

Date : November 16, 2018

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18K15-PTH01-1-CC

Customer identification : Chamomile German CO2 -se extract - CA4104810R

Type : CO2 extract

Source : *Matricaria chamomilla*

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sylvain Mercier, M. Sc., Chimiste

Analysis date : November 15, 2018

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

PHYSICOCHEMICAL DATA

Physical aspect: Dark green liquid

Refractive index: 1.5113 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
3-Buten-2-one	0.01	0.02	Aliphatic ketone
Acetic acid	0.12	0.12*	Aliphatic acid
Ethyl 2-methylbutyrate	0.01	0.02	Aliphatic ester
Isovaleric acid	0.05	9.19*	Aliphatic acid
2-Methylbutyric acid	0.03	0.03	Aliphatic acid
3-Methylcyclopentyl acetate	0.01		Aliphatic ester
α -Thujene	0.01	0.01	Monoterpene
α -Pinene	0.01	0.01	Monoterpene
Benzaldehyde	0.01	0.01	Simple phenolic
Sabinene	0.01	0.01	Monoterpene
6-Methyl-5-hepten-2-one	0.03	0.03	Aliphatic ketone
Caproic acid	0.10	0.11	Aliphatic acid
Yomogi alcohol	0.02	0.01	Monoterpenic alcohol
para-Cymene	0.03	0.03	Monoterpene
Limonene	0.06*	0.01	Monoterpene
1,8-Cineole	[0.06]*	0.05	Monoterpenic ether
(Z)- β -Ocimene	0.01	tr	Monoterpene
Butyl isovalerate	0.02*		Aliphatic ester
(E)- β -Ocimene	[0.02]*	0.03	Monoterpene
γ -Terpinene	0.03	0.03	Monoterpene
Artemisia ketone	0.06	0.06	Monoterpenic alcohol
cis-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Artemisia alcohol	0.04	0.03	Monoterpenic alcohol
trans-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Linalool	0.01	0.02*	Monoterpenic alcohol
Menthone	0.01	[0.12]*	Monoterpenic ketone
neo-Menthol	0.02	[0.06]	Monoterpenic alcohol
Artemisyl acetate	0.01	0.01	Monoterpenic ester
Terpinen-4-ol	0.04	0.06*	Monoterpenic alcohol
α -Terpineol	0.03	0.46*	Monoterpenic alcohol
Creosol	0.04*	0.07*	Simple phenolic
Methyl salicylate	[0.04]*	[0.29]*	Phenolic ester
(3Z)-Hexenyl isovalerate	0.01	0.03*	Aliphatic ester
Carvone	0.02	0.01	Monoterpenic ketone
(E)-4,8-Dimethylnona-3,8-dien-2-one	0.02	0.02	Terpenic ketone
(E)-Anethole	0.01	0.03	Phenylpropanoid
Thymol	0.02	0.02	Monoterpenic alcohol
Carvacrol	0.02	8.40*	Monoterpenic alcohol
Methyl decanoate	0.02	[0.06]*	Aliphatic ester
Silphiperfol-5-ene	0.01	0.01	Sesquiterpene
α -Longipinene	0.02	0.03*	Sesquiterpene
α -Cubebene	0.02	[0.03]*	Sesquiterpene
Eugenol	0.01	0.20*	Phenylpropanoid
α -Ylangene	0.01	0.01	Sesquiterpene
Modhephene	0.04*	0.02	Sesquiterpene
α -Copaene	[0.04]*	[0.03]*	Sesquiterpene
α -Isocomene	0.51*	0.06	Sesquiterpene
Capric acid	[0.51]*	0.58	Aliphatic acid

