

Date : May 19, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22E12-PTH09

Customer identification : Cypress ORGANIC -Spain - CB9106R

Type : Essential oil

Source : *Cupressus sempervirens*

Customer : Plant Therapy

ANALYSIS

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

Analyst : Pamela Lavoie, M.Sc., Chimiste

Analysis date : May 19, 2022

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid

Refractive index: 1.4711 ± 0.0003 (20 °C; method PC-MAT-016)

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
Toluene	0.01	Simple phenolic
Unknown	tr	Alkene
Cyclofenchene	0.01	Monoterpene
Bornylene	0.05	Monoterpene
Tricyclene	0.18	Monoterpene
α -Thujene	0.54	Monoterpene
α -Pinene	52.49	Monoterpene
α -Fenchene	0.61	Monoterpene
Camphene	0.25	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.08	Monoterpene
Sabinene	0.81	Monoterpene
β -Pinene	0.88	Monoterpene
Pseudolimonene isomer	0.01	Monoterpene
Myrcene	1.92	Monoterpene
2-Carene	0.02	Monoterpene
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.11	Monoterpene
Menthatriene isomer I	0.01	Monoterpene
Δ^3 -Carene	22.89	Monoterpene
α -Terpinene	0.36	Monoterpene
meta-Cymene	0.05	Monoterpene
para-Cymene	0.38	Monoterpene
Sylvestrene	0.15	Monoterpene
Limonene	2.33	Monoterpene
1,8-Cineole	0.15	Monoterpenic ether
β -Phellandrene	0.43	Monoterpene
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.04	Monoterpene
Unknown	0.04	Monoterpene
γ -Terpinene	0.62	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
meta-Cymenene	0.02	Monoterpene
Terpinolene isomer	0.05	Monoterpene
Isoterpinolene	0.13	Monoterpene
Terpinolene	3.12	Monoterpene
para-Cymenene	0.11	Monoterpene
α -Pinene oxide	0.02	Monoterpenic ether
trans-Sabinene hydrate	tr	Monoterpenic alcohol
Unknown	0.01	Unknown
Linalool	0.38	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
para-Mentha-1,3,8-triene	0.01	Monoterpene

endo-Fenchol	0.03	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.03	Aliphatic alcohol
trans-Pinocarveol	0.04	Monoterpenic alcohol
Camphor	0.26	Monoterpenic ketone
Camphene hydrate	0.01	Monoterpenic alcohol
Epoxyterpinolene	0.05	Monoterpenic ether
meta-Mentha-4,6-dien-8-ol	0.01	Monoterpenic alcohol
Karahanaenone	0.23	Monoterpenic ketone
Borneol	0.06	Monoterpenic alcohol
α-Phellandren-8-ol	0.03	Monoterpenic alcohol
Umbellulone	0.10	Monoterpenic ketone
Unknown	0.01	Oxygenated monoterpene
Terpinen-4-ol	0.79	Monoterpenic alcohol
meta-Cymen-8-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.07	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
α-Terpineol	0.29	Monoterpenic alcohol
Myrtenal	0.01	Monoterpenic aldehyde
Myrtenol	0.02	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Verbenone	0.10	Monoterpenic ketone
Unknown	0.01	Unknown
trans-Carveol	0.02	Monoterpenic alcohol
Unknown	0.04	Oxygenated monoterpene
Carvacrol methyl ether	0.03	Monoterpenic ether
Car-3-en-2-one	0.01	Monoterpenic ketone
(cis?)-Linalool oxide acetate (fur.)?	0.01	Monoterpenic ester
Linalyl acetate	0.02	Monoterpenic ester
(trans?)-Linalool oxide acetate (fur.)?	0.01	Monoterpenic ester
trans-Ascaridole glycol?	0.03	Oxygenated monoterpene
Unknown	0.01	Oxygenated monoterpene
Bornyl acetate	0.03	Monoterpenic ester
Cuminol	0.01	Monoterpenic alcohol
Thymol	0.04	Monoterpenic alcohol
Unknown	0.22	Monoterpenic ester
Terpinen-4-yl acetate	0.02	Monoterpenic ester
Unknown	0.05	Oxygenated monoterpene
Unknown	0.03	Unknown
Unknown	0.26	Monoterpenic ester
α-Cubebene	0.11	Sesquiterpene
α-Terpinyl acetate	2.14	Monoterpenic ester
α-Ylangene	0.02	Sesquiterpene
α-Copaene	0.05	Sesquiterpene
2-epi-α-Funebrene	0.01	Sesquiterpene
α-Duprezianene	0.02	Sesquiterpene
β-Bourbonene	0.01	Sesquiterpene
β-Cubebene	0.02	Sesquiterpene
β-Elemene	0.04	Sesquiterpene
Sesquithujene	0.25*	Sesquiterpene
β-Funebrene	0.25*	Sesquiterpene
α-Cedrene	0.22	Sesquiterpene

