

Date : September 18, 2019

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 19I17-PTH01-1-SCC

Customer identification : Cypress Organic - France - CB910187R

Type : Essential oil

Source : *Cupressus sempervirens*

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-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 : Sylvain Mercier, M. Sc., Chimiste

Analysis date : September 18, 2019

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid
Refractive index: 1.4730 ± 0.0003 (20 °C)

NFT 75-254:1992 - OIL OF CUPRESSUS

Compound	Min. %	Max. %	Observed %	Complies?
Manoyl oxide	tr		0.04	Yes
Isopimaradiene	tr		0.03	Yes
Karahanaenone	tr		0.79	Yes
Germacrene D	0.5	3.0	0.4	No
α-Cedrol	0.8	7.0	1.2	Yes
α-Terpinyl acetate	1	4	3	Yes
Terpinen-4-ol	0.2	2.0	2.6	No
Limonene	1.8	5.0	2.3	Yes
Δ3-Carene	12	25	16	Yes
Myrcene	1.0	3.5	2.4	Yes
β-Pinene	0.5	3.0	0.9	Yes
α-Pinene	40	65	47	Yes
Refractive index	1.4680	1.4780	1.4730	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil marginally does not comply with the AFNOR standard for oil of cupressus.

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Classe
2-Butanone	tr	Aliphatic ketone
Toluene	0.02	Simple phenolic
Unknown	0.01	Alkene
Cyclofenchene	0.02	Monoterpene
Bornylene	0.05	Monoterpene
Tricyclene	0.19	Monoterpene
α -Thujene	0.81	Monoterpene
α -Pinene	46.87	Monoterpene
Camphene	0.19	Monoterpene
α -Fenchene	0.62	Monoterpene
Thuja-2,4(10)-diene	0.06	Monoterpene
meta-Cymene	0.09	Monoterpene
Sabinene	2.11	Monoterpene
β -Pinene	0.92	Monoterpene
Pseudolimonene isomer	0.02	Monoterpene
Myrcene	2.40	Monoterpene
α -Phellandrene	0.08	Monoterpene
Δ^3 -Carene	16.42	Monoterpene
α -Terpinene	0.45	Monoterpene
ortho-Cymene	0.05	Monoterpene
para-Cymene	0.74	Monoterpene
Sylvestrene	0.13	Monoterpene
Limonene	2.30	Monoterpene
1,8-Cineole	0.35*	Monoterpenic ether
β -Phellandrene	[0.35]*	Monoterpene
(Z)- β -Ocimene	0.02	Monoterpene
(E)- β -Ocimene	0.03	Monoterpene
Unknown	0.02	Monoterpene
γ -Terpinene	0.91	Monoterpene
cis-Sabinene hydrate	0.03	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.05	Monoterpenic alcohol
meta-Cymenene	0.02	Monoterpene
Terpinolene isomer	0.01	Monoterpene
Isoterpinolene	0.08	Monoterpene
Terpinolene	2.01	Monoterpene
para-Cymenene	0.11	Monoterpene
α -Pinene oxide	0.06	Monoterpenic ether
Unknown	0.01	Unknown
Perillene	0.02	Monoterpenic ether
Linalool	1.40	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
endo-Fenchol	0.03	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.06	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.03	Aliphatic alcohol
trans-Pinocarveol	0.08	Monoterpenic alcohol

