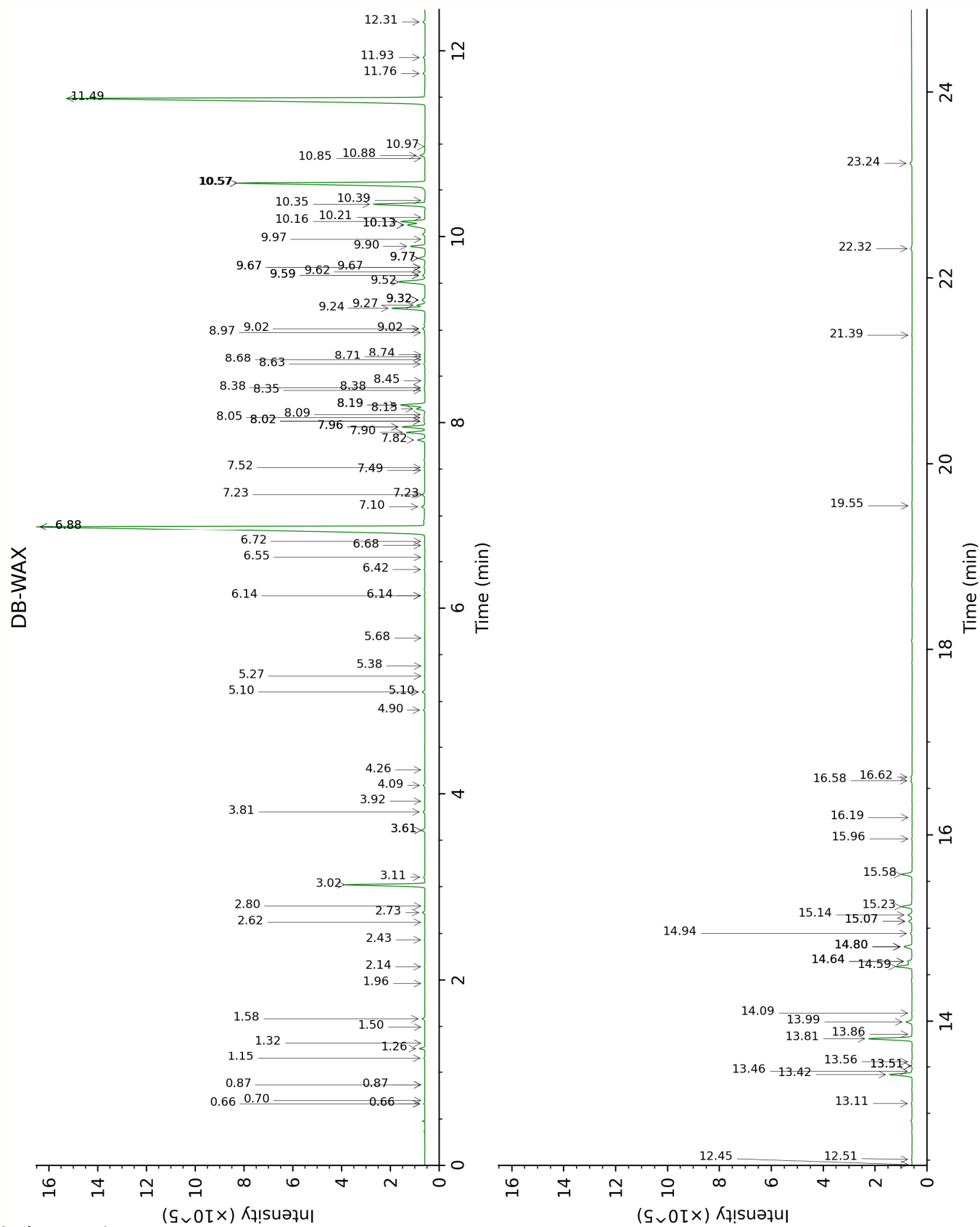
Note: no correction factor was applied

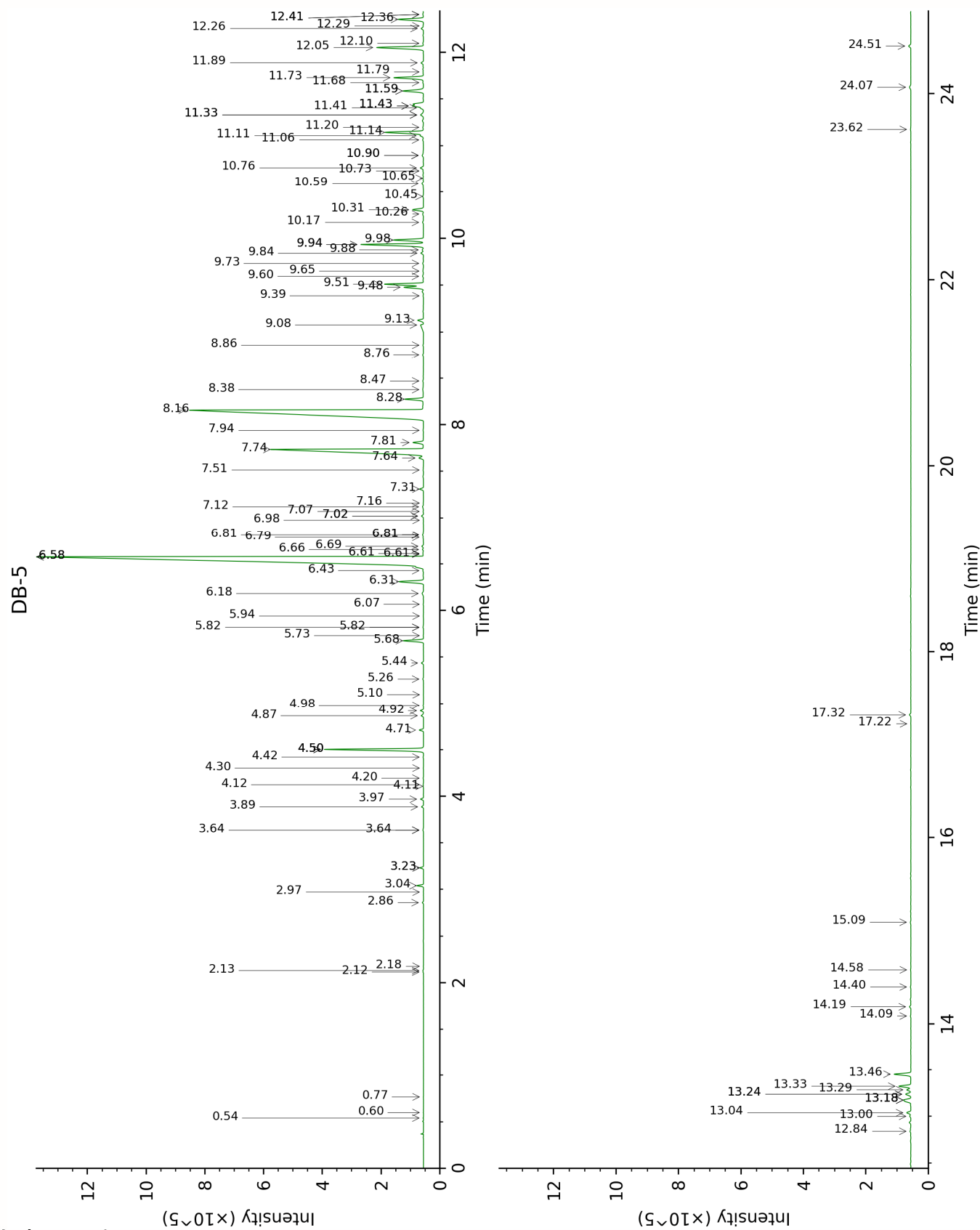
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Methylcyclopentane ?	Column DB-WAX			Column DB-5		
				0.54	621.5	0.01
Isovaleral	0.70	882.3	tr	0.60	642.8	tr
2-Ethylfuran	0.87*	919.6	[tr]	0.77	703.3	tr
Unknown COCI I [m/z 55, 83 (89), 82 (70), 67 (66), 41 (55), 69 (46), 111 (37)... 126 (2)]	0.66*	867.6	[0.03]	2.12	859.5	0.01
Unknown COCI II [m/z 55, 83 (79), 67 (65), 41 (63), 82 (60), 69 (58)... 111 (27), 126 (9)]	0.66*	867.6	[0.03]	2.13	860.9	0.01
Unknown ROOF III [m/z 67, 81 (70), 66 (53), 68 (41), 82 (38), 109 (38)...]	0.87*	919.6	[tr]	2.18	864.7	tr
Tricyclene	1.15	970.4	0.04	2.86	918.5	0.04
α -Thujene	1.32	998.5	0.01	2.97	926.1	0.01
α -Pinene	1.26	990.0	0.20	3.04	930.7	0.20
Camphene	1.58	1025.7	0.11	3.23*	943.4	[0.11]
α -Fenchene	1.50	1016.4	tr	3.23*	943.4	[0.11]
Sabinene	2.14	1084.0	0.02	3.64*	970.5	[0.03]
β -Pinene	1.96	1065.2	0.01	3.64*	970.5	[0.03]
6-Methyl-5-hepten-2- one	4.90	1300.8	0.06	3.89	987.3	0.07
Myrcene	2.73	1133.9	0.10	3.97	992.8	0.10
α -Phellandrene	2.62	1125.4	0.01	4.11	1002.1	0.02
Octanal	4.26	1253.4	0.01	4.12	1003.2	0.02
Δ 3-Carene	2.43	1110.2	0.02	4.20	1007.7	0.02
α -Terpinene	2.80	1139.6	0.01	4.30	1014.5	0.01
<i>para</i> -Cymene	3.92	1228.3	0.01	4.42	1022.0	0.02
β -Phellandrene	3.11	1164.7	0.06	4.50*	1027.2	[3.54]
Limonene	3.02	1158.1	3.47	4.50*	1027.2	[3.54]
Unknown COCI XLIV [m/z 59, 43 (12), 109 (11), 41 (10), 127 (8)...]	6.14*	1389.3	[0.02]	4.50*	1027.2	[3.54]
(Z)- β -Ocimene	3.61*	1204.9	[0.15]	4.71	1040.3	0.14
(E)- β -Ocimene	3.81	1219.7	0.08	4.87	1050.2	0.09
