

Date : 2024-06-27

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24F12-PTH01

Customer Identification : Palo Santo - Ecuador - PJ0110R

Type : Essential Oil

Source : *Bursera graveolens*

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 : 2024-06-19

PHYSICOCHEMICAL DATA

Refractive index : 1.479 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2024-06-14

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
3-Methylcyclopentanone	0.02	Aliphatic ketone
α -Pinene	0.07	Monoterpene
3-Methylcyclohexanone	0.03	Aliphatic ketone
Sabinene	0.01	Monoterpene
Hexahydroacetophenone epimer I	0.03	Aliphatic ketone
Hexahydroacetophenone epimer II	0.03	Aliphatic ketone
Dehydro-1,8-cineole	0.01	Monoterpenic ether
Myrcene	0.35	Monoterpene
α -Phellandrene	0.17	Monoterpene
Pseudolimonene	0.02	Monoterpene
α -Terpinene	0.01	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
<i>para</i> -Cymene	0.62	Monoterpene
Limonene	62.69	Monoterpene
1,8-Cineole	[0.27]	Monoterpenic ether
β -Phellandrene	[0.27]	Monoterpene
(<i>E</i>)- β -Ocimene	0.01	Monoterpene
γ -Terpinene	0.02	Monoterpene
Terpinolene	0.03	Monoterpene
<i>para</i> -Cymenene	0.04	Monoterpene
Linalool	0.06	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.06	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.10	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.04	Monoterpenic ether
<i>cis</i> - β -Terpineol	0.07	Monoterpenic alcohol
Menthone	0.07	Monoterpenic ketone
Menthofuran	17.17	Monoterpenic ether
Isomenthone	0.11	Monoterpenic ketone
<i>trans</i> - β -Terpineol	0.05	Monoterpenic alcohol
neo-Menthol	0.03	Monoterpenic alcohol
<i>trans</i> -Isopulegone	0.08	Monoterpenic ketone
Unknown	0.02	Oxygenated monoterpene
Terpinen-4-ol	0.05	Monoterpenic alcohol
<i>trans</i> -Isocarveol	0.01	Monoterpenic alcohol
α -Terpineol	8.54	Monoterpenic alcohol
Unknown	0.02	Unknown
<i>cis</i> -Dihydrocarvone	0.10	Monoterpenic ketone
<i>trans</i> -Dihydrocarvone	0.06	Monoterpenic ketone
<i>trans</i> -Isopiperitenol	0.08	Monoterpenic alcohol

<i>trans</i> -Piperitol	0.03	Monoterpenic alcohol
4,7-Dimethylbenzofuran?	0.01	Furan
<i>cis</i> -Isopiperitenol	0.01	Monoterpenic alcohol
<i>trans</i> -Carveol	0.08	Monoterpenic alcohol
<i>cis-para</i> -Mentha-1(7),8-dien-2-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Carveol	0.03	Monoterpenic alcohol
Pulegone	0.82	Monoterpenic ketone
Carvone	0.97	Monoterpenic ketone
Unknown	0.07	Unknown
Unknown	0.01	Unknown
Unknown	0.08	Unknown
Menthofuro lactone isomer I	0.13	Monoterpenic lactone
Menthofuro lactone isomer II	0.17	Monoterpenic lactone
α -Copaene	0.07	Sesquiterpene
<i>cis</i> - β -Elemene	0.02	Sesquiterpene
β -Cubebene	0.04	Sesquiterpene
β -Elemene	0.10	Sesquiterpene
Unknown	0.01	Unknown
α -Cedrene	0.03	Sesquiterpene
β -Ylangene	0.07	Sesquiterpene
8-Hydroxycarvotanacetone	0.02	Monoterpenic alcohol
β -Copaene	0.06	Sesquiterpene
<i>cis</i> -Thujopsene	0.03	Sesquiterpene
Menthofuro lactone isomer III	0.08	Monoterpenic lactone
<i>cis</i> - β -Bergamotene?	0.04	Sesquiterpene
Unknown	0.15	Sesquiterpene
α -Humulene	0.04	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
γ -Muurolene	0.23	Sesquiterpene
Germacrene D	2.84	Sesquiterpene
β -Selinene	0.06	Sesquiterpene
Menthallactone	0.19	Monoterpenic lactone
Bicyclogermacrene	0.12	Sesquiterpene
α -Selinene	0.07	Sesquiterpene
α -Muurolene	0.10	Sesquiterpene
Germacrene A	0.06	Sesquiterpene
γ -Cadinene	0.11	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.33	Sesquiterpene
β -Bisabolene	0.04	Sesquiterpene
<i>trans</i> -Calamenene	0.03	Sesquiterpene
δ -Cadinene	0.32	Sesquiterpene
Menthofuro lactone analog	0.08	Monoterpenic lactone
α -Cadinene	0.04	Sesquiterpene
Germacrene B	0.05	Sesquiterpene
1,5-Epoxy salvia-4(14)-ene	0.02	Sesquiterpenic ether

