

Date : 2025-01-30

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25A16-NSO02

Customer Identification : Lavender - Bulgaria - Lot: OLOGH 2/2024

Type : Essential Oil

Source : *Lavandula angustifolia*

Customer : Natural Sourcing LLC

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 : 2025-01-24

PHYSICOCHEMICAL DATA

Refractive index : 1.4618 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-01-16

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
3-Buten-2-one	tr	Aliphatic ketone
2-Methyl-3-buten-2-ol	0.01	Aliphatic alcohol
Isovaleral	0.02	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Toluene	0.01	Simple phenolic
Butyl acetate	0.01	Aliphatic ester
Methyl hexyl ether	0.11	Aliphatic ether
(3Z)-Hexenol	0.03	Aliphatic alcohol
Hexanol	0.14	Aliphatic alcohol
Tricyclene	0.02	Monoterpene
α -Thujene	0.10	Monoterpene
α -Pinene	0.19	Monoterpene
Camphene	0.12	Monoterpene
α -Fenchene	0.02	Monoterpene
5,5-Dimethyl-2(5H)-furanone	0.02	Aliphatic lactone
Butyl isobutyrate	0.02	Aliphatic ester
β -Pinene	0.05	Monoterpene
Sabinene	0.05	Monoterpene
Octen-3-ol	0.24	Aliphatic alcohol
Octan-3-one	1.22	Aliphatic ketone
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Myrcene	0.55	Monoterpene
Butyl butyrate	0.07	Aliphatic ester
Octan-3-ol	0.29	Aliphatic alcohol
Pseudolimonene	0.02	Monoterpene
α -Phellandrene	0.04	Monoterpene
cis-Dehydroxylinalool oxide	0.02	Monoterpenic ether
Δ^3 -Carene	0.10	Monoterpene
α -Terpinene	0.05	Monoterpene
Hexyl acetate	0.51	Aliphatic ester
meta-Cymene	0.04	Monoterpene
para-Cymene	0.16	Monoterpene
β -Phellandrene	0.26	Monoterpene
Limonene	0.30	Monoterpene
1,8-Cineole	0.64	Monoterpenic ether
(Z)- β -Ocimene	4.66	Monoterpene
(E)- β -Ocimene	2.76	Monoterpene

γ -Terpinene	0.17	Monoterpene
<i>cis</i> -Sabinene hydrate	0.08	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.14	Monoterpenic alcohol
Octanol	0.03	Aliphatic alcohol
α -Pinene oxide analog	0.01	Monoterpenic ether
Terpinolene	0.08	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.10	Monoterpenic alcohol
Rosefuran	0.08	Monoterpenic ether
Linalool	29.75	Monoterpenic alcohol
(<i>Z</i>)-6-Methyl-3,5-heptadien-2-one	0.06	Aliphatic ketone
β -Thujone	0.06	Monoterpenic ketone
Octen-3-yl acetate	0.79	Aliphatic ester
Unknown	0.04	Unknown
Octan-3-yl acetate	0.11	Aliphatic ester
allo-Ocimene	0.09	Monoterpene
(<i>Z</i>)-Myroxide	0.03	Monoterpenic ether
Camphor	0.27	Monoterpenic ketone
(<i>E</i>)-Myroxide	0.05	Monoterpenic ether
Hexyl isobutyrate	0.08	Aliphatic ester
Nerol oxide	0.01	Aliphatic ether
Unknown	0.02	Oxygenated monoterpene
Borneol	0.54	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (pyr.)	0.02	Monoterpenic alcohol
Lavandulol	1.16	Monoterpenic alcohol
Terpinen-4-ol	4.26	Monoterpenic alcohol
Cryptone	0.20	Normonoterpenic ketone
<i>meta</i> -Cymen-8-ol	0.07	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.08	Monoterpenic alcohol
α -Terpineol	0.85	Monoterpenic alcohol
Hexyl butyrate	0.46	Aliphatic ester
Verbenone	0.02	Monoterpenic ketone
Unknown	0.02	Unknown
(3 <i>E</i> ,5 <i>E</i>)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.02	Monoterpenic alcohol
<i>trans</i> -Carveol	0.02	Monoterpenic alcohol
Bornyl formate	0.05	Monoterpenic ester
Nerol	0.14	Monoterpenic alcohol
Cuminal	0.04	Monoterpenic aldehyde
Hexyl 2-methylbutyrate	0.05	Aliphatic ester
Carvone	0.08	Monoterpenic ketone
Hexyl isovalerate	0.02	Aliphatic ester
Linalyl acetate	31.19	Monoterpenic ester
Geraniol	0.36	Monoterpenic alcohol
Geranial	0.03	Monoterpenic aldehyde
2,6-Dimethyl-1,7-octadiene-3,6-diol	tr	Monoterpenic alcohol
Bornyl acetate	0.14	Monoterpenic ester