Camphor	0.21	Monoterpenic ketone
Epoxyterpinolene	0.06	Monoterpenic ether
meta-Mentha-4,6-dien-8-ol	0.04	Monoterpenic alcohol
Karahanaenone	0.79	Monoterpenic ketone
Borneol	0.05	Monoterpenic alcohol
α -Phellandren-8-ol	0.04	Monoterpenic alcohol
Umbellulone	0.09	Monoterpenic ketone
Terpinen-4-ol	2.61	Monoterpenic alcohol
meta-Cymen-8-ol	0.08	Monoterpenic alcohol
para-Cymen-8-ol	0.16	Monoterpenic alcohol
Unknown	0.09	Oxygenated monoterpene
α -Terpineol	0.74	Monoterpenic alcohol
Myrtenal	0.03	Monoterpenic aldehyde
Myrtenol	0.07	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Verbenone	0.12	Monoterpenic ketone
Unknown	0.04	Unknown
<i>trans</i> -Carveol	0.04	Monoterpenic alcohol
Unknown	0.07	Oxygenated monoterpene
Carvacrol methyl ether	0.22	Monoterpenic ether
Car-3-en-2-one	0.01	Monoterpenic ketone
Linalyl acetate	0.08	Monoterpenic ester
<i>trans</i> -Ascaridole glycol	0.02	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Bornyl acetate	0.13	Monoterpenic ester
Cuminol	0.02	Monoterpenic alcohol
Unknown	0.66	Monoterpenic ester
Terpinen-4-yl acetate	0.04	Monoterpenic ester
Unknown	0.03	Oxygenated monoterpene
Unknown	0.03	Unknown
Unknown	0.32	Monoterpenic ester
α -Cubebene	0.64	Sesquiterpene
α -Terpinyl acetate	3.26	Monoterpenic ester
α -Ylangene	0.03	Sesquiterpene
α -Copaene	0.17	Sesquiterpene
β -Bourbonene	0.05	Sesquiterpene
β -Cubebene	0.01	Sesquiterpene
β -Elemene	0.04	Sesquiterpene
α -Cedrene	0.63	Sesquiterpene
β -Funebrene	0.32	Sesquiterpene
β -Caryophyllene	0.25	Sesquiterpene
β -Cedrene	0.27	Sesquiterpene
β -Copaene	0.02	Sesquiterpene
<i>cis</i> -Thujopsene	0.08	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	0.04	Sesquiterpene
α -Humulene	0.29	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.19	Sesquiterpene
<i>cis</i> -Cadina-1(6),4-diene	0.08	Sesquiterpene
Unknown	0.04	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.05	Sesquiterpene
γ -Muurolole	0.21	Sesquiterpene
Germacrene D	0.40	Sesquiterpene

α-Amorphene	0.65	Sesquiterpene
<i>trans</i> -Muurolo-4(15),5-diene	0.07	Sesquiterpene
β-Alaskene	0.05	Sesquiterpene
Epizonarene	0.12	Sesquiterpene
α-Muurolole	0.23	Sesquiterpene
δ-Amorphene	0.03	Sesquiterpene
γ-Cadinene	0.13	Sesquiterpene
α-Alaskene	0.07	Sesquiterpene
δ-Cadinene	0.50	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.05	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene
α-Calacorene	0.02	Sesquiterpene
Salviadienol?	0.07	Sesquiterpenic alcohol
Caryophyllene oxide	0.05	Sesquiterpenic ether
allo-Cedrol	0.04	Sesquiterpenic alcohol
α-Cedrol	1.17	Sesquiterpenic alcohol
Widdrol	0.02	Sesquiterpenic alcohol
epi-Cedrol	0.06	Sesquiterpenic alcohol
1-epi-Cubenol	0.02	Sesquiterpenic alcohol
α-Acorenol	0.02	Sesquiterpenic alcohol
Unknown	0.16	Unknown
τ-Cadinol	0.03	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.04	Sesquiterpenic alcohol
α-Cadinol	0.03	Sesquiterpenic alcohol
Unknown	0.09	Unknown
Eudesma-4(15),7-dien-1β-ol	0.04	Sesquiterpenic alcohol
β-Turmerone	0.01	Sesquiterpenic ketone
Phenylethyl octanoate	0.02	Phenolic ester
Isopimaradiene	0.03	Diterpene
Manoyl oxide	0.04	Diterpenic ether
7,13-Abietadiene	0.02	Diterpene
Unknown	0.02	Unknown
Consolidated total	97.93%	