β-Elemene	0.02	0.11*	Sesquiterpene
β-Isocomene	0.01	[0.02]*	Sesquiterpene
β-Caryophyllene	0.12*	[0.11]*	Sesquiterpene
β-Ylangene	[0.12]*	[0.02]*	Sesquiterpene
β-Copaene	0.02	[0.11]*	Sesquiterpene
Aromadendrene	0.07	[0.06]*	Sesquiterpene
α-Humulene	0.03	0.02	Sesquiterpene
allo-Aromadendrene	0.02	0.02	Sesquiterpene
(E)-β-Farnesene	8.62	[9.19]*	Sesquiterpene
γ-Murolene	0.12	0.13	Sesquiterpene
Germacrene D	0.43*	[0.46]*	Sesquiterpene
Unknown	[0.43]*		Sesquiterpene
β-Selinene	0.15*	0.11	Sesquiterpene
ar-Curcumene	[0.15]*	0.03	Sesquiterpene
Bicyclogermacrene	0.16*	0.10*	Sesquiterpene
α-Selinene	[0.16]*	0.05	Sesquiterpene
β-Himachalene	[0.16]*	[0.46]*	Sesquiterpene
α-Murolene	0.01	[0.10]*	Sesquiterpene
(3Z,6E)-α-Farnesene	0.07	0.04	Sesquiterpene
γ-Cadinene	0.34*	0.29	Sesquiterpene
Cubebol	[0.34]*	0.06	Sesquiterpenic alcohol
(3E,6E)-α-Farnesene	[0.34]*	0.23	Sesquiterpene
δ-Cadinene	0.37	[0.29]*	Sesquiterpene
β-Sesquiphellandrene	[0.37]	0.09	Sesquiterpene
α-Cadinene	0.02	0.03	Sesquiterpene
Unknown	0.04	0.18	Oxygenated sesquiterpene
Dendrolasin	0.06	[0.07]*	Sesquiterpenic ether
Spathulenol	0.41	0.44*	Sesquiterpenic alcohol
Caryophyllene oxide	0.04	0.03	Sesquiterpenic ether
Salvial-4(14)-en-1-one	0.04	0.04	Aliphatic alcohol
Torilenol	0.05	0.05	Oxygenated sesquiterpene
cis-Zingiberenol	0.04	[0.44]*	Sesquiterpenic alcohol
(2,7Z)-Bisaboladien-4-ol	0.02	[0.20]*	Sesquiterpenic alcohol
τ-Cadinol	0.03	0.02	Sesquiterpenic alcohol
Unknown	0.02		Unknown
α-Bisabolol oxide B, epimer 1	0.89*	0.90*	Sesquiterpenic alcohol
α-Bisabolol oxide B, epimer 2	[0.89]*	[0.90]*	Sesquiterpenic alcohol
Ageratochromene	0.01	0.02	Chromane
Eudesma-4(15),7-dien-1β-ol	0.17*		Sesquiterpenic alcohol
Bisabolone oxide A	[0.17]*	[0.20]*	Sesquiterpenic ketone
α-Bisabolol	7.99	[8.40]*	Sesquiterpenic alcohol
Herniarin	2.13	17.09*	Coumarin
Chamazulene	0.82	0.86	Azulene
α-Bisabolol oxide A	1.66	1.79	Sesquiterpenic alcohol
Unknown	0.49*	0.07	Unknown
Unknown	[0.49]*		Unknown
Phytone	0.05	0.09*	Terpenic ketone
(Z)-Spiroether	15.69	[17.09]*	Polyyne
(E)-Spiroether	2.69	2.42	Polyyne
(Z)-Tibetin spiroether	0.11		Polyyne
Methyl palmitate	0.12	0.13	Aliphatic ester
(E)-Tibetin spiroether	0.42		Polyyne