Lavandulyl acetate	3.07	Monoterpenic ester
Hexyl tiglate	0.06	Aliphatic ester
Hodiendiol derivative	0.03	Oxygenated monoterpene
α -Terpinyl acetate	0.02	Monoterpenic ester
Unknown	0.03	Oxygenated monoterpene
Unknown	0.03	Oxygenated monoterpene
Neryl acetate	0.24	Monoterpenic ester
α -Copaene	0.02	Sesquiterpene
β -Bourbonene	0.05	Sesquiterpene
Geranyl acetate	0.38	Monoterpenic ester
7-epi-Sesquithujene	0.11	Sesquiterpene
Hexyl hexanoate	0.12	Aliphatic ester
Sesquithujene	0.06	Sesquiterpene
<i>cis</i> - α -Bergamotene	0.07	Sesquiterpene
β -Caryophyllene	3.65	Sesquiterpene
α -Santalene	0.43	Sesquiterpene
Coumarin	0.06	Coumarin
<i>trans</i> - α -Bergamotene	0.15	Sesquiterpene
Sesquisabinene A	0.07	Sesquiterpene
α -Humulene	0.14	Sesquiterpene
Lavandulyl butyrate?	0.14	Monoterpenic ester
β -Santalene	0.02	Sesquiterpene
(<i>E</i>)- β -Farnesene	4.18	Sesquiterpene
Germacrene D	0.54	Sesquiterpene
<i>trans</i> - β -Bergamotene	0.07	Sesquiterpene
Isodaucene	0.03	Sesquiterpene
γ -Cadinene	0.10	Sesquiterpene
β -Bisabolene	0.03	Sesquiterpene
Lavandulyl isovalerate	0.03	Monoterpenic ester
Unknown	0.04	Oxygenated sesquiterpene
δ -Cadinene	tr	Sesquiterpene
β -Sesquiphellandrene	0.03	Sesquiterpene
Isocaryophyllene epoxide B	0.03	Sesquiterpenic ether
<i>cis</i> -Sesquisabinene hydrate	0.01	Sesquiterpenic alcohol
(<i>E</i>)-Nerolidol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.04	Sesquiterpenic ether
Caryophyllene oxide	0.27	Sesquiterpenic ether
Caryophylladienol II	0.02	Sesquiterpenic alcohol
τ -Cadinol	0.07	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	0.02	Sesquiterpenic alcohol
Phytone	0.01	Terpenic ketone
Pentylcurcumene?	0.02	Diterpene
Consolidated total	99.26	