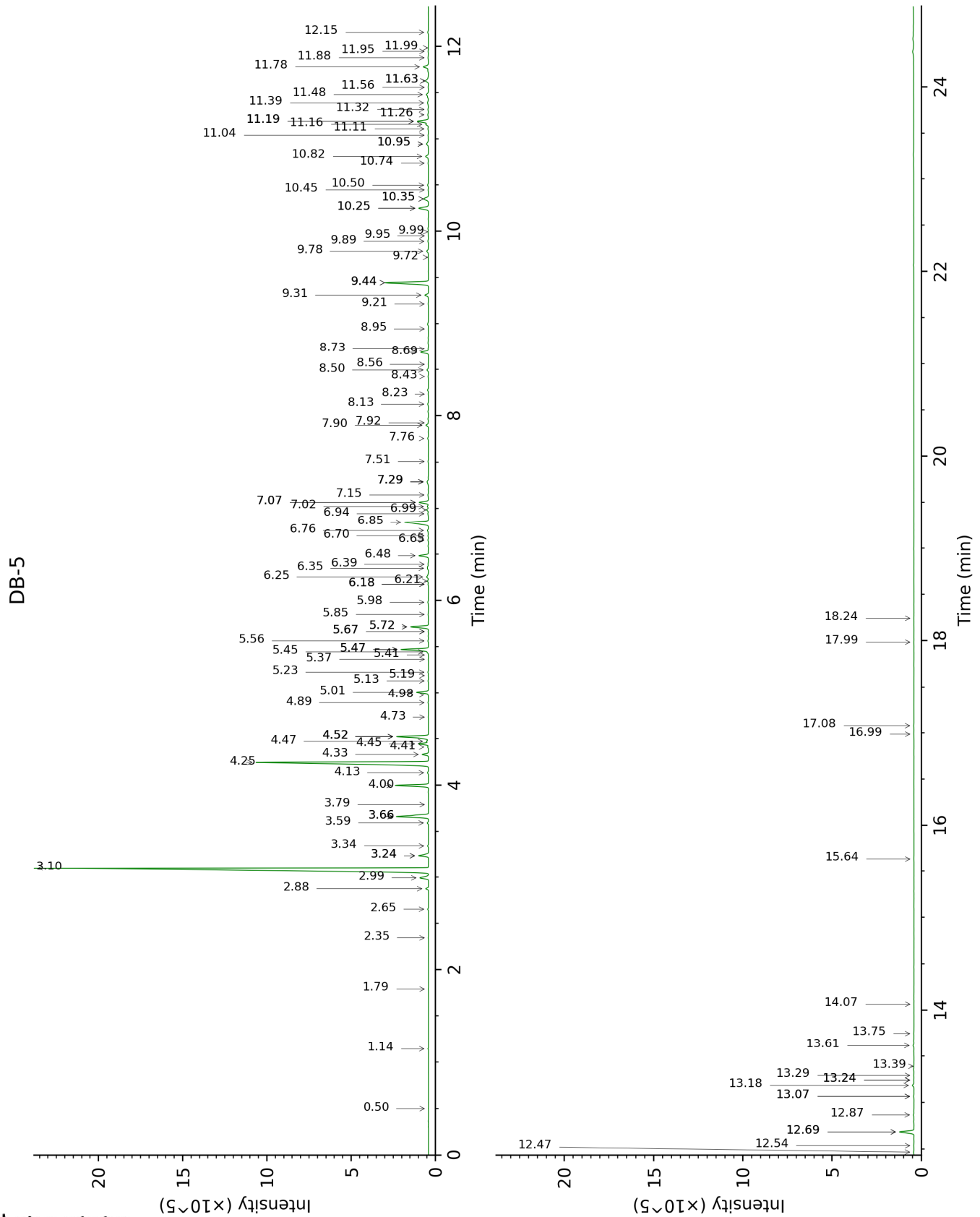
*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