2,6-Dimethyl-5- heptenal (melonal)	5.10*	1315.3	[0.12]	4.92	1053.6	0.10
γ -Terpinene	3.61*	1204.9	[0.15]	4.98	1057.5	0.02
<i>cis</i> -Sabinene hydrate	6.68	1428.9	0.02	5.10	1064.9	0.01
Octanol	7.96*	1524.8	[1.06]	5.26	1075.5	0.03

Terpinolene	4.09	1241.0	0.07	5.44	1086.5	0.07
Linalool	7.90	1520.3	0.80	5.68	1101.7	0.75
Nonanal	5.68	1356.8	0.01	5.73	1105.2	0.01
Unknown COCI VII [m/z 111, 69 (70), 41 (68), 55 (53), 43 (51)... 154 (7)]	5.38	1335.2	0.01	5.82*	1110.9	[0.03]
cis-Rose oxide	5.10*	1315.3	[0.12]	5.82*	1110.9	[0.03]
trans-para-Mentha- 2,8-dien-1-ol	8.74	1585.4	0.02	5.94	1118.8	0.01
trans-Rose oxide	5.27	1327.5	0.01	6.07	1127.0	0.01
Melonol ?				6.18	1134.5	0.08
Isopulegol	7.96*	1524.8	[1.06]	6.31	1142.8	1.04
Menthone	6.42	1409.8	0.03	6.43	1150.4	0.03
Citronellal	6.88*	1444.3	[36.59]	6.58*†	1160.0	[36.75]
iso-Isopulegol	7.82	1514.0	0.35	6.58*†	1160.0	[36.75]
Isomenthone	6.72	1432.1	0.01	6.60	1161.9	0.02
Borneol	9.59*	1653.4	[0.13]	6.61	1162.4	0.03
neoiso-Isopulegol	8.63	1576.9	0.05	6.66	1165.1	0.03
Unknown PIMA 4 [m/z 109, 108 (48), 67 (41), 81 (40), 41 (28)...]	7.23*	1469.8	[0.11]	6.69	1167.4	0.06
Isopulegol isomer	8.35	1555.1	0.01	6.79*†	1173.8	[0.02]
Terpinen-4-ol	8.38*	1557.2	[0.06]	6.81*†	1175.4	[0.05]
Unknown CYFL V [m/z 84, 83 (74), 137 (56), 41 (47), 93 (43), 108 (40)... 152 (2)]	9.32*	1632.2	[0.18]	6.81*†	1175.4	[0.05]
Rosefuran oxide	8.38*	1557.2	[0.06]	6.81*†	1175.4	[0.05]
Isogeranial	8.02*	1529.6	[0.06]	6.98	1186.0	0.01
Myrtenal	8.45	1563.1	0.01	7.02*	1189.0	[0.07]
α-Terpineol	9.59*	1653.4	[0.13]	7.02*	1189.0	[0.07]
