CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20B12-PTH12
Customer identification : Cypress ORGANIC - Spain - CB910292R
Type : Essential oil
Source : *Cupressus sempervirens*
Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-007 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Sylvain Mercier, M. Sc., Chimiste
Analysis date : February 13, 2020

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid
Refractive index: 1.4712 ± 0.0003 (20 °C)

NF T 75-254:1992 - OIL OF CUPRESSUS

Compound	Min. %	Max. %	Observed %	Complies?
Manoyl oxide	tr		0.09	Yes
Isopimaradiene	tr		0.03	Yes
Karahanaenone	tr		0.20	Yes
Germacrene D	0.5	3.0	0.5	Yes
α-Cedrol	0.8	7.0	1.2	Yes
α-Terpinyl acetate	1	4	2	Yes
Terpinen-4-ol	0.2	2.0	1.0	Yes
Limonene	1.8	5.0	2.4	Yes
Δ3-Carene	12	25	22	Yes
Myrcene	1.0	3.5	1.7	Yes
β-Pinene	0.5	3.0	1.1	Yes
α-Pinene	40	65	55	Yes
Refractive index	1.4680	1.4780	1.4712	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil complies with the AFNOR standard for oil of cupressus.

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ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

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

Identification	%	Classe
Toluene	0.01	Simple phenolic
Cyclofenchene	0.02	Monoterpene
Bornylene	0.05	Monoterpene
Tricyclene	0.19	Monoterpene
α-Thujene	0.41	Monoterpene
α-Pinene	55.22	Monoterpene
Camphene	0.25	Monoterpene
α-Fenchene	0.48	Monoterpene
Thuja-2,4(10)-diene	0.04	Monoterpene
meta-Cymene	0.07	Monoterpene
Sabinene	0.57	Monoterpene
β-Pinene	1.05	Monoterpene
Myrcene	1.72	Monoterpene
2-Carene	0.05	Monoterpene
α-Phellandrene	0.11	Monoterpene
Pseudolimonene	0.02	Monoterpene
Menthatriene isomer I	0.01	Monoterpene
Δ3-Carene	21.83	Monoterpene
1,4-Cineole	0.07	Monoterpenic ether
α-Terpinene	0.29	Monoterpene
ortho-Cymene	0.04	Monoterpene
para-Cymene	0.34	Monoterpene
Sylvestrene	0.10	Monoterpene
Limonene	2.43	Monoterpene
β-Phellandrene	0.47	Monoterpene
1,8-Cineole	0.05	Monoterpenic ether
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.03	Monoterpene
Unknown	0.02	Monoterpene
γ-Terpinene	0.44	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
meta-Cymenene	0.01	Monoterpene
Terpinolene isomer	0.04	Monoterpene
Terpinolene	2.64	Monoterpene
para-Cymenene	0.09	Monoterpene
α-Pinene oxide	0.03	Monoterpenic ether
Unknown	0.01	Unknown
Linalool	0.29	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Perillene	0.01	Monoterpenic ether
endo-Fenchol	0.03	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.02	Aliphatic alcohol
trans-Pinocarveol	0.04	Monoterpenic alcohol
Camphor	0.13	Monoterpenic ketone