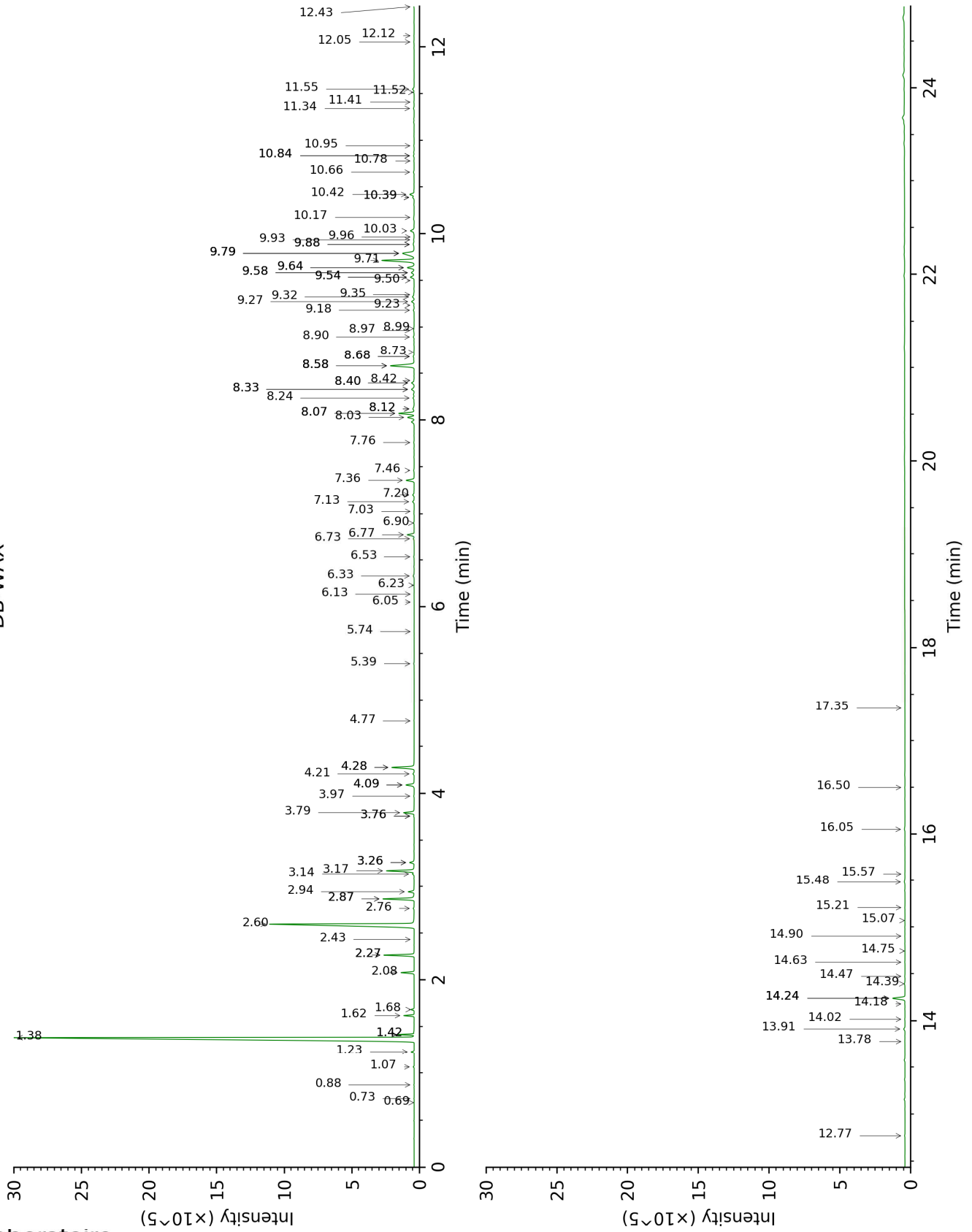
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

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



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
2-Butanone	0.50	594	tr	0.69	866	0.01
Toluene	1.14	760	0.02	1.42*	1002	0.84
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.79	832	0.01	0.73	881	0.01
Cyclofenchene	2.34	877	0.02	0.88	916	0.01
Bornylene	2.65	902	0.05	1.07	947	0.05
Tricyclene	2.88	917	0.19	1.23	973	0.19
α -Thujene	2.99	925	0.81	1.42*	1002	[0.84]
α -Pinene	3.10	932	46.87	1.38	998	47.03
Camphene	3.24*	941	0.83	1.68	1028	0.19
α -Fenchene	3.24*	941	[0.83]	1.62	1022	0.62
Thuja-2,4(10)-diene	3.34	948	0.06	2.27*	1085	2.20
meta-Cymene	3.59	964	0.09	2.87*	1134	2.47
Sabinene	3.66*	969	3.03	2.27*	1085	[2.20]
β -Pinene	3.66*	969	[3.03]	2.08	1067	0.92
Pseudolimonene isomer	3.79	977	0.02	2.43	1101	0.01
Myrcene	4.00	991	2.40	2.87*	1134	[2.47]
α -Phellandrene	4.13	1000	0.08	2.76	1127	0.09
Δ^3 -Carene	4.25	1007	16.42	2.60	1114	16.43
α -Terpinene	4.33	1013	0.45	2.94	1140	0.52
ortho-Cymene	4.41	1018	0.05	4.09*	1227	0.77
para-Cymene	4.45	1020	0.74	4.09*	1227	[0.77]
Sylvestrene	4.47	1022	0.13	3.14	1156	0.14
Limonene	4.52*	1025	2.65	3.17	1158	2.30
1,8-Cineole	4.52*	1025	[2.65]	3.26*	1165	0.41
β -Phellandrene	4.52*	1025	[2.65]	3.26*	1165	[0.41]
(Z)- β -Ocimene	4.73	1038	0.02	3.76*	1203	0.04
(E)- β -Ocimene	4.89	1048	0.03	3.97	1219	0.04
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	4.98	1054	0.02	3.76*	1203	[0.04]
γ -Terpinene	5.01	1056	0.91	3.79	1206	0.92
cis-Sabinene hydrate	5.13	1063	0.03	6.90	1432	0.05
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.19	1067	0.02	4.77	1277	0.02
cis-Linalool oxide (fur.)	5.23	1069	0.05	6.53	1405	0.04
meta-Cymenene	5.37	1078	0.02	6.23	1383	0.03