Palmitic acid	5.36	5.95	Aliphatic acid
Methyl linoleate	0.33	0.38	Aliphatic ester
Methyl petroselinate?	0.16		Aliphatic ester
Heneicosane	0.03	[0.09]*	Alkane
Phytol	0.09	0.16	Diterpenic alcohol
Linoleic acid	24.95	16.39	Aliphatic acid
Oleic acid	[24.95]*	5.65	Aliphatic acid
α -Linolenic acid	[24.95]*	3.59	Aliphatic acid
<i>cis</i> -Vaccenic acid?	[24.95]	0.36	Aliphatic acid
(9Z)-18-Octadecenolide?	[24.95]		Aliphatic lactone
Stearic acid	1.83	2.09	Aliphatic acid
Docosane	0.04	0.02	Alkane
Tricosane	0.30	0.32	Alkane
Tetracosane	0.08	0.09	Alkane
Pentacosane	0.93	0.79	Alkane
Hexacosane	0.05	0.03	Alkane
Heptacosane	0.19	0.14	Alkane
6,8-Pentacosanedione?	0.12		β -Diketone
Octacosane	0.32	0.39	Alkane
Nonacosane	0.05	0.09	Alkane
Unknown	0.14	0.14	Oxygenated triterpene
6,8-Heptacosanedione?	0.77		β -Diketone
α -Tocopherol	0.13		Tocopherol
Seudenone?		0.02	Aliphatic ketone
γ -Butyrolactone		0.01	Aliphatic lactone
Total identified	81.80%	81.59%	

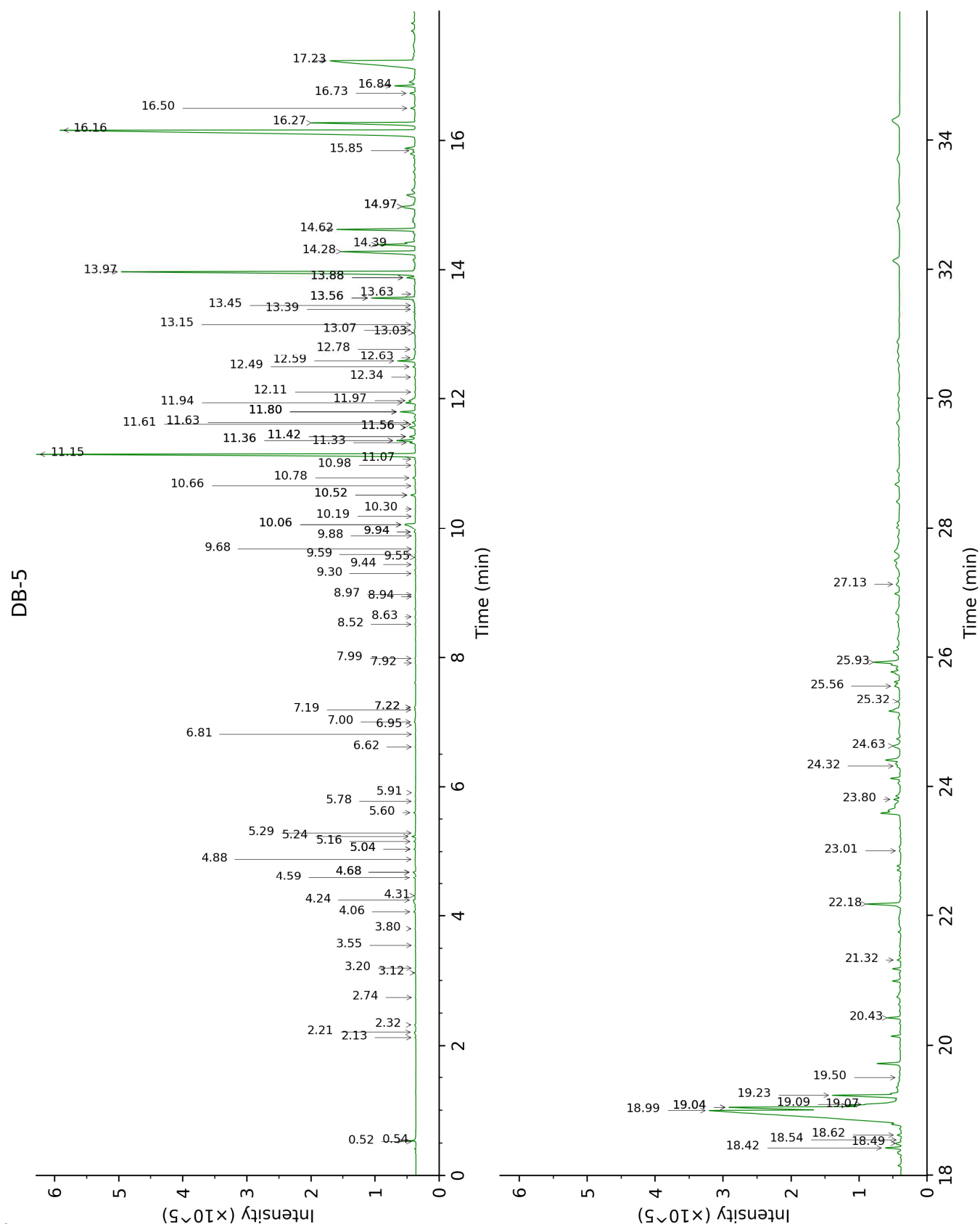
*: Two or more compounds are coeluting on this column