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

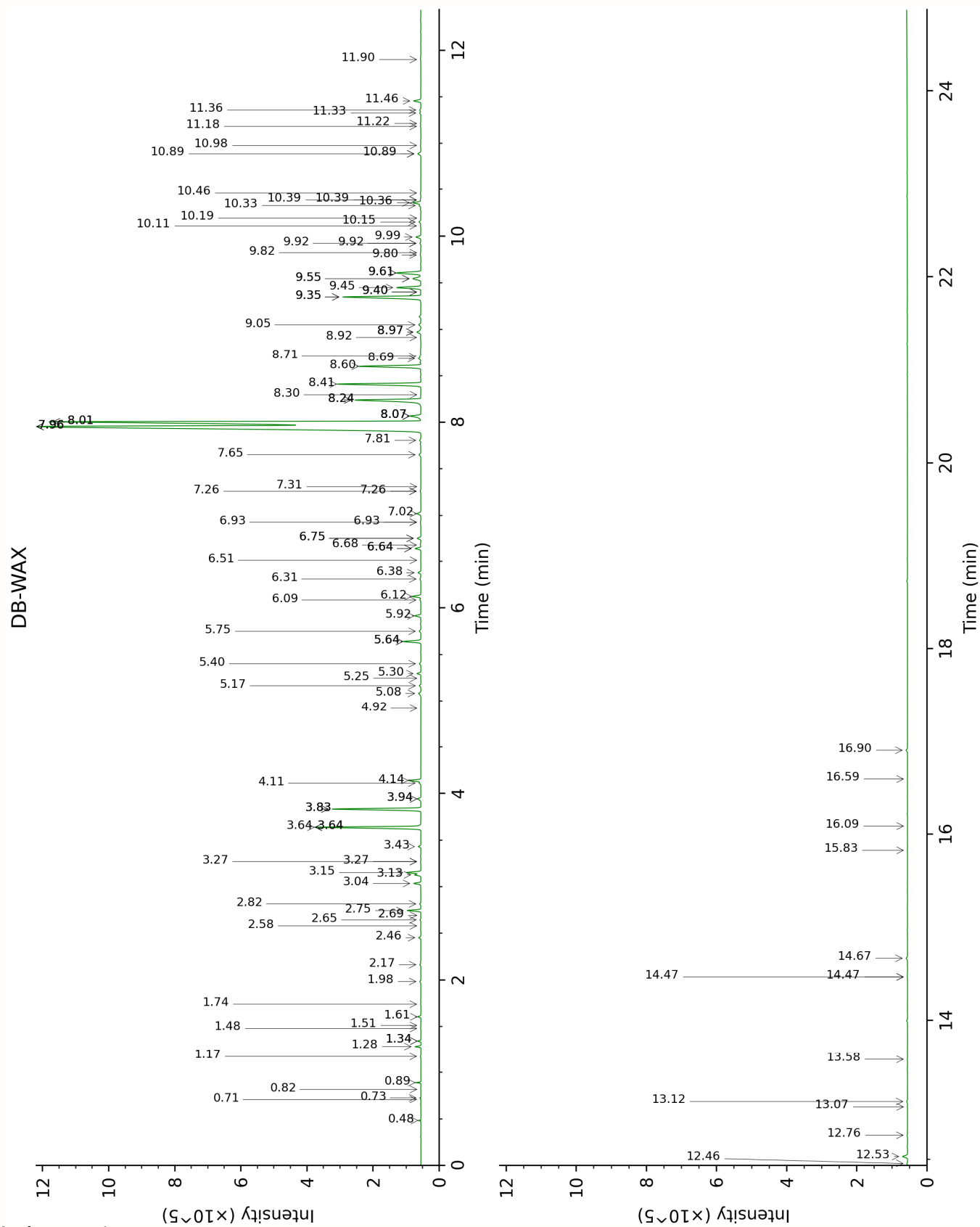
Note: no correction factor was applied

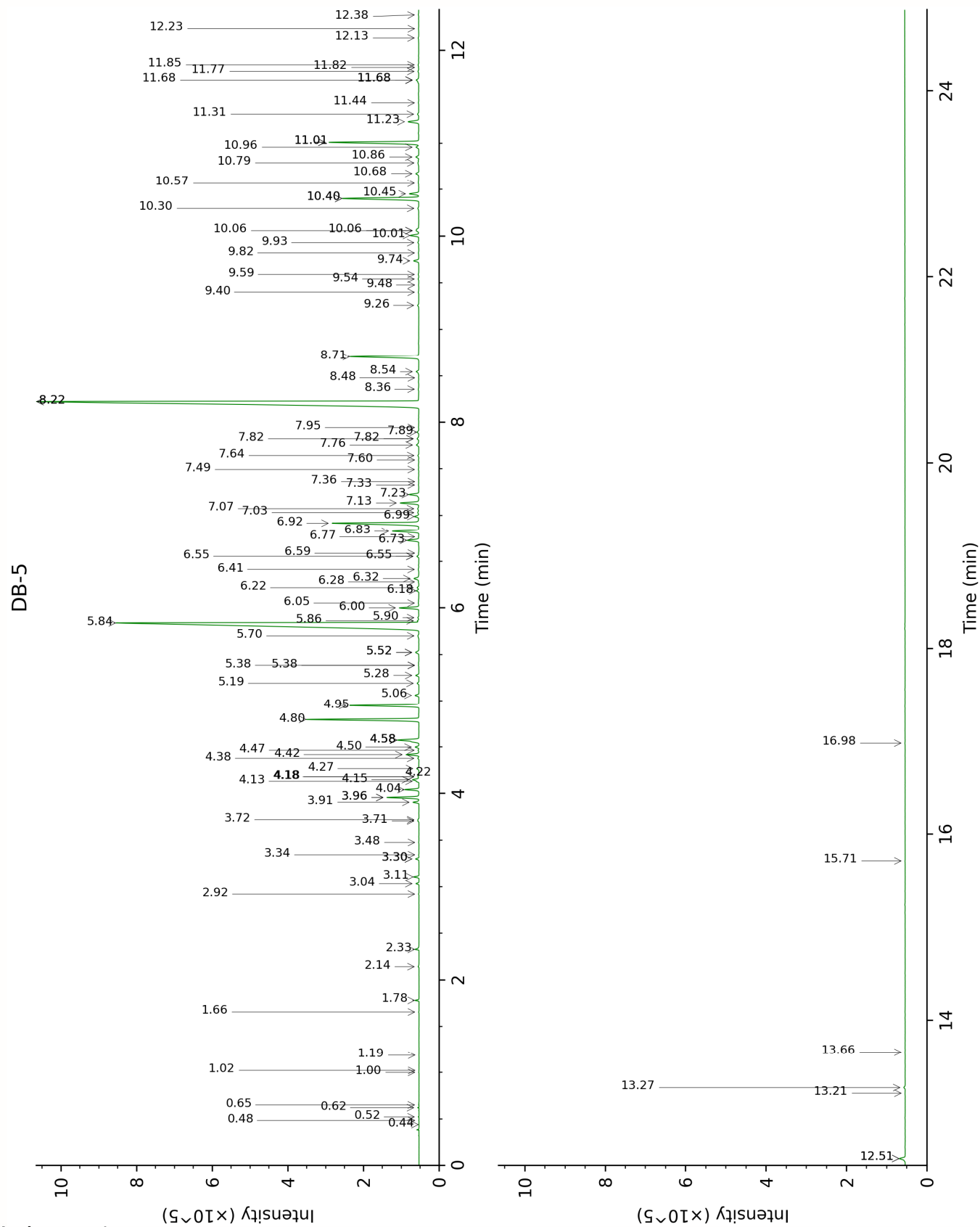
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Isobutyral	Column DB-WAX			Column DB-5		
	0.48	783.9	0.04	0.44	536.8	tr
3-Buten-2-one	0.82	909.5	tr	0.48	574.4	tr
2-Methyl-3-buten-2-ol	1.48	1013.5	0.02	0.52	605.6	0.01
Isovaleral	0.73	888.0	0.02	0.62	640.3	0.02
2-Methylbutyral	0.71	881.1	0.01	0.65	650.9	0.01
Isoamyl alcohol	3.27*	1175.4	[0.02]	1.00	732.5	0.01
2-Methylbutanol	3.27*	1175.4	[0.02]	1.02	735.5	tr
Toluene	1.34*	999.8	[0.10]	1.19	759.1	0.01
Butyl acetate	1.74	1040.2	0.02	1.66	816.7	0.01
Methyl hexyl ether	0.89	922.0	0.11	1.78	827.2	0.11
(3Z)-Hexenol	5.64*	1352.3	[0.83]	2.14	857.4	0.03
Hexanol	5.30	1327.6	0.17	2.33	873.0	0.14
Tricyclene	1.17	970.8	0.02	2.92	918.8	0.02
α -Thujene	1.34*	999.8	[0.10]	3.04	926.3	0.10
α -Pinene	1.28	990.1	0.19	3.11	931.0	0.19
Camphene	1.61	1026.4	0.12	3.30*	943.8	[0.14]
α -Fenchene	1.51	1016.9	0.02	3.30*	943.8	[0.14]