Terpinolene isomer	5.41	1081	0.01	4.28*	1241	2.02
Isoterpinolene	5.45	1083	0.08	4.21	1236	0.11
Terpinolene	5.47*	1085	2.16	4.28*	1241	[2.02]
para-Cymenene	5.47*	1085	[2.16]	6.33	1390	0.11
α-Pinene oxide	5.56	1091	0.06	5.39	1322	0.04
Unknown [m/z 109, 43 (65), 95 (54), 119 (50), 91 (47)... 149 (8)...]	5.66*	1097	0.02	6.05	1370	0.01
Perillene	5.66*	1097	[0.02]	6.14	1376	0.02
Linalool	5.72*	1100	1.42	8.07*	1519	1.37
Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.72*	1100	[1.42]	5.74	1347	0.01
endo-Fenchol	5.85	1109	0.03	8.40*	1544	0.28
cis-para-Menth-2-en-1-ol	5.98	1118	0.06	8.12*	1523	0.19
cis-para-Mentha-2,8-dien-1-ol	6.18*	1130	0.04	9.50	1630	0.02
4-Hydroxy-4-methylcyclohex-2-enone	6.18*	1130	[0.04]	14.02	2025	0.03
trans-Pinocarveol	6.21	1133	0.08	9.18	1605	0.09
Camphor	6.25	1136	0.21	7.20	1454	0.16
Epoxyterpinolene	6.35	1142	0.06	6.73	1419	0.07
meta-Mentha-4,6-dien-8-ol	6.39	1145	0.04	9.35	1618	0.05
Karahanaenone	6.48	1151	0.79	7.36	1465	0.76
Borneol	6.65	1162	0.05	9.79*	1654	1.91
α-Phellandren-8-ol	6.70	1165	0.04	10.17	1685	0.04
Umbellulone	6.76	1169	0.09	8.90	1582	0.08
Terpinen-4-ol	6.85	1175	2.61	8.58*	1558	2.66
meta-Cymen-8-ol	6.94	1181	0.08	11.52	1798	0.04
para-Cymen-8-ol	6.98	1184	0.16	11.55	1801	0.17
Unknown [m/z 93, 59 (85), 81 (36), 92 (35), 43 (34), 121 (20), 136 (16)...]	7.02	1186	0.09			
α-Terpineol	7.07*	1189	0.77	9.79*	1654	[1.91]
Myrtenal	7.07*	1189	[0.77]	8.68*	1566	0.11
Myrtenol	7.15	1194	0.07	10.84*	1740	0.07
Unknown [m/z 109, 91 (100), 81 (88), 94 (75), 119 (74), 96 (73), 41 (63)... 150 (2)]	7.29*	1204	0.18	10.78	1736	0.03
Verbenone	7.29*	1204	[0.18]	9.58*	1637	0.34
Unknown [m/z	7.29*	1204	[0.18]	10.95	1749	0.04

95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]						
<i>trans</i> -Carveol	7.51	1219	0.04	11.41	1789	0.03
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.76	1236	0.07	11.34	1783	0.07
Carvacrol methyl ether	7.90	1246	0.22	8.58*	1558	[2.66]
Car-3-en-2-one	7.92	1248	0.01	10.39*	1702	0.15
Linalyl acetate	8.13	1261	0.08	8.12*	1523	[0.19]
<i>trans</i> -Ascaridole glycol	8.24	1268	0.02	14.18	2040	0.02
Unknown [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	8.42	1280	0.03	12.43	1878	0.03
Bornyl acetate	8.50	1285	0.13	8.24	1532	0.12
Cuminol	8.56	1289	0.02	14.24*	2046	1.23
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107 (47), 108 (44)...]	8.69	1298	0.66	8.58*	1558	[2.66]
Terpinen-4-yl acetate	8.73	1300	0.04	8.73	1570	0.04
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	8.95	1315	0.03	12.05	1845	0.04
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...]	9.22	1334	0.03			
Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...]	9.31	1341	0.32	9.54*	1633	0.41
α -Cubebene	9.44*	1350	3.93	6.77	1422	0.64
α -Terpinyl acetate	9.44*	1350	[3.93]	9.71	1648	3.26
α -Ylangene	9.72	1369	0.03	7.03	1441	0.02
α -Copaene	9.78	1374	0.17	7.13	1449	0.16
β -Bourbonene	9.89	1381	0.05	7.46	1473	0.06
β -Cubebene	9.95	1385	0.01	7.76	1495	0.04
β -Elemene	9.99	1388	0.04	8.42	1546	0.03
α -Cedrene	10.25*	1406	0.95	8.03	1516	0.63
β -Funebrene	10.25*	1406	[0.95]	8.07*	1519	[1.37]
β -Caryophyllene	10.35*	1414	0.55	8.40*	1544	[0.28]
β -Cedrene	10.35*	1414	[0.55]	8.33*	1539	0.30
β -Copaene	10.45	1421	0.02	8.33*	1539	[0.30]
<i>cis</i> -Thujopsene	10.50	1425	0.08	8.68*	1566	[0.11]
<i>cis</i> -Muurolo-3,5-diene	10.74	1443	0.04	8.99	1589	0.03