β-Cedrene	0.14	Sesquiterpene
β-Caryophyllene	0.19	Sesquiterpene
β-Copaene	0.05	Sesquiterpene
cis-Muuro-la-3,5-diene	0.03	Sesquiterpene
trans-Muuro-la-3,5-diene	0.01	Sesquiterpene
α-Humulene	0.16	Sesquiterpene
cis-Muuro-la-4(15),5-diene	0.14	Sesquiterpene
Unknown	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.03	Sesquiterpene
γ-Muuro-lene	0.17	Sesquiterpene
α-Amorphene	0.05	Sesquiterpene
Germacrene D	0.49	Sesquiterpene
trans-Muuro-la-4(15),5-diene	0.02	Sesquiterpene
β-Alaskene	0.08	Sesquiterpene
Epizonarene	0.10	Sesquiterpene
α-Muuro-lene	0.06	Sesquiterpene
δ-Amorphene	0.02	Sesquiterpene
α-Alaskene	0.15	Sesquiterpene
γ-Cadinene	0.03	Sesquiterpene
δ-Cadinene	0.31*	Sesquiterpene
Zonarene	0.31*	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene
trans-Cadina-1,4-diene	0.04	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene
α-Calacorene	0.03	Sesquiterpene
Salviadienol?	0.03	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.03	Sesquiterpenic ether
allo-Cedrol	0.02	Sesquiterpenic alcohol
Widdrol	0.01	Sesquiterpenic alcohol
α-Cedrol	1.01	Sesquiterpenic alcohol
epi-Cedrol	0.02	Sesquiterpenic alcohol
10-epi-Cubenol	0.02	Sesquiterpenic alcohol
α-Acorenol	0.02	Sesquiterpenic alcohol
1-epi-Cubenol	0.01	Sesquiterpenic alcohol
β-Acorenol	0.01	Sesquiterpenic alcohol
Unknown	0.03	Unknown
τ-Muuro-lol	0.01	Sesquiterpenic alcohol
τ-Cadinol	tr	Sesquiterpenic alcohol
α-Muuro-lol	0.02	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
Unknown	0.03	Unknown
Eudesma-4(15),7-dien-1β-ol	0.01	Sesquiterpenic alcohol
Manoyl oxide	0.06	Diterpenic ether
7,13-Abietadiene	0.01	Diterpene
Unknown	0.01	Unknown
Isopimaradiene	0.03	Diterpene
Consolidated total	99.15%	