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Compound	Value	Class
Epoxyterpinolene	0.08	Monoterpenic ether
meta-Mentha-4,6-dien-8-ol	0.02	Monoterpenic alcohol
Karahanaenone	0.20	Monoterpenic ketone
Borneol	0.05	Monoterpenic alcohol
α-Phellandren-8-ol	0.02	Monoterpenic alcohol
Umbellulone	0.17	Monoterpenic ketone
Terpinen-4-ol	0.96	Monoterpenic alcohol
meta-Cymen-8-ol	0.03	Monoterpenic alcohol
para-Cymen-8-ol	0.06	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
α-Terpineol	0.28	Monoterpenic alcohol
Myrtenol	0.03	Monoterpenic alcohol
Unknown	0.04	Oxygenated monoterpene
Verbenone	0.05	Monoterpenic ketone
trans-Carveol	0.02	Monoterpenic alcohol
Unknown	0.05	Oxygenated monoterpene
(*cis*?)-Linalool oxide acetate (fur.)?	0.01	Monoterpenic ester
Linalyl acetate	0.03	Monoterpenic ester
(*trans*?)-Linalool oxide acetate (fur.)?	0.03	Monoterpenic ester
Unknown	0.03	Oxygenated monoterpene
Bornyl acetate	0.08	Monoterpenic ester
Unknown	0.14	Monoterpenic ester
Terpinen-4-yl acetate	0.02	Monoterpenic ester
Unknown	0.03	Oxygenated monoterpene
Unknown	0.02	Unknown
Unknown	0.20	Monoterpenic ester
α-Terpinyl acetate	1.84	Monoterpenic ester
α-Cubebene	0.11	Sesquiterpene
α-Ylangene	0.02	Sesquiterpene
α-Copaene	0.05	Sesquiterpene
β-Bourbonene	0.02	Sesquiterpene
β-Cubebene	0.01	Sesquiterpene
β-Elemene	0.04	Sesquiterpene
α-Cedrene	0.19	Sesquiterpene
β-Funebrene	0.20	Sesquiterpene
Sesquithujene	0.05	Sesquiterpene
β-Caryophyllene	0.27	Sesquiterpene
β-Cedrene	0.13	Sesquiterpene
β-Copaene	0.04	Sesquiterpene
cis-Thujopsene	0.04	Sesquiterpene
cis-Muurola-3,5-diene	0.03	Sesquiterpene
α-Humulene	0.17	Sesquiterpene
cis-Cadina-1(6),4-diene	0.03	Sesquiterpene
cis-Muurola-4(15),5-diene	0.13	Sesquiterpene
Unknown	0.01	Sesquiterpene
trans-Cadina-1(6),4-diene	0.03	Sesquiterpene
γ-Muurolene	0.14	Sesquiterpene
α-Amorphene	0.07	Sesquiterpene
Germacrene D	0.52	Sesquiterpene
trans-Muurola-4(15),5-diene	0.02	Sesquiterpene
β-Alaskene	0.08	Sesquiterpene
Epizonarene	0.07	Sesquiterpene