7 α -Hydroxymintlactone	0.03	Monoterpenic alcohol
(E)-Nerolidol	0.04	Sesquiterpenic alcohol
Spathulenol	0.04	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Salvial-4(14)-en-1-one	0.01	Aliphatic alcohol
Unknown	0.03	Oxygenated sesquiterpene
10-epi- γ -Eudesmol	0.03	Sesquiterpenic alcohol
Junenol	0.08	Sesquiterpenic alcohol
1-epi-Cubenol	0.04	Sesquiterpenic alcohol
τ -Cadinol	0.03	Sesquiterpenic alcohol
τ -Muurolol	0.05	Sesquiterpenic alcohol
β -Eudesmol	0.03	Sesquiterpenic alcohol
Unknown	0.06	Sesquiterpenic alcohol
α -Cadinol	0.06	Sesquiterpenic alcohol
Germacra-4(15),5,10(14)-trien-1 α -ol	0.02	Sesquiterpenic alcohol
Consolidated total	99.73	

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

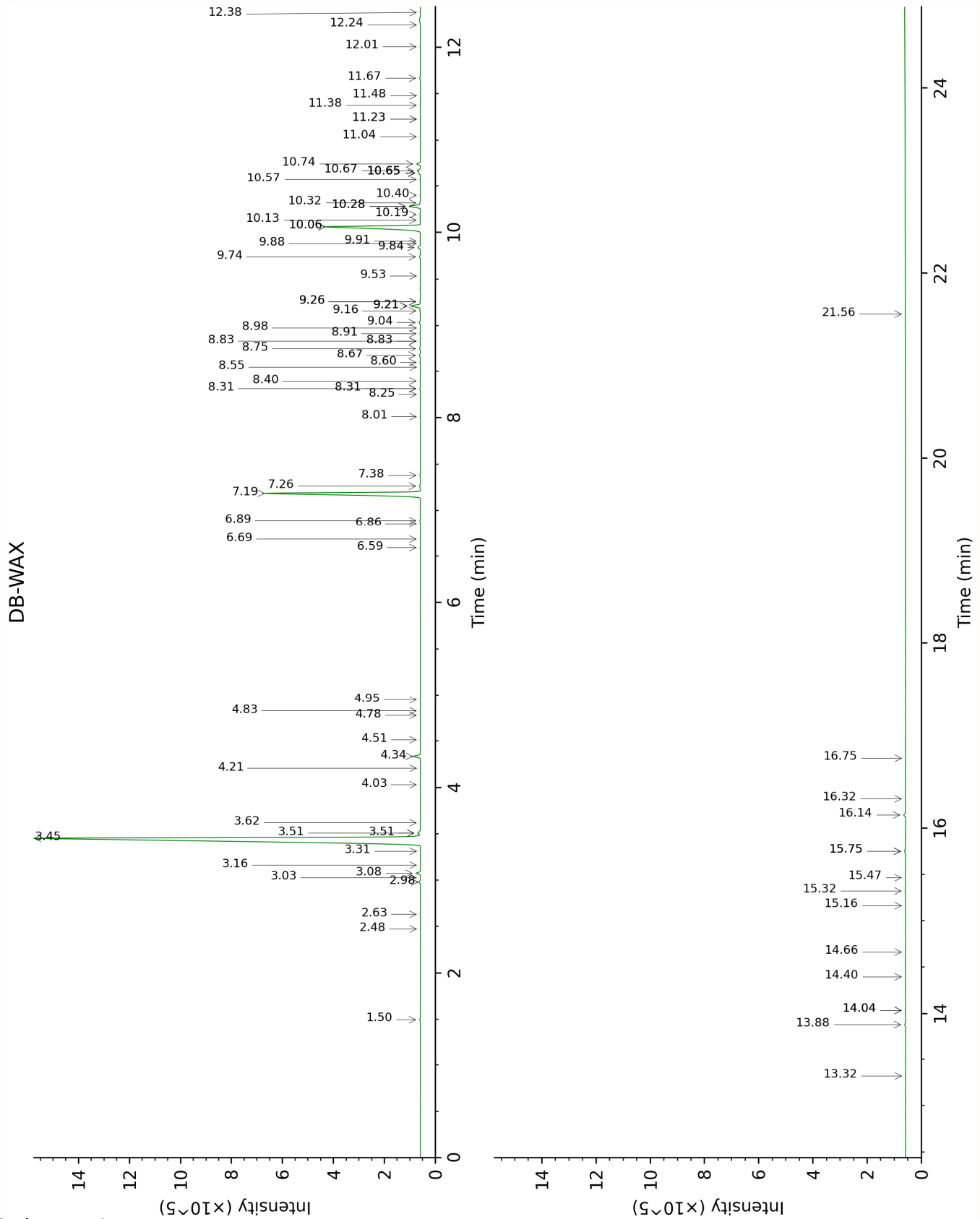
Note: no correction factor was applied

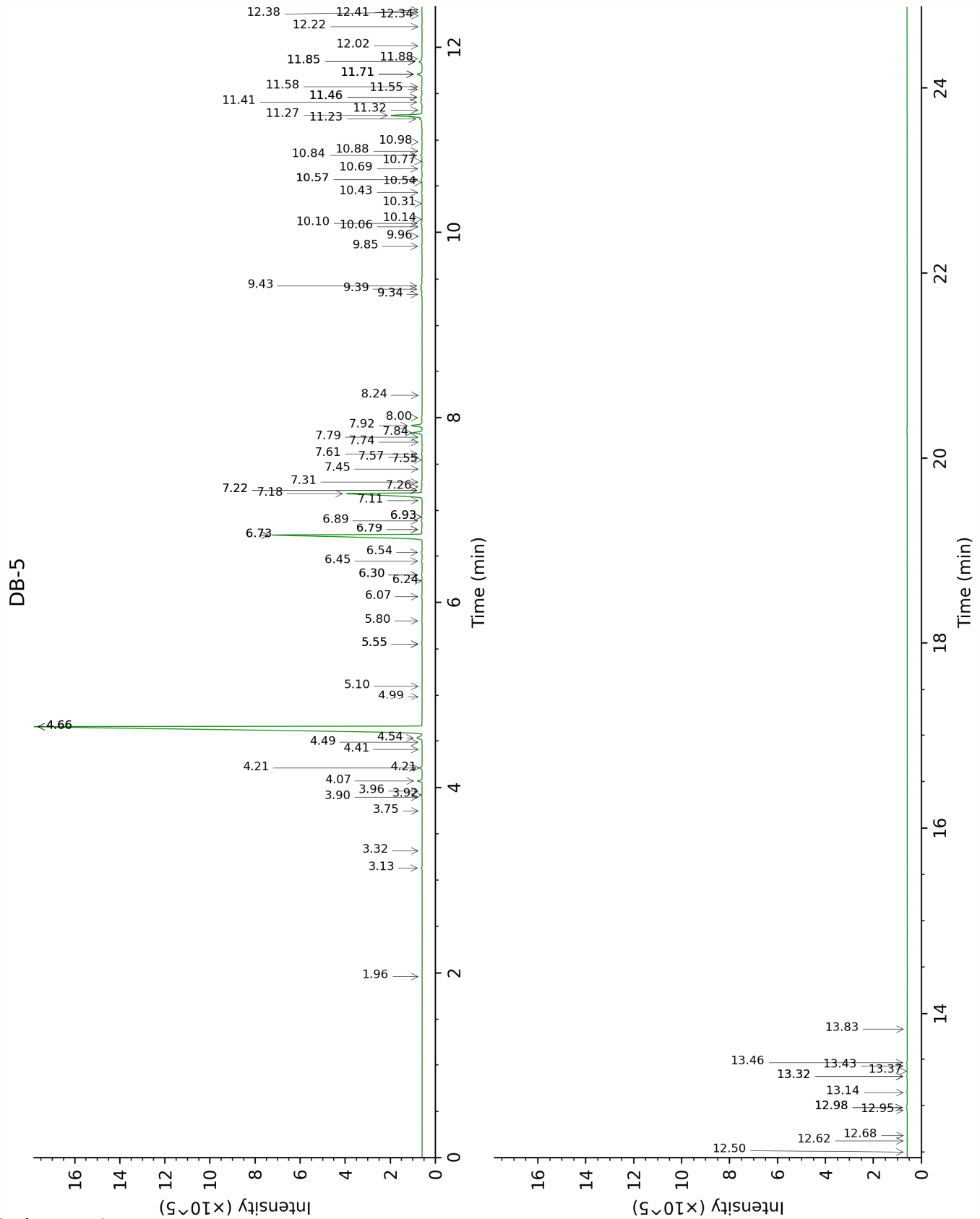
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