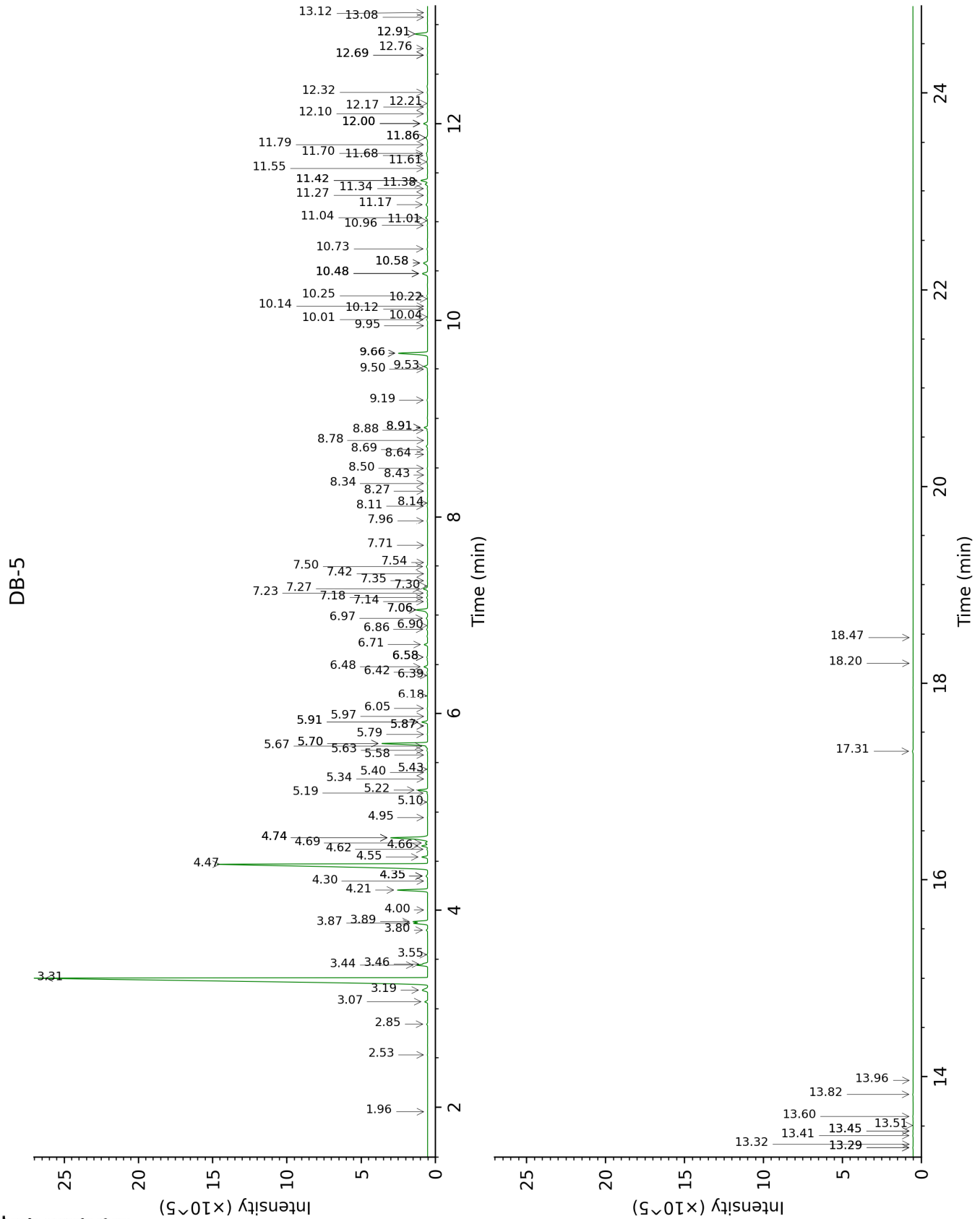
*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of total signal.