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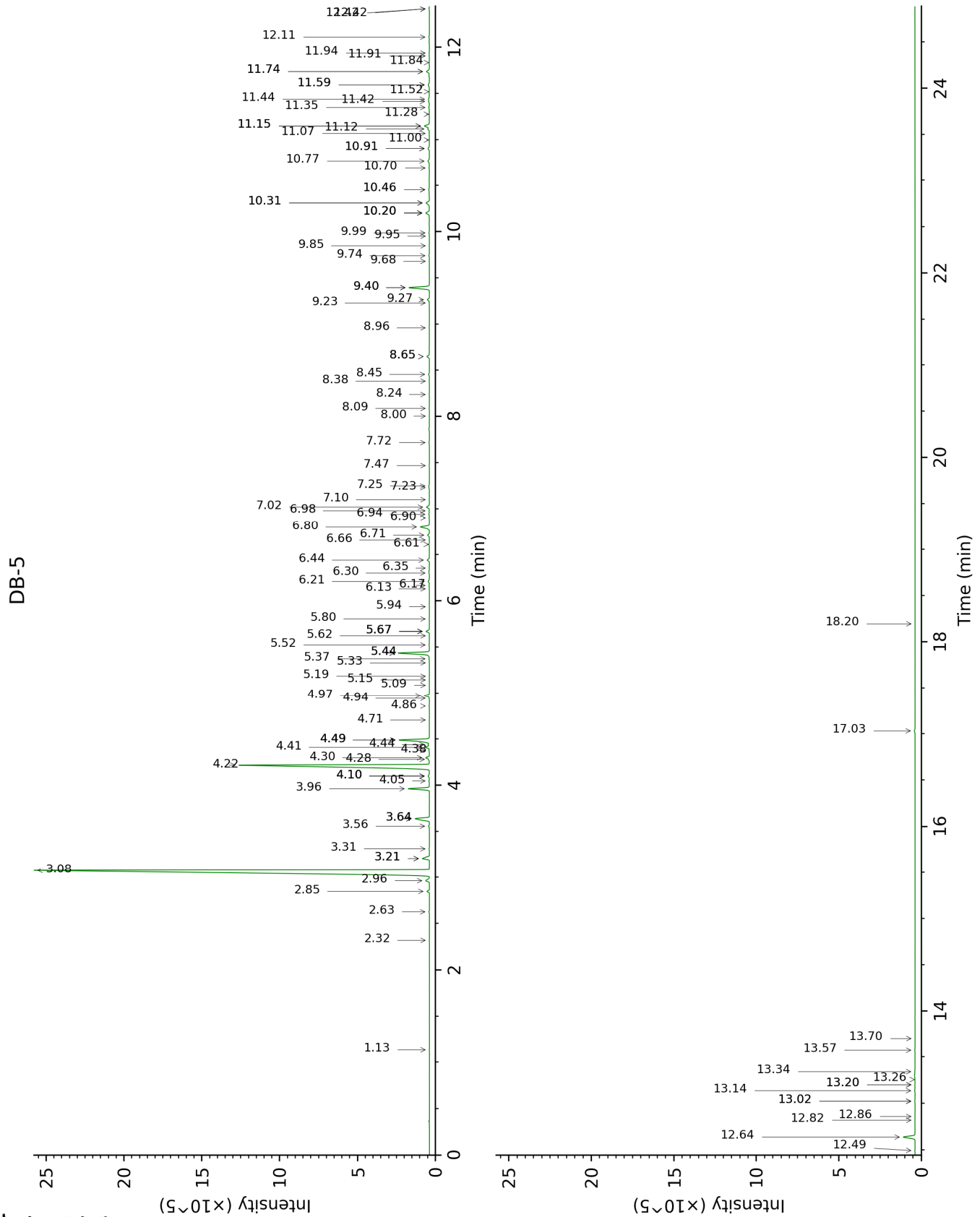|		
α-Muurolene	0.11	Sesquiterpene
δ-Amorphene	0.03	Sesquiterpene
α-Alaskene	0.01	Sesquiterpene
γ-Cadinene	0.11	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene
δ-Cadinene	0.29	Sesquiterpene
trans-Cadina-1,4-diene	0.04	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene
α-Calacorene	0.03	Sesquiterpene
Salviadienol?	0.06	Sesquiterpenic alcohol
Caryophyllene oxide	0.04	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
allo-Cedrol	0.03	Sesquiterpenic alcohol
α-Cedrol	1.19	Sesquiterpenic alcohol
epi-Cedrol	0.02	Sesquiterpenic alcohol
10-epi-Cubenol	0.02	Sesquiterpenic alcohol
1-epi-Cubenol	0.02	Sesquiterpenic alcohol
α-Acorenol	0.02	Sesquiterpenic alcohol
Unknown	0.04	Unknown
τ-Cadinol	0.02	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.02	Sesquiterpenic alcohol
α-Cadinol	0.03	Sesquiterpenic alcohol
Unknown	0.02	Unknown
Eudesma-4(15),7-dien-1β-ol	tr	Sesquiterpenic alcohol
Manoyl oxide	0.09	Diterpenic ether
Unknown	0.01	Unknown
Isopimaradiene	0.03	Diterpene
Consolidated total	**99.10%**	