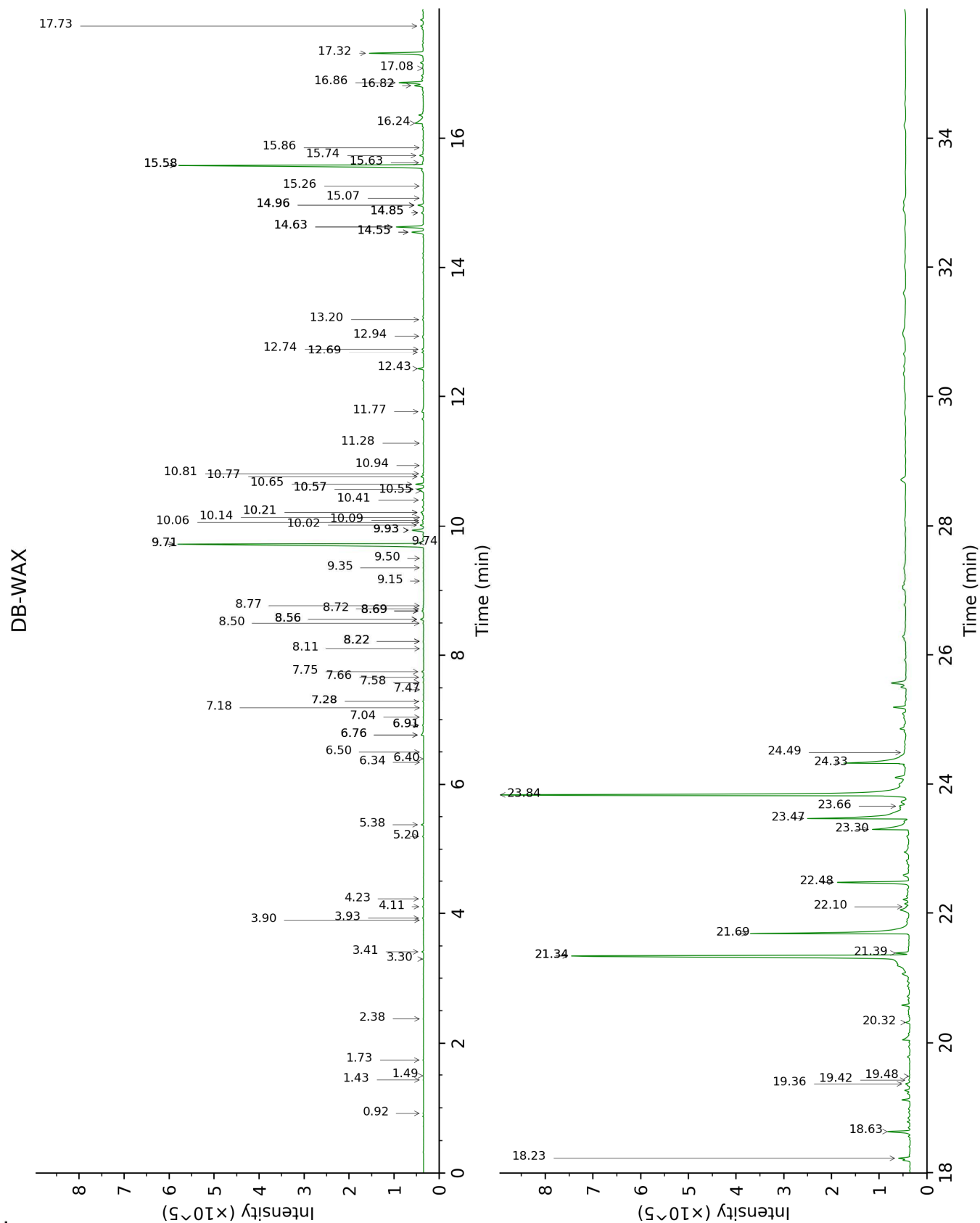
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
3-Buten-2-one	0.52	592	0.01	0.92	917	0.02
Acetic acid	0.54	601	0.12	6.76*	1410	0.12
Ethyl 2-methylbutyrate	2.13	848	0.01	1.73	1024	0.02
Isovaleric acid	2.21	855	0.05	9.72*	1636	9.19
2-Methylbutyric acid	2.32	864	0.03	10.06	1664	0.03
3-Methylcyclopentyl acetate	2.74	899	0.01			
α -Thujene	3.12	925	0.01	1.49	1001	0.01
α -Pinene	3.20	930	0.01	1.43	992	0.01
Benzaldehyde	3.55	952	0.01	7.47	1463	0.01
Sabinene	3.80	969	0.01	2.38	1085	0.01
6-Methyl-5-hepten-2-one	4.06	986	0.03	5.20	1298	0.03
Caproic acid	4.24	998	0.10	11.77	1807	0.11
Yomogi alcohol	4.31	1003	0.02	6.34	1380	0.01
para-Cymene	4.59	1021	0.03	4.23	1230	0.03
Limonene	4.68*	1026	0.06	3.30	1159	0.01
1,8-Cineole	4.68*	1026	[0.06]	3.41	1168	0.05
(Z)- β -Ocimene	4.88	1039	0.01	3.90	1206	tr
Butyl isovalerate	5.04*	1049	0.02			
(E)- β -Ocimene	5.04*	1049	[0.02]	4.11	1221	0.03