5,5-Dimethyl-2(5H)-furanone	8.30	1549.5	0.01	3.34	946.8	0.02
Butyl isobutyrate	2.58	1120.3	0.02	3.48	955.6	0.02
β -Pinene	1.98	1065.0	0.05	3.71*†	970.9	[0.04]
Sabinene	2.16	1083.6	0.05	3.72*†	971.8	[0.04]
Octen-3-ol	6.64*	1424.5	[0.26]	3.91	984.2	0.24
Octan-3-one	3.84*	1219.1	[3.97]	3.96*	987.7	[1.23]
6-Methyl-5-hepten-2-one	4.92	1299.4	0.01	3.96*	987.7	[1.23]
Myrcene	2.75	1133.4	0.54	4.04	993.3	0.55
Butyl butyrate	3.43	1188.3	0.11	4.13	999.2	0.07
Octan-3-ol	5.92	1372.0	0.29	4.15	1000.3	0.29
Pseudolimonene	2.69	1129.3	0.02	4.18*	1002.5	[0.05]
α -Phellandrene	2.65	1125.5	0.04	4.18*	1002.5	[0.05]
cis-Dehydroxylinalool oxide	3.64*	1204.7	[4.82]	4.22	1004.7	0.02
Δ^3 -Carene	2.46	1110.2	0.10	4.27	1008.0	0.10
α -Terpinene	2.82	1139.2	0.06	4.38	1014.9	0.05
Hexyl acetate	4.14	1241.8	0.52	4.42	1017.4	0.51
meta-Cymene	3.94*	1227.1	[0.18]	4.47	1020.4	0.04
para-Cymene	3.94*	1227.1	[0.18]	4.50	1022.5	0.16
β -Phellandrene	3.13	1164.1	0.26	4.58*	1027.2	[1.19]
Limonene	3.04	1156.7	0.30	4.58*	1027.2	[1.19]
1,8-Cineole	3.15	1166.0	0.64	4.58*	1027.2	[1.19]