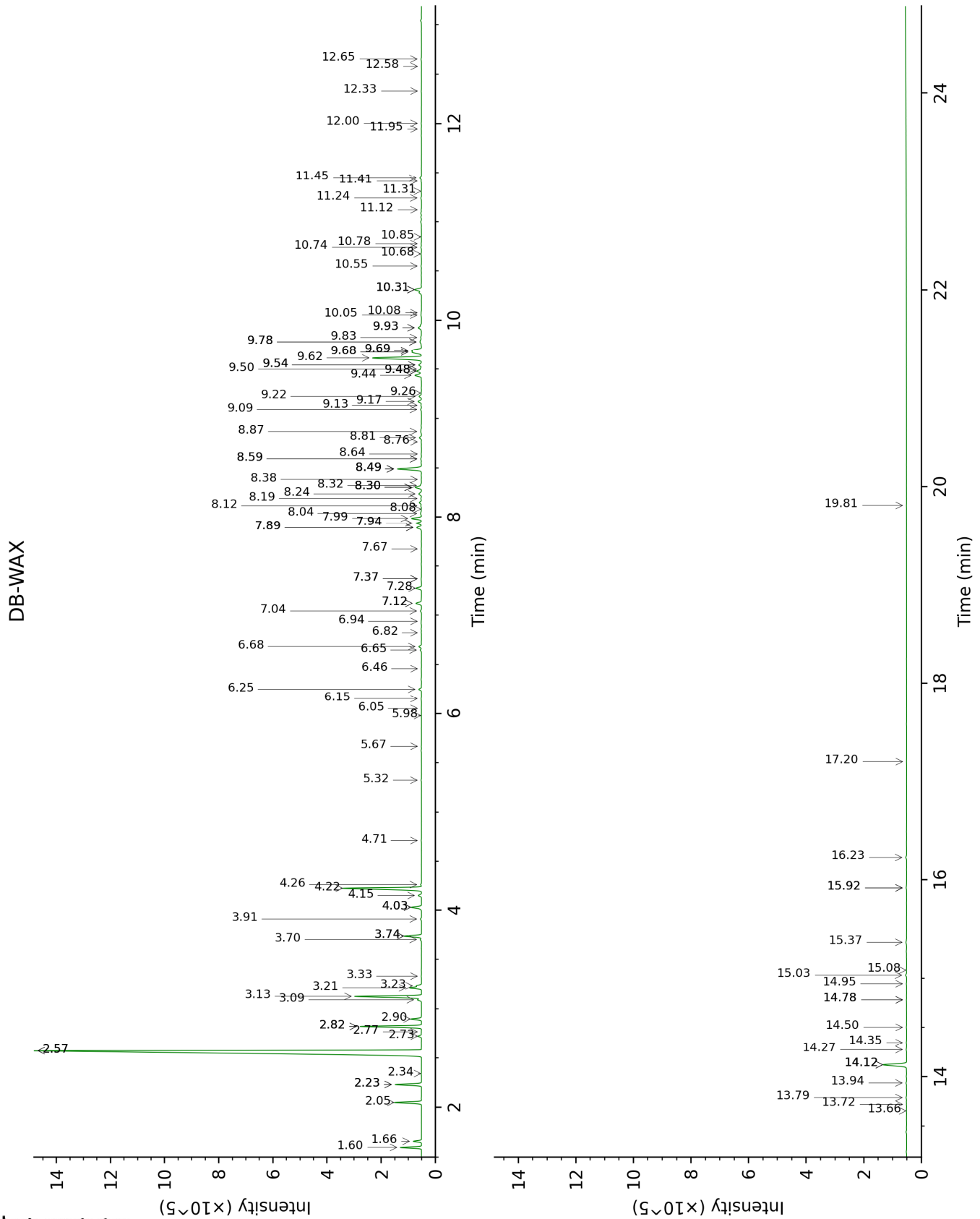
Note: no correction factor was applied

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.