γ -Terpinene	5.16	1056	0.03	3.93	1208	0.03
Artemisia ketone	5.24	1061	0.06	5.38	1311	0.06
cis-Sabinene hydrate	5.29	1064	0.01	7.04	1431	0.01
Artemisia alcohol	5.60	1084	0.04	7.66	1477	0.03
trans-Sabinene hydrate	5.78	1095	0.01	8.11	1510	0.01
Linalool	5.91	1104	0.01	8.22*	1519	0.02
Menthone	6.62	1149	0.01	6.76*	1410	[0.12]
neo-Menthol	6.81	1162	0.02	8.72†	1557	[0.06]
Artemisyl acetate	6.95	1171	0.01	6.50	1391	0.01
Terpinen-4-ol	7.00	1174	0.04	8.69*†	1555	0.06
α -Terpineol	7.19	1186	0.03	9.93*	1654	0.46
Creosol	7.22*	1189	0.04	12.69*	1888	0.07
Methyl salicylate	7.22*	1189	[0.04]	10.57*†	1706	[0.29]
(3Z)-Hexenyl isovalerate	7.92	1236	0.01	7.28*	1449	0.03
Carvone	7.99	1240	0.02	10.14	1670	0.01
(E)-4,8-Dimethylnona-3,8-dien-2-one	8.52	1277	0.02	9.35	1607	0.02
(E)-Anethole	8.63	1285	0.01	11.28	1766	0.03
Thymol	8.94	1306	0.02	15.26	2132	0.02
Carvacrol	8.97	1308	0.02	15.58*	2164	8.40