Unknown DRMO III [m/z 43, 81 (47), 67 (45), 69 944), 41 (42), 59 (40), 55 (39)...]	8.98	1603.9	0.04	7.07	1192.2	0.01
(4Z)-Decenal	7.52	1491.4	0.03	7.12	1195.4	0.05
trans-Isopiperitenol	10.21	1704.1	0.02	7.16	1198.0	0.01
Decanal	7.10	1460.2	0.13	7.31	1207.9	0.14
2,3-Epoxyneral?				7.52	1221.8	0.02
Nerol	10.88	1760.9	0.29	7.64	1230.6	0.19
Citronellol	10.57*	1735.1	[10.66]	7.74	1236.9	10.46
Neral	9.27	1627.6	0.36	7.81	1241.9	0.40
Piperitone	9.67*	1660.5	[0.08]	7.94	1250.8	0.02
Geraniol	11.49	1813.7	24.59	8.16	1265.6	24.46

Geranial	9.90	1678.6	0.66	8.28	1273.7	0.66
Citronellyl formate	8.68	1580.5	0.01	8.38	1280.7	0.04
Bornyl acetate	8.02*	1529.6	[0.06]	8.47	1287.1	0.02
Geranyl formate	9.67*	1660.5	[0.08]	8.76	1306.7	0.03
Unknown CYSC II [m/z 135, 121 (81), 177 (78), 107 (60), 192 (42), 149 (35)]	6.14*	1389.3	[0.02]	8.86	1310.6	0.02
Citronellic acid				9.08	1326.0	0.24
8-Hydroxy-neo- menthol	13.99	2044.3	0.29	9.13	1329.6	0.22
α -Cubebene	6.55	1419.5	0.02	9.39	1348.2	0.02
Eugenol	14.59	2102.2	0.76	9.48	1354.7	0.74
Citronellyl acetate	9.24	1625.0	1.56	9.51	1357.1	1.44
8-Hydroxy-iso- menthol	14.80*	2123.5	[0.41]	9.60	1363.0	0.05
Neryl acetate	9.97	1684.7	0.03	9.65	1367.0	0.04
α -Copaene	6.88*	1444.3	[36.59]	9.74	1372.8	0.03
β -Bourbonene	7.23*	1469.8	[0.11]	9.84	1380.6	0.10
<i>cis</i> - β -Elemene	8.06	1532.5	0.06	9.88	1383.1	0.05
β -Cubebene	7.49	1489.1	0.01	9.94*	1387.2	[2.46]
Geranyl acetate	10.35	1716.0	2.46	9.94*	1387.2	[2.46]
β -Elemene	8.19*	1543.0	[1.20]	9.98	1390.6	1.16
Methyleugenol	13.11	1960.1	0.04	10.17	1404.0	0.04
Dodecanal	9.77*	1668.3	[0.32]	10.26	1410.6	0.04
β -Caryophyllene	8.15	1539.9	0.42	10.31	1414.1	0.43