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.27	758	0.01	1.37*	997	52.56
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.96	831	tr	0.72	879	tr
Cyclofenchene	2.53	878	0.01	0.86	912	0.02
Bornylene	2.85	903	0.05	1.05	944	0.05
Tricyclene	3.07	918	0.18	1.21	971	0.18
α-Thujene	3.19	926	0.54	1.40	1000	0.54
α-Pinene	3.31	934	52.49	1.37*	997	[52.56]
α-Fenchene	3.44†	942	0.86	1.60	1020	0.61
Camphene	3.46†	943	[0.86]	1.66	1026	0.25
Thuja-2,4(10)-diene 3,7,7-	3.55	949	0.03	2.23*	1083	0.85
Trimethylcyclohepta-1,3,5-triene	3.80	966	0.08	2.82*	1133	2.00
Sabinene	3.87†	970	1.69	2.23*	1083	[0.85]
β-Pinene	3.89†	971	[1.69]	2.05	1065	0.88
Pseudolimonene isomer	4.00	979	0.01	2.57*	1113	22.90
Myrcene	4.20	992	1.92	2.82*	1133	[2.00]
2-Carene	4.30	998	0.02	2.34	1094	0.01
Pseudolimonene	4.35*	1002	0.13	2.77	1129	0.01
α-Phellandrene	4.35*	1002	[0.13]	2.72	1126	0.11
Menthatriene isomer I	4.35*	1002	[0.13]	3.33	1174	0.01
Δ3-Carene	4.47	1010	22.89	2.57*	1113	[22.90]
α-Terpinene	4.55	1014	0.36	2.90	1139	0.35
meta-Cymene	4.62	1019	0.05	4.03*	1227	0.42
para-Cymene	4.66	1021	0.38	4.03*	1227	[0.42]
Sylvestrene	4.69	1023	0.15	3.09†	1155	2.50
Limonene	4.74*	1027	2.92	3.13†	1158	[2.50]
1,8-Cineole	4.74*	1027	[2.92]	3.24	1166	0.15
β-Phellandrene	4.74*	1027	[2.92]	3.22	1164	0.43
(Z)-β-Ocimene	4.95	1039	0.01	3.74*	1205	0.63
(E)-β-Ocimene	5.10	1049	0.04	3.91	1218	0.04
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	5.19	1055	0.04	3.70	1203	0.05
γ-Terpinene	5.22	1057	0.62	3.74*	1205	[0.63]
cis-Sabinene hydrate	5.34	1064	0.01	6.82	1429	0.01
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.40	1068	0.01	4.71	1277	0.02
cis-Linalool oxide (fur.)	5.44	1070	0.01	6.46	1402	0.01
meta-Cymenene	5.58	1079	0.02	6.15	1380	0.02

Terpinolene isomer	5.63	1082	0.05	4.26	1244	0.03
Isoterpinolene	5.67†	1085	3.33	4.15	1236	0.13
Terpinolene	5.70*†	1087	[3.33]	4.22	1241	3.12
para-Cymenene	5.70*†	1087	[3.33]	6.25	1387	0.11
α-Pinene oxide	5.79	1093	0.02	5.32	1320	0.02
trans-Sabinene hydrate	5.87*	1098	0.01	7.89*	1508	0.22
Unknown [m/z 109, 43 (65), 95 (54), 119 (50), 91 (47)... 149 (8)...]	5.87*	1098	[0.01]	5.98	1367	0.01
Linalool	5.91*	1100	0.39	7.99	1516	0.38
Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.91*	1100	[0.39]	5.67	1345	0.01
para-Mentha-1,3,8-triene	5.97	1104	0.01	6.05	1373	0.01
endo-Fenchol	6.05	1109	0.03	8.30*†	1540	0.31
cis-para-Menth-2-en-1-ol	6.18	1118	0.02	8.04	1520	0.06
4-Hydroxy-4-methylcyclohex-2-enone	6.39	1131	0.03	13.94	2024	0.03
trans-Pinocarveol	6.42	1134	0.04	9.09	1602	0.04
Camphor	6.48	1137	0.26	7.12*	1451	0.26
Camphene hydrate	6.58*†	1144	0.08	8.38	1547	0.01
Epoxyterpinolene	6.58*†	1144	[0.08]	6.65	1416	0.05
meta-Mentha-4,6-dien-8-ol	6.58*†	1144	[0.08]	9.26	1615	0.01
Karahanaenone	6.70	1152	0.23	7.28	1462	0.23
Borneol	6.86	1162	0.06	9.69*†	1650	[0.89]
α-Phellandren-8-ol	6.90	1164	0.03	10.06	1680	0.03
Umbellulone	6.97	1169	0.10	8.81	1579	0.09
Unknown [m/z 43, 137 (89), 109 (69), 91 (49), 152 (45), 67 (31), 119 (29)]	7.06*	1175	0.93	10.08	1682	0.01
Terpinen-4-ol	7.06*	1175	[0.93]	8.49*	1555	1.05
meta-Cymen-8-ol	7.14	1180	0.02	11.41	1794	0.02
para-Cymen-8-ol	7.18	1183	0.07	11.45	1797	0.07
Unknown [m/z 93, 59 (85), 81 (36), 92 (35), 43 (34), 121 (20), 136 (16)...]	7.23	1186	0.03	9.68*†	1649	0.89
α-Terpineol	7.27	1188	0.29	9.69*†	1650	[0.89]
Myrtenal	7.30	1190	0.01	8.59*	1563	0.04
Myrtenol	7.35	1194	0.02	10.78	1740	0.02
Unknown [m/z 109, 91 (100), 81 (88), 94 (75), 119 (74), 96 (73), 41 (63)... 150 (2)]	7.42	1198	0.01	10.74	1737	0.03
Verbenone	7.50	1203	0.10	9.54*	1638	0.13