Methyl decanoate	9.30	1325	0.02	8.69*†	1555	[0.06]
Silphiperfol-5-ene	9.44	1335	0.01	6.40	1384	0.01
α-Longipinene	9.55	1343	0.02	6.91*	1421	0.03
α-Cubebene	9.59	1346	0.02	6.91*	1421	[0.03]
Eugenol	9.68	1352	0.01	14.96*	2102	0.20
α-Ylangene	9.88	1366	0.01	7.18	1441	0.01
Modhephene	9.94*	1371	0.04	7.58	1471	0.02
α-Copaene	9.94*	1371	[0.04]	7.28*	1449	[0.03]
α-Isocomene	10.06*	1379	0.51	7.75	1483	0.06
Capric acid	10.06*	1379	[0.51]	16.24	2231	0.58
β-Elemene	10.19	1389	0.02	8.56*	1545	0.11
β-Isocomene	10.30	1397	0.01	8.22*	1519	[0.02]
β-Caryophyllene	10.52*	1412	0.12	8.56*	1545	[0.11]
β-Ylangene	10.52*	1412	[0.12]	8.22*	1519	[0.02]
β-Copaene	10.66	1423	0.02	8.56*	1545	[0.11]
Aromadendrene	10.78	1432	0.07	8.69*†	1555	[0.06]
α-Humulene	10.98	1447	0.03	9.50	1618	0.02
allo-Aromadendrene	11.07	1454	0.02	9.15	1590	0.02
(E)-β-Farnesene	11.15	1460	8.62	9.72*	1636	[9.19]
γ-Murolene	11.33	1473	0.12	9.74	1638	0.13
Germacrene D	11.36*	1476	0.43	9.93*	1654	[0.46]
Unknown [m/z 119, 132 (91), 105 (60), 91 (34), 41 (33), 131 (32)...202 (18)]	11.36*	1476	[0.43]			
β-Selinene	11.42*	1480	0.15	10.02	1661	0.11
ar-Curcumene	11.42*	1480	[0.15]	10.81	1726	0.03
Bicyclogermacrene	11.56*	1491	0.16	10.22*	1676	0.10
α-Selinene	11.56*	1491	[0.16]	10.09	1666	0.05
β-Himachalene	11.56*	1491	[0.16]	9.93*	1654	[0.46]
α-Murolene	11.61	1494	0.01	10.22*	1676	[0.10]
(3Z,6E)-α-Farnesene	11.63	1496	0.07	10.41	1692	0.04
γ-Cadinene	11.80*	1509	0.34	10.55†	1704	0.29
Cubebol	11.80*	1509	[0.34]	12.74	1893	0.06
(3E,6E)-α-Farnesene	11.80*	1509	[0.34]	10.65	1712	0.23
δ-Cadinene	11.94†	1520	0.37	10.57*†	1706	[0.29]
β-Sesquiphellandrene	11.97†	1523	[0.37]	10.77	1722	0.09
α-Cadinene	12.11	1533	0.02	10.94	1737	0.03
Unknown [m/z 79, 96 (89), 109 (76), 107 (71), 41 (66), 95 (63)... 220 (6)]	12.34	1552	0.04	12.43	1866	0.18
Dendrolasin	12.49	1564	0.06	12.69*	1888	[0.07]
Spathulenol	12.59	1571	0.41	14.55*	2062	0.44
Caryophyllene oxide	12.63	1575	0.04	12.94	1912	0.03
Salvial-4(14)-en-1-one	12.78	1586	0.04	13.20	1935	0.04
Torilenol	13.03	1606	0.05	15.63	2169	0.05
cis-Zingiberenol	13.07	1610	0.04	14.55*	2062	[0.44]