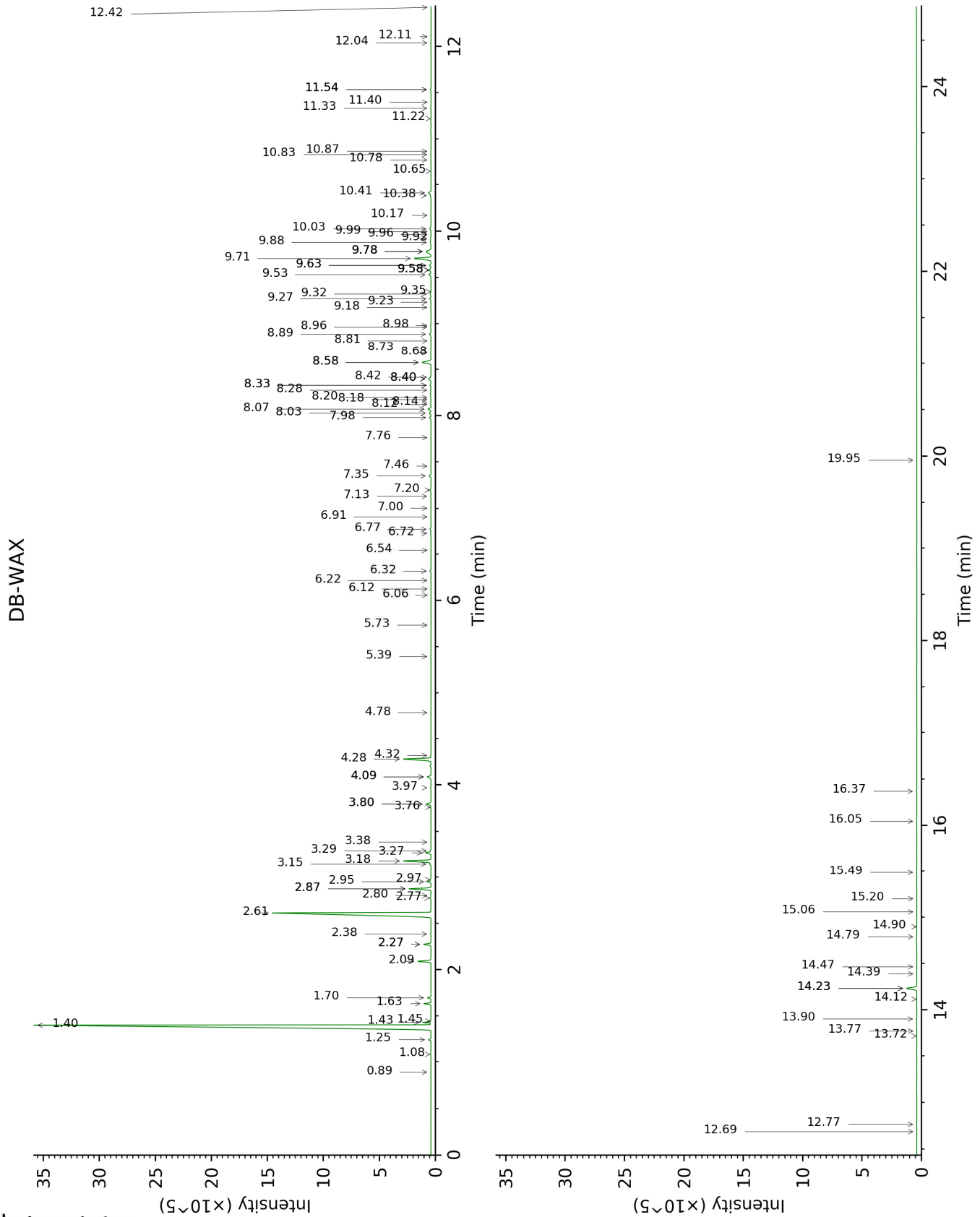tr: The compound has been detected below 0.005% of total signal.