Unknown [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	7.54	1206	0.01	10.85	1746	0.01
<i>trans</i> -Carveol	7.71	1218	0.02	11.31	1785	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.96	1235	0.04	11.24	1779	0.03
Carvacrol methyl ether	8.11	1245	0.03	8.49*	1555	[1.05]
Car-3-en-2-one	8.14	1248	0.01	10.31*†	1701	0.41
(<i>cis</i> ?) <i>-</i> Linalool oxide acetate (fur.)?	8.27	1256	0.01	8.08	1523	0.01
Linalyl acetate	8.34	1261	0.02	8.12	1526	0.03
(<i>trans</i> ?) <i>-</i> Linalool oxide acetate (fur.)?	8.43	1267	0.01	8.59*	1563	[0.04]
<i>trans</i> -Ascaridole glycol?	8.50	1272	0.03			
Unknown [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	8.64	1281	0.01	12.33	1875	0.02
Bornyl acetate	8.69	1285	0.03	8.19	1532	0.03
Cuminol	8.78	1291	0.01	14.12*	2042	1.04
Thymol	8.88	1298	0.04	15.03	2131	0.04
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107 (47), 108 (44)...]	8.91*	1300	0.24	8.49*	1555	[1.05]
Terpinen-4-yl acetate	8.91*	1300	[0.24]	8.64	1566	0.02
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	9.19	1314	0.05	11.95	1841	0.01
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...]	9.50	1336	0.03			
Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...]	9.53	1339	0.26	9.44	1630	0.30
α -Cubebene	9.66*	1348	2.23	6.68	1419	0.11
α -Terpinyl acetate	9.66*	1348	[2.23]	9.62	1644	2.14
α -Ylangene	9.95	1368	0.02	6.94	1438	0.01
α -Copaene	10.01	1373	0.05	7.04	1445	0.05
2- <i>epi</i> - α -Funebrene	10.04	1375	0.01	7.12*	1451	[0.26]
α -Duprezianene	10.12	1380	0.02	7.37*	1469	0.03
β -Bourbonene	10.14	1382	0.01	7.37*	1469	[0.03]
β -Cubebene	10.22	1388	0.02	7.67	1492	0.02
β -Elemene	10.25	1390	0.04	8.32†	1542	[0.31]
Sesquithujene	10.48*	1406	0.46	7.94*	1512	0.23
β -Funebrene	10.48*	1406	[0.46]	7.94*	1512	[0.23]
α -Cedrene	10.48*	1406	[0.46]	7.89*	1508	[0.22]
β -Cedrene	10.58*	1414	0.40	8.24	1535	0.14