β -Copaene	8.09	1535.1	0.04	10.45	1424.8	0.03
<i>trans</i> - α -Bergamotene	8.19*	1543.0	[1.20]	10.59	1435.1	0.06
Isogermacrene D	8.71	1583.0	0.02	10.65	1439.8	0.03
(<i>E</i>)-Isoeugenol	16.19	2265.8	0.01	10.73	1445.7	0.02
α -Humulene	9.02*	1607.2	[0.12]	10.76	1448.1	0.12
(<i>E</i>)- β -Farnesene	9.32*	1632.2	[0.18]	10.90*	1458.2	[0.07]
Methyl (<i>Z</i>)- isoeugenol	13.86	2031.6	0.02	10.90*	1458.2	[0.07]
<i>trans</i> -Cadina-1(6),4- diene	9.02*	1607.2	[0.12]	11.06	1470.6	0.03
γ -Muurolene	9.32*	1632.2	[0.18]	11.11	1474.1	0.11
Germacrene D	9.52	1647.9	1.66	11.14	1476.7	1.61
β -Selinene	9.62	1656.5	0.02	11.20	1480.8	0.03
epi-Cubebol	11.76	1837.4	0.09	11.33*	1490.7	[0.15]
α -Selinene	9.67*	1660.5	[0.08]	11.33*	1490.7	[0.15]
α -Muurolene	9.77*	1668.3	[0.32]	11.41	1496.5	0.08
Methyl (<i>E</i>)-isoeugenol	14.80*	2123.5	[0.41]	11.43*	1498.0	[0.44]
Germacrene A	10.13*	1697.3	[1.21]	11.43*	1498.0	[0.44]
Cubebol	12.31	1886.6	0.10	11.59*	1510.3	[0.88]

γ -Cadinene	10.13*	1697.3	[1.21]	11.59*	1510.3	[0.88]
<i>trans</i> -Calamenene	10.97	1769.0	0.03	11.68	1517.3	0.02
δ -Cadinene	10.16	1700.4	1.17	11.73	1521.5	1.19
Unknown OCSA II [m/z 119, 105 (53), 161 (33), 93 (28), 91 (25), 40 (20)...204]	10.39	1719.5	0.03	11.79	1526.4	0.02
α -Cadinene	10.57*	1735.1	[10.66]	11.89	1534.1	0.10
α -Elemol	13.81	2026.8	2.02	12.05	1547.0	1.97
Germacrene B	10.85	1758.3	0.02	12.10	1550.6	0.03
Geranyl butyrate	11.93	1852.7	0.09	12.26	1563.2	0.09
(<i>E</i>)-Nerolidol	13.51*	1997.9	[0.03]	12.29	1565.3	0.01
Germacrene D-4-ol	13.42	1989.0	1.07	12.36	1570.9	1.01
Caryophyllene oxide	12.51	1904.4	0.03	12.41*	1575.1	[0.03]