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

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DB-5

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DB-WAX

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.13	761	0.01	1.45	1001	0.03
Cyclofenchene	2.32	878	0.02	0.89	912	0.01
Bornylene	2.63	903	0.05	1.08	944	0.04
Tricyclene	2.85	918	0.19	1.24	971	0.18
α-Thujene	2.96	925	0.41	1.43	1000	0.45
α-Pinene	3.08	933	55.22	1.40	997	54.70
Camphene	3.21*†	942	0.74	1.70	1026	0.25
α-Fenchene	3.21*†	942	[0.74]	1.63	1020	0.48
Thuja-2,4(10)-diene	3.32	949	0.04	2.27*	1083	0.61
meta-Cymene	3.56	965	0.07	2.87*	1133	1.80
Sabinene	3.64*	970	1.63	2.27*	1083	[0.61]
β-Pinene	3.64*	970	[1.63]	2.09	1065	1.05
Myrcene	3.96	992	1.72	2.87*	1133	[1.80]
2-Carene	4.05	997	0.05	2.38	1094	0.03
α-Phellandrene	4.10*	1001	0.13	2.77	1125	0.11
Pseudolimonene	4.10*	1001	[0.13]	2.80	1127	0.02
Menthatriene isomer I	4.10*	1001	[0.13]	3.38	1173	0.01
Δ3-Carene	4.22	1008	21.83	2.61	1112	21.59
1,4-Cineole	4.28†	1012	0.36	2.97	1140	0.07
α-Terpinene	4.30†	1013	[0.36]	2.95	1139	0.29
ortho-Cymene	4.38	1018	0.04	4.09*	1225	0.39
para-Cymene	4.41	1020	0.34	4.09*	1225	[0.39]
Sylvestrene	4.44	1022	0.10	3.15	1154	0.10
Limonene	4.49*	1025	2.93	3.18	1157	2.43
β-Phellandrene	4.49*	1025	[2.93]	3.27	1164	0.47
1,8-Cineole	4.49*	1025	[2.93]	3.29	1165	0.05
(Z)-β-Ocimene	4.71	1039	0.01	3.80*†	1204	[0.49]
(E)-β-Ocimene	4.86	1049	0.03	3.97	1217	0.04
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	4.94	1054	0.02	3.76†	1201	0.49
γ-Terpinene	4.97	1056	0.44	3.80*†	1204	[0.49]
cis-Sabinene hydrate	5.09	1063	0.01	6.91	1429	0.01
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.15	1067	0.01	4.78	1275	0.01
cis-Linalool oxide (fur.)	5.19	1069	0.01	6.54	1402	0.01
meta-Cymenene	5.33	1079	0.01	6.22	1378	0.02
Terpinolene isomer	5.37	1081	0.04	4.32	1242	0.04

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Terpinolene	5.44*	1085	2.81	4.28	1239	2.64
para-Cymenene	5.44*	1085	[2.81]	6.32	1385	0.09
α-Pinene oxide	5.52	1091	0.03	5.40	1319	0.03
Unknown [m/z 109, 43 (65), 95 (54), 119 (50), 91 (47)... 149 (8)...]	5.62	1097	0.01	6.06	1367	0.01
Linalool	5.67*	1100	0.30	8.07	1516	0.29
Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.67*	1100	[0.30]	5.73	1343	0.01
Perillene	5.67*	1100	[0.30]	6.12	1371	0.01
endo-Fenchol	5.80	1109	0.03	8.40*	1541	0.30
cis-para-Menth-2-en-1-ol	5.94	1118	0.02	8.14	1521	0.03
4-Hydroxy-4-methylcyclohex-2-enone	6.13	1130	0.02	14.12	2031	0.03
trans-Pinocarveol	6.17	1132	0.04	9.18	1601	0.04
Camphor	6.21	1135	0.13	7.20	1450	0.11
Epoxyterpinolene	6.30	1141	0.08	6.72	1415	0.04
meta-Mentha-4,6-dien-8-ol	6.35	1145	0.02	9.35	1615	0.01
Karahanaenone	6.44	1150	0.20	7.35	1462	0.20
Borneol	6.61	1162	0.05	9.78*	1650	0.86
α-Phellandren-8-ol	6.66	1165	0.02	10.17	1682	0.02
Umbellulone	6.71	1168	0.17	8.89	1579	0.17
Terpinen-4-ol	6.80	1174	0.96	8.58*	1555	1.10
meta-Cymen-8-ol	6.90	1181	0.03	11.54*	1796	0.07
para-Cymen-8-ol	6.94	1183	0.06	11.54*	1796	[0.07]
Unknown [m/z 93, 59 (85), 81 (36), 92 (35), 43 (34), 121 (20), 136 (16)...]	6.98	1186	0.03			
α-Terpineol	7.02	1188	0.28	9.78*	1650	[0.86]
Myrtenol	7.10	1194	0.03	10.87	1740	0.02
Unknown [m/z 109, 91 (100), 81 (88), 94 (75), 119 (74), 96 (73), 41 (63)... 150 (2)]	7.23	1202	0.04	10.83	1737	0.04
Verbenone	7.25	1203	0.05	9.63*	1638	0.16
trans-Carveol	7.47	1218	0.02	11.40	1785	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.72	1236	0.05	11.33	1779	0.05
(cis?)-Linalool oxide acetate	8.00	1256	0.01	8.18	1524	0.02