β -Caryophyllene	10.58*	1414	[0.40]	8.30*†	1540	[0.31]
β -Copaene	10.73	1424	0.05	8.30*†	1540	[0.31]
<i>cis</i> -Muurolo-3,5-diene	10.96	1442	0.03	8.87	1584	0.04
<i>trans</i> -Muurolo-3,5-diene	11.01	1446	0.01	8.76	1576	0.02
α -Humulene	11.04	1448	0.16	9.17	1608	0.15
<i>cis</i> -Muurolo-4(15),5-diene	11.17	1458	0.14	9.22	1612	0.11
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.27	1465	0.02	9.50	1635	0.04
<i>trans</i> -Cadina-1(6),4-diene	11.34	1470	0.03	9.13	1605	0.02
γ -Muurolole	11.38	1473	0.17	9.48*	1633	0.22
α -Amorphene	11.42*	1476	0.54	9.48*	1633	[0.22]
Germacrene D	11.42*	1476	[0.54]	9.68*†	1649	[0.89]
<i>trans</i> -Muurolo-4(15),5-diene	11.55	1486	0.02	9.78*	1658	0.12
β -Alaskene	11.61	1491	0.08	9.54*	1638	[0.13]
Epizonarene	11.68†	1495	0.16	9.78*	1658	[0.12]
α -Muurolole	11.70†	1497	[0.16]	9.93*†	1669	0.21
δ -Amorphene	11.79	1504	0.02	9.83	1661	0.04
α -Alaskene	11.86*	1509	0.17	9.93*†	1669	[0.21]
γ -Cadinene	11.86*	1509	[0.17]	10.31*†	1701	[0.41]
δ -Cadinene	12.00*	1520	0.32	10.31*†	1701	[0.41]
Zonarene	12.00*	1520	[0.32]	10.31*†	1701	[0.41]
<i>trans</i> -Calamenene	12.00*	1520	[0.32]	11.12	1769	0.02
<i>trans</i> -Cadina-1,4-diene	12.10	1528	0.04	10.55	1721	0.02
α -Cadinene	12.17	1534	0.03	10.68	1731	0.02
α -Calacorene	12.20	1536	0.03	12.00	1846	0.01
Salviadienol?	12.32	1545	0.03	14.27	2056	0.03
Caryophyllene oxide isomer	12.69*	1575	0.03	12.58	1898	0.01
Caryophyllene oxide	12.69*	1575	[0.03]	12.66	1904	0.03
allo-Cedrol	12.76	1580	0.02	14.12*	2042	[1.04]
Widdrol	12.91*	1592	1.03	14.50	2078	0.01
α -Cedrol	12.91*	1592	[1.03]	14.12*	2042	[1.04]
epi-Cedrol	13.08	1605	0.02			
10-epi-Cubenol	13.12	1609	0.02	13.66	1997	0.02
α -Acorenol	13.29*	1622	0.03	14.35	2063	0.02
1-epi-Cubenol	13.29*	1622	[0.03]	13.72	2003	0.01
β -Acorenol	13.32	1625	0.01	14.78*	2106	0.01
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.41	1632	0.03	13.79	2010	0.03
τ -Muurolol	13.45*	1636	0.03	14.95	2122	0.01
τ -Cadinol	13.45*	1636	[0.03]	14.78*	2106	[0.01]
α -Muurolol	13.51	1641	0.02	15.08	2136	0.01

α -Cadinol	13.60	1648	0.02	15.37	2164	0.05
Unknown [m/z 85, 57 (59), 79 (26), 67 (18), 41 (16), 80 (15), 81 (10), 77 (8), 238 (7)]	13.82	1667	0.03			
Eudesma-4(15),7-dien-1 β -ol	13.96	1678	0.01	15.92*	2221	0.04
Manoyl oxide	17.31	1978	0.06	16.23	2254	0.04
7,13-Abietadiene	18.20	2066	0.01	17.20	2357	0.01
Unknown [m/z 191, 81 (47), 95 (41), 69 (39), 109 (32), 93 (32)...]	18.47	2092	0.01	19.81	2657	0.01
Isopimaradiene				15.92*	2221	[0.04]
Total identified		98.71%			98.49%	
Total reported		99.30%			99.07%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not 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