3- Methylcyclopentanone	Column DB-WAX			Column DB-5		
	3.62	1172.9	0.03	1.96	840.8	0.02
α -Pinene	1.50	989.6	0.06	3.13	931.1	0.07
3-Methylcyclohexanone	4.95	1267.0	0.03	3.32	943.4	0.03
Sabinene	2.48	1084.6	0.02	3.75	971.9	0.01
Hexahydroacetophenone epimer I	4.78	1255.2	0.03	3.90	981.7	0.03
Hexahydroacetophenone epimer II	4.83	1258.5	0.03	3.92	983.4	0.03
Dehydro-1,8-cineole	3.31	1149.8	0.02	3.96	986.1	0.01
Myrcene	3.08	1131.9	0.36	4.07	993.3	0.35
α -Phellandrene	2.98	1124.7	0.17	4.21*	1002.6	[0.20]
Pseudolimonene	3.03	1128.3	0.02	4.21*	1002.6	[0.20]
α -Terpinene	3.16	1138.5	0.02	4.41	1015.2	0.01
Carvomenthene	2.63	1098.3	0.04	4.49	1020.1	0.02
<i>para</i> -Cymene	4.34	1224.3	0.64	4.54	1023.0	0.62
Limonene	3.45	1160.3	62.69	4.66*	1030.6	[62.71]
1,8-Cineole	3.51*	1164.6	[0.27]	4.66*	1030.6	[62.71]
β -Phellandrene	3.51*	1164.6	[0.27]	4.66*	1030.6	[62.71]
(<i>E</i>)- β -Ocimene	4.21	1215.4	0.01	4.98	1051.3	0.01
γ -Terpinene	4.03	1202.9	0.03	5.10	1058.4	0.02
Terpinolene	4.52	1236.8	0.03	5.55*	1086.9	[0.06]
<i>para</i> -Cymenene	6.59	1387.1	0.04	5.55*	1086.9	[0.06]
Linalool	8.32*	1515.0	[0.08]	5.80	1102.7	0.06
<i>trans-para</i> -Mentha-2,8- dien-1-ol	9.21*	1583.9	[0.90]	6.06	1119.3	0.06
<i>cis</i> -Limonene oxide	6.69	1393.8	0.04	6.24	1130.2	0.03
<i>cis-para</i> -Mentha-2,8- dien-1-ol	9.74	1626.1	0.10	6.30*	1134.2	[0.09]
<i>trans</i> -Limonene oxide	6.86	1406.3	0.04	6.30*	1134.2	[0.09]
<i>cis</i> - β -Terpineol	9.26*	1587.6	[0.07]	6.45	1143.9	0.07
Menthone	6.89	1408.9	0.07	6.54	1149.8	0.07
Menthofuran	7.19	1430.7	17.17	6.73*	1161.8	[17.14]
Isomenthone	7.26	1436.4	0.11	6.73*	1161.8	[17.14]
<i>trans</i> - β -Terpineol	9.91	1639.6	0.05	6.79*	1165.6	[0.08]
neo-Menthol	8.83*	1554.9	[0.06]	6.79*	1165.6	[0.08]
<i>trans</i> -Isopulegone	9.16	1579.9	0.08	6.89	1172.1	0.08
Unknown CASA XVIII [m/z 69, 84 (62), 41 (30), 123 (26), 97 (24), 109 (23)...]	9.88	1637.5	0.02	6.93*	1174.8	[0.07]
Terpinen-4-ol	8.83*	1554.9	[0.06]	6.93*	1174.8	[0.07]
<i>trans</i> -Isocarveol	11.23*	1748.1	[0.03]	7.11	1186.0	0.01
α -Terpineol	10.06*	1652.0	[11.42]	7.18	1190.8	8.54