(Z)- β -Ocimene	3.64*	1204.7	[4.82]	4.80	1041.2	4.66
(E)- β -Ocimene	3.84*	1219.1	[3.97]	4.95	1050.7	2.76
γ -Terpinene	3.64*	1204.7	[4.82]	5.06	1057.8	0.17
cis-Sabinene hydrate	6.75*	1432.7	[0.18]	5.19	1065.9	0.08
cis-Linalool oxide (fur.)	6.38	1405.3	0.13	5.28	1071.3	0.14
Octanol	8.01*†	1527.0	[24.79]	5.38*†	1078.1	[0.03]
α -Pinene oxide analog	5.25	1324.0	0.01	5.38*†	1078.1	[0.03]
Terpinolene	4.11	1239.7	0.08	5.52*	1086.8	[0.18]
trans-Linalool oxide (fur.)	6.75*	1432.7	[0.18]	5.52*	1086.8	[0.18]
Rosefuran	5.75	1360.2	0.09	5.70	1098.0	0.08
Linalool	7.96*†	1523.1	[35.97]	5.84	1106.7	29.75
(Z)-6-Methyl-3,5-heptadien-2-one	8.01*†	1527.0	[24.79]	5.86	1108.1	0.06
β -Thujone	6.09	1384.2	0.05	5.90	1110.3	0.06
Octen-3-yl acetate	5.64*	1352.3	[0.83]	6.00	1117.0	0.79
Unknown LAAN I [m/z 82, 81 (72), 43 (64), 54 (32), 41 (20)...]	9.40*	1636.9	[0.02]	6.05	1120.3	0.04
Octan-3-yl acetate	5.08	1312.3	0.14	6.18	1128.8	0.11
allo-Ocimene	5.40	1335.2	0.07	6.22	1130.9	0.09
(Z)-Myroxide	6.68	1427.3	0.04	6.28	1134.9	0.03
Camphor	7.02	1452.9	0.20	6.32	1137.2	0.27
(E)-Myroxide	6.93*	1446.1	[0.03]	6.41	1143.4	0.05
Hexyl isobutyrate	5.17	1318.2	0.08	6.56*	1152.4	[0.09]
Nerol oxide	6.64*	1424.5	[0.26]	6.56*	1152.4	[0.09]
Unknown BOCA III [m/z 97, 81 (96), 109 (80), 43 (53), 53 (40), 41 (36), 56 (29), 95 (25)... 152 (1)]	7.31	1474.3	0.01	6.59	1154.6	0.02
Borneol	9.61*	1653.5	[1.36]	6.73	1163.4	0.54
cis-Linalool oxide (pyr.)	10.11	1694.3	0.03	6.77	1165.9	0.02
Lavandulol	9.45	1640.8	1.16	6.83	1169.8	1.16
Terpinen-4-ol	8.41	1558.4	4.15	6.92	1175.5	4.26
Cryptone	8.98*	1602.2	[0.25]	6.99	1180.2	0.20
meta-Cymen-8-ol	11.33	1797.3	0.06	7.03	1182.8	0.07
para-Cymen-8-ol	11.36	1800.2	0.06	7.07	1185.5	0.08
α -Terpineol	9.61*	1653.5	[1.36]	7.14	1189.5	0.85
Hexyl butyrate	6.12	1387.0	0.41	7.23	1195.3	0.46