Caryophyllene oxide isomer	12.45	1899.2	0.01	12.41*	1575.1	[0.03]
1,10-diepi-Cubenol	13.51*	1997.9	[0.03]	12.84	1609.4	0.04
1-epi-Cubenol	13.56	2002.3	0.03	13.00	1622.8	0.05
γ -Eudesmol	14.64*†	2107.7	[0.22]	13.04	1625.9	0.17
τ -Muurolol	14.80*	2123.5	[0.41]	13.18*	1637.2	[0.44]
τ -Cadinol	14.64*†	2107.7	[0.22]	13.18*	1637.2	[0.44]
Cubenol	13.46	1992.3	0.02	13.18*	1637.2	[0.44]
β -Eudesmol	15.14	2157.9	0.20	13.24*	1642.5	[0.24]
α -Muurolol	14.94	2137.8	0.06	13.24*	1642.5	[0.24]
α -Eudesmol	15.07*	2151.0	[0.15]	13.29	1646.4	0.16
α -Cadinol	15.23	2166.9	0.48	13.33	1649.6	0.47
Unknown CYWI V [suspected m/z 59, 93 (79), 161 (61), 107 (47), 81 (44), 121 (37)...]				13.46	1660.3	0.66
(2 <i>E</i> ,6 <i>Z</i>)-Farnesal	15.07*	2151.0	[0.15]	14.09	1713.1	0.03
(2 <i>E</i> ,6 <i>E</i>)-Farnesol	16.58	2307.7	0.07	14.19	1721.7	0.06
(2 <i>E</i> ,6 <i>E</i>)-Farnesal	15.58	2202.2	0.51	14.40	1740.2	0.03
Geranyl caproate	14.09	2053.3	0.02	14.58	1756.1	0.02
Cryptomeridiol	19.55	2646.7	0.01	15.09	1800.5	0.03
Unknown COCI XXIX [m/z 81, 137 (70), 95 (46), 69 (45), 41 (39), 55 (29)...]	15.96	2242.0	0.02	17.22	1998.3	0.01
Unknown COCI XXX [m/z 41, 69 (98), 55 (55), 81 (46), 109 (46)... 290 (8)]	16.62	2311.9	0.06	17.32	2007.5	0.06
Unknown CYWI II	21.39	2878.2	0.02	23.62	2708.2	0.03

[m/z 69, 81 (79), 81 (70), 137 (53), 139 (35), 95 (30)...]						
Unknown CYWI III [m/z 69, 81 (84), 137 (53), 83 (30), 95 (27), 41 (19)...]	22.32	3002.5	0.08	24.07	2766.2	0.08
Unknown CYWI IV [m/z 69, 81 (64), 95 (29), 137 (19), 41 (19)...]	23.24	3131.1	0.10	24.51	2823.5	0.10
Total reported	98.47%			98.37%		

*: 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