(2,7Z)-Bisaboladien-4-ol	13.15	1617	0.02	14.96*	2102	[0.20]
τ-Cadinol	13.39	1637	0.03	15.07	2113	0.02
Unknown [m/z 123, 43 (86), 81 (75), 95 (73), 82 (68), 161 (64), 105 (63)... 220 (6)]	13.45	1642	0.02			
α-Bisabolol oxide B, epimer 1	13.56*	1651	0.89	14.63*	2070	0.90
α-Bisabolol oxide B, epimer 2	13.56*	1651	[0.89]	14.63*	2070	[0.90]
Ageratochromene	13.63	1656	0.01	17.08	2320	0.02
Eudesma-4(15),7-dien-1β-ol	13.88*	1677	0.17			
Bisabolone oxide A	13.88*	1677	[0.17]	14.96*	2102	[0.20]
α-Bisabolol	13.97	1685	7.99	15.58*	2164	[8.40]
Herniarin	14.28	1711	2.13	21.34*	2816	17.09
Chamazulene	14.39	1720	0.82	16.86	2296	0.86
α-Bisabolol oxide A	14.62	1740	1.66	17.32	2345	1.79
Unknown [m/z 82, 43 (99), 95 (50), 67 (38), 139 (41)...]	14.97*	1771	0.49	19.42	2582	0.07
Unknown [m/z 128, 158 (74), 199 (63), 115 (61), 129 (57), 200 (50)...]	14.97*	1771	[0.49]			
Phytone	15.85	1849	0.05	14.84*	2091	0.09
(Z)-Spiroether	16.16	1878	15.69	21.34*	2816	[17.09]
(E)-Spiroether	16.28	1888	2.69	22.48	2963	2.42
(Z)-Tibetin spiroether	16.50	1909	0.11			
Methyl palmitate	16.73	1931	0.12	15.74	2180	0.13
(E)-Tibetin spiroether	16.84	1942	0.42			
Palmitic acid	17.23	1979	5.36	21.69	2860	5.95
Methyl linoleate	18.42	2096	0.33	18.22	2445	0.38
Methyl petroselinat?	18.49	2103	0.16			
Heneicosane	18.54	2108	0.03	14.84*	2091	[0.09]
Phytol	18.62	2116	0.09	19.36	2575	0.16
Linoleic acid	18.99†	2154	24.95	23.84	3149	16.39
Oleic acid	19.04*†	2160	[24.95]	23.47	3098	5.65
α-Linolenic acid	19.04*†	2160	[24.95]	24.33	3218	3.59
cis-Vaccenic acid?	19.07†	2162	[24.95]	23.66	3124	0.36
(9Z)-18-Octadecenolide?	19.09†	2164	[24.95]			
Stearic acid	19.23	2179	1.83	23.30	3075	2.09
Docosane	19.50	2207	0.04	15.86	2192	0.02
Tricosane	20.42	2307	0.30	16.82	2291	0.32
Tetracosane	21.32	2406	0.08	17.73	2390	0.09
Pentacosane	22.18	2506	0.93	18.63	2490	0.79

Hexacosane	23.01	2606	0.05	19.48	2588	0.03
Heptacosane	23.80	2705	0.19	20.32	2689	0.14
6,8-Pentacosanedione?	24.32	2770	0.12			
Octacosane	24.63	2810	0.32	21.39	2822	0.39
Nonacosane	25.32	2902	0.05	22.10	2914	0.09
Unknown [m/z 69, 81 (36), 41 (31), 93 (24), 95 (19), 91 (14), 67 (13), 121 (12)... 408? (2)]	25.56	2935	0.14	24.49	3242	0.14
6,8-Heptacosanedione?	25.93	2985	0.77			
α-Tocopherol	27.13	3129	0.13			
Seudenone?				8.50	1540	0.02
γ-Butyrolactone				8.77	1561	0.01
Total identified		81.80%			81.59%	
Total reported		82.00%			81.98%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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