Verbenone	9.40*	1636.9	[0.02]	7.33	1201.8	0.02
Unknown SASC VII [m/z 43, 71 (66), 59 (52), 41 (47), 68 (46)...] (3E,5E)-2,6- Dimethylocta-3,5,7- trien-2-ol	7.26*	1470.7	[0.04]	7.36	1204.1	0.02
trans-Carveol	11.18	1785.2	0.03	7.49	1212.8	0.02
Bornyl formate	11.22	1787.8	0.02	7.60	1219.7	0.02
Nerol	7.81	1511.6	0.07	7.64	1222.9	0.05
Cuminal	10.89*	1760.2	[0.18]	7.76	1230.5	0.14
Hexyl 2- methylbutyrate	10.39*	1717.6	[0.03]	7.82*	1235.0	[0.10]
Carvone	6.31	1400.4	0.05	7.82*	1235.0	[0.10]
Hexyl isovalerate	9.80	1669.0	0.04	7.90	1239.7	0.08
Linalyl acetate	6.51	1415.2	0.01	7.94	1243.0	0.02
Geraniol	7.96*†	1523.1	[35.97]	8.22*	1261.7	[31.55]
Geranial	11.46	1808.9	0.36	8.22*	1261.7	[31.55]
2,6-Dimethyl-1,7- octadiene-3,6-diol	9.92*	1679.1	[0.06]	8.36	1270.6	0.03
Bornyl acetate	14.47*	2087.9	[0.03]	8.48	1278.8	tr
Lavandulyl acetate	8.07*	1531.8	[0.61]	8.54	1283.2	0.14
Hexyl tiglate	8.60	1573.2	3.04	8.71	1294.2	3.07
Hodiendiol derivative	8.71	1581.7	0.05	9.26	1332.6	0.06
α-Terpinyl acetate	12.76	1925.9	0.02	9.40	1342.6	0.03
Unknown SASC II [m/z 43, 79 (47), 71 (31), 94 (27), 81 (23), 41 (22)... 197 (0)]	9.55*	1648.5	[0.53]	9.48	1348.1	0.02
Unknown SASC III [m/z 43, 79 (46), 71 (30), 94 (25), 41 (23), 81 (21)... 197 (0)]	10.89*	1760.2	[0.18]	9.54	1352.5	0.03
Neryl acetate	10.98	1767.8	0.04	9.59	1356.0	0.03
α-Copaene	9.99	1684.6	0.25	9.74	1366.3	0.24
β-Bourbonene	6.93*	1446.1	[0.03]	9.82	1372.2	0.02
Geranyl acetate	7.26*	1470.7	[0.04]	9.93	1380.0	0.05
7-epi- Sesquithujene	10.36	1715.0	0.39	10.01	1385.4	0.38
Hexyl hexanoate	7.65	1499.7	0.11	10.06*	1389.1	[0.20]
Sesquithujene	8.69	1579.8	0.12	10.06*	1389.1	[0.20]
cis-α-Bergamotene	7.96*†	1523.1	[35.97]	10.30	1406.0	0.06
β-Caryophyllene	8.07*	1531.8	[0.61]	10.40*	1413.9	[3.72]
	8.24*	1545.1	[3.80]	10.40*	1413.9	[3.72]