α -Humulene	10.82	1448	0.29	9.27	1612	0.26
<i>cis</i> -Muurolo-4(15),5-diene	10.95*	1458	0.24	9.32	1616	0.19
<i>cis</i> -Cadina-1(6),4-diene	10.95*	1458	[0.24]	8.97	1588	0.08
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.04	1465	0.04	9.54*	1633	[0.41]
<i>trans</i> -Cadina-1(6),4-diene	11.11	1470	0.05	9.24	1609	0.04
γ -Muurolole	11.16	1474	0.21	9.58*	1637	[0.34]
Germacrene D	11.19*	1476	1.06	9.79*	1654	[1.91]
α -Amorphene	11.19*	1476	[1.06]	9.64*	1641	0.70
<i>trans</i> -Muurolo-4(15),5-diene	11.26	1481	0.07	9.88*	1661	0.17
β -Alaskene	11.32	1486	0.05	9.64*	1641	[0.70]
Epizonarene	11.39	1491	0.12	9.88*	1661	[0.17]
α -Muurolole	11.48	1497	0.23	10.03	1673	0.42
δ -Amorphene	11.56	1503	0.03	9.96	1668	0.01
γ -Cadinene	11.63*	1508	0.37	10.39*	1702	[0.15]
α -Alaskene	11.63*	1508	[0.37]	9.93	1665	0.07
δ -Cadinene	11.78	1520	0.50	10.42	1705	0.45
<i>trans</i> -Cadina-1,4-diene	11.88	1528	0.05	10.66	1726	0.08
α -Cadinene	11.95	1533	0.03	10.84*	1740	[0.07]
α -Calacorene	11.99	1536	0.02	12.12	1851	0.02
Salviadienol?	12.15	1549	0.07	14.40	2061	0.07
Caryophyllene oxide	12.47	1574	0.05	12.77	1909	0.04
allo-Cedrol	12.54	1580	0.04	14.24*	2046	[1.23]
α -Cedrol	12.69*	1591	1.28	14.24*	2046	[1.23]
Widdrol	12.69*	1591	[1.28]	14.63	2083	0.02
epi-Cedrol	12.87	1605	0.06	14.75	2095	0.02
1-epi-Cubenol	13.07*	1622	0.05	13.78	2002	0.02
α -Acorenol	13.07*	1622	[0.05]	14.48	2069	0.02
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.18	1631	0.16	13.91	2015	0.14
τ -Cadinol	13.24*	1636	0.04	14.90	2111	0.03
τ -Muurolol	13.24*	1636	[0.04]	15.07	2127	0.02
α -Muurolol	13.29	1640	0.04	15.21	2141	0.02
α -Cadinol	13.39	1648	0.03	15.48	2169	0.10
Unknown [m/z 85, 57 (59), 79 (26), 67 (18), 41 (16), 80 (15), 81 (10), 77 (8), 238 (7)]	13.61	1667	0.09			
Eudesma-4(15),7-	13.75	1678	0.04			

dien-1 β -ol						
β -Turmerone	14.07	1704	0.01	15.57	2178	0.02
Phenylethyl octanoate	15.64	1842	0.02			
Isopimaradiene	16.99	1968	0.03	16.05	2226	0.08
Manoyl oxide	17.08	1976	0.04	16.50	2273	0.03
7,13-Abietadiene	17.99	2066	0.02	17.35	2364	0.02
Unknown [m/z 191, 81 (47), 95 (41), 69 (39), 109 (32), 93 (32)...]	18.24	2092	0.02			
Total identified		96.67%			97.21%	
Total reported		98.25%			97.61%	

*: Two or more compounds are coeluting on this column

[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
R.T.: Retention time (minutes)
R.I.: Retention index