Unknown MISC XXXII [m/z 121, 79 (61), 93 (55), 94 (40), 91 (39), 84 (37)...]	8.32*	1515.0	[0.08]	7.22*†	1193.1	[0.15]
<i>cis</i> -Dihydrocarvone	8.75	1548.7	0.10	7.22*†	1193.1	[0.15]
<i>trans</i> -Dihydrocarvone	8.91	1561.1	0.06	7.26*†	1195.6	[0.04]
<i>trans</i> -Isopiperitenol	10.65*	1699.4	[0.15]	7.31*†	1198.8	[0.07]
<i>trans</i> -Piperitol	10.65*	1699.4	[0.15]	7.45	1207.9	0.03
4,7-Dimethylbenzofuran?				7.55	1214.5	0.01
<i>cis</i> -Isopiperitenol	10.57	1692.9	0.05	7.57	1216.3	0.01
<i>trans</i> -Carveol	11.67	1785.1	0.09	7.61	1218.8	0.08
<i>cis-para</i> -Mentha-1(7),8- dien-2-ol	12.24	1835.3	0.01	7.74	1227.4	0.02
<i>cis</i> -Carveol	12.01	1814.7	0.05	7.79	1230.9	0.03
Pulegone	9.21*	1583.9	[0.90]	7.84	1234.1	0.82
Carvone	10.28*	1669.7	[1.06]	7.92	1239.3	0.97
Unknown BUGR I [m/z 112, 43 (70), 70 (63), 59 (53), 97 (46), 84 (25)...]				8.00	1245.0	0.07
Unknown MEPU IV [m/z 112, 70 (63), 43 (59), 59 (51), 97 (45), 84 (22)...]	11.23*	1748.1	[0.03]	8.24	1261.2	0.01
Unknown BUGR III [m/z 150, 71 (67), 107 (54), 43 (44), 109 (42)...]				9.34	1336.0	0.08
Menthofuroolactone isomer I				9.39	1340.0	0.13
Menthofuroolactone isomer II				9.43	1342.5	0.17
α -Copaene	7.38	1444.9	0.06	9.85	1372.4	0.07
<i>cis</i> - β -Elemene	8.55	1532.8	0.02	9.96	1380.1	0.02
β -Cubebene	8.01	1491.7	0.04	10.06	1387.3	0.04
β -Elemene	8.67	1542.6	0.12	10.10	1389.8	0.10
Unknown CALU VIII [m/z 71, 100 (92), 111 (79), 69 (46), 109 (45)...]				10.14	1392.8	0.01
α -Cedrene	8.25	1510.2	0.03	10.31	1404.9	0.03
β -Ylangene	8.40	1521.3	0.05	10.43	1413.7	0.07
8- Hydroxycarvotanacetone	16.75	2264.1	0.01	10.54	1421.8	0.02
β -Copaene	8.60	1536.8	0.06	10.57*	1424.0	[0.10]
<i>cis</i> -Thujopsene	8.98	1565.8	0.03	10.57*	1424.0	[0.10]
Menthofuroolactone isomer III				10.69	1433.4	0.08
<i>cis</i> - β -Bergamotene?				10.77	1439.3	0.04
Unknown BOCA IV [m/z	9.04	1570.4	0.14	10.84	1444.0	0.15