α -Santalene	8.07*	1531.8	[0.61]	10.45	1417.6	0.43
Coumarin	16.90	2339.7	0.09	10.57	1426.2	0.06
<i>trans</i> - α -Bergamotene	8.24*	1545.1	[3.80]	10.68	1434.1	0.15
Sesquisabinene A	8.98*	1602.2	[0.25]	10.79	1442.7	0.07
α -Humulene	9.05	1608.5	0.11	10.86	1447.5	0.14
Lavandulyl butyrate?	10.33	1712.5	0.08	10.96	1455.3	0.14
β -Santalene	8.92	1597.7	0.02	11.01*	1459.3	[4.21]
(<i>E</i>)- β -Farnesene	9.35*	1632.7	[4.25]	11.01*	1459.3	[4.21]
Germacrene D	9.55*	1648.5	[0.53]	11.23	1475.7	0.54
<i>trans</i> - β -Bergamotene	9.35*	1632.7	[4.25]	11.32	1481.7	0.07
Isodaucene	9.82	1671.0	0.02	11.44	1490.8	0.03
γ -Cadinene	10.15	1697.6	0.10	11.68*†	1509.3	[0.14]
β -Bisabolene	9.92*	1679.1	[0.06]	11.68*†	1509.3	[0.14]
Lavandulyl isovalerate	10.46	1723.9	0.03	11.68*†	1509.3	[0.14]
Unknown CULO LIV [m/z 121, 93 (56), 91 (12), 94 (11), 122 (10)...220]	13.12	1959.5	0.06	11.77	1516.6	0.04
δ -Cadinene	10.19	1701.1	0.02	11.82	1519.9	tr
β -Sesquiphellandrene	10.39*	1717.6	[0.03]	11.84	1522.2	0.03
Isocaryophyllene epoxide B	11.90	1848.3	0.04	12.13	1544.8	0.03
<i>cis</i> -Sesquisabinene hydrate	13.07	1954.2	0.01	12.23	1552.6	0.01
(<i>E</i>)-Nerolidol	13.58	2001.9	0.03	12.38	1564.4	0.02
Caryophyllene oxide isomer	12.46	1897.6	0.04	12.51*	1574.3	[0.32]
Caryophyllene oxide	12.53	1904.7	0.27	12.51*	1574.3	[0.32]
Caryophylladienol II	15.83	2225.5	0.02	13.21	1630.9	0.02
τ -Cadinol	14.67	2107.8	0.09	13.27	1635.9	0.07
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	16.59	2306.1	0.02	13.66	1667.5	0.02
Phytone	14.47*	2087.9	[0.03]	15.71	1846.2	0.01
Pentylcurcumene?	16.09	2252.7	0.01	16.98	1963.9	0.02
Total reported		98.52%			99.18%	

*: 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