91, 161 (92), 105 (85), 119
(63), 133 (53), 79 (49), 204
(46)]

α-Humulene	9.53	1609.5	0.03	10.88	1447.5	0.04
allo-Aromadendrene	9.26*	1587.6	[0.07]	10.98	1454.8	0.02
γ-Muurolene	9.84	1634.1	0.25	11.23	1473.4	0.23
Germacrene D	10.06*	1652.0	[11.42]	11.27	1476.1	2.84
β-Selinene	10.13	1657.7	0.04	11.32	1480.4	0.06
Menthylactone	16.14	2201.6	0.17	11.41	1486.8	0.19
Bicyclgermacrene	10.28*	1669.7	[1.06]	11.46*	1490.7	[0.19]
α-Selinene	10.19	1662.6	0.07	11.46*	1490.7	[0.19]
α-Muurolene	10.32	1672.6	0.05	11.55	1497.1	0.10
Germacrene A	10.65*	1699.4	[0.15]	11.58	1499.2	0.06
γ-Cadinene	10.65*	1699.4	[0.15]	11.71*	1509.5	[0.48]
(3E,6E)-α-Farnesene	10.74	1707.6	0.33	11.71*	1509.5	[0.48]
β-Bisabolene	10.40	1679.1	0.04	11.71*	1509.5	[0.48]
trans-Calamenene	11.48	1769.3	0.03	11.85*	1520.3	[0.32]
δ-Cadinene	10.67	1701.5	0.32	11.85*	1520.3	[0.32]
Menthofuroloactone analog				11.88	1522.5	0.08
α-Cadinene	11.04	1732.3	0.04	12.02	1533.5	0.04
Germacrene B	11.38	1760.7	0.03	12.22	1549.8	0.05
1,5-Epoxysalvial-4(14)- ene	12.38	1847.1	0.03	12.34	1559.1	0.02
7α-Hydroxymintlactone	21.56	2808.9	0.02	12.38	1562.0	0.03
(E)-Nerolidol	14.04*	1997.0	[0.03]	12.41	1564.5	0.04
Spathulenol	14.66	2056.6	0.03	12.50	1571.4	0.04
Unknown BOCA XIX [m/z 161, 105 (61), 43 (51), 121 (45), 93 (39), 81 938), 95 (37), 122 (35)... 204 (25)...]				12.62	1580.9	0.03
Salvial-4(14)-en-1-one	13.32	1931.3	0.02	12.68	1585.4	0.01
Unknown CULO XXIII [m/z 43, 93 (88), 91 (76), 79 (73), 69 (64), 41 (63), 95 (53).. 220 (3)]				12.95	1606.9	0.03
10-epi-γ-Eudesmol	14.40	2031.2	0.03	12.98*	1609.4	[0.13]
Junenol	13.88	1982.4	0.08	12.98*	1609.4	[0.13]
1-epi-Cubenol	14.04*	1997.0	[0.03]	13.14	1622.7	0.04
τ-Cadinol	15.16	2104.8	0.03	13.32*	1637.2	[0.08]
τ-Muurolol	15.32	2120.3	0.05	13.32*	1637.2	[0.08]
β-Eudesmol	15.75*	2162.4	[0.12]	13.37	1641.9	0.03
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109	15.47	2134.4	0.03	13.43	1646.5	0.06

(40)... 204 (35), 222 (2)]						
α -Cadinol	15.75*	2162.4	[0.12]	13.46	1649.4	0.06
Germacra-4(15),5,10(14)-trien-1 α -ol	16.32	2219.4	0.03	13.83	1679.9	0.02
Total reported		98.82%			99.26%	

*: 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