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(fur.)?						
Linalyl acetate	8.09	1261	0.03	8.20	1526	0.03
(*trans*?)-Linalool oxide acetate (fur.)?	8.24	1272	0.03	8.73	1567	0.03
Unknown [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	8.38	1282	0.03	12.42	1874	0.02
Bornyl acetate	8.45	1287	0.08	8.28	1532	0.04
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107 (47), 108 (44)...]	8.65*	1300	0.23	8.58*	1555	[1.10]
Terpinen-4-yl acetate	8.65*	1300	[0.23]	8.82	1573	0.02
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	8.96	1317	0.03	12.04	1841	0.03
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...]	9.23	1336	0.02			
Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...]	9.27	1338	0.20	9.53	1630	0.24
α-Terpinyl acetate	9.40*	1348	1.96	9.70	1644	1.84
α-Cubebene	9.40*	1348	[1.96]	6.77	1418	0.11
α-Ylangene	9.68	1368	0.02	7.00	1436	0.02
α-Copaene	9.74	1372	0.05	7.13	1445	0.05
β-Bourbonene	9.85	1380	0.02	7.46	1469	0.02
β-Cubebene	9.95	1387	0.01	7.76	1492	0.02
β-Elemene	9.99	1390	0.04	8.42	1542	0.05
α-Cedrene	10.20*	1405	0.42	7.98	1509	0.19
β-Funebrene	10.20*	1405	[0.42]	8.03	1512	0.20
Sesquithujene	10.20*	1405	[0.42]	8.12	1520	0.05
β-Caryophyllene	10.31*	1413	0.40	8.40*	1541	[0.30]
β-Cedrene	10.31*	1413	[0.40]	8.33*	1536	0.13
β-Copaene	10.46*	1423	0.08	8.33*	1536	[0.13]
cis-Thujopsene	10.46*	1423	[0.08]	8.68	1563	0.04
cis-Muurola-3,5-diene	10.70	1442	0.03	8.96	1584	0.05
α-Humulene	10.77	1447	0.17	9.27	1609	0.15
cis-Cadina-1(6),4-diene	10.91*	1457	0.15	8.98	1586	0.03
cis-Muurola-4(15),5-diene	10.91*	1457	[0.15]	9.32	1613	0.13
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.00	1464	0.01	9.58*	1634	0.22

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trans-Cadina-1(6),4-diene	11.07	1469	0.03	9.23	1606	0.03
γ-Muurolene	11.12	1473	0.14	9.58*	1634	[0.22]
α-Amorphene	11.15*	1475	0.53	9.58*	1634	[0.22]
Germacrene D	11.15*	1475	[0.53]	9.78*	1650	[0.86]
trans-Muurola-4(15),5-diene	11.28	1485	0.02	9.88	1658	0.16
β-Alaskene	11.35	1490	0.08	9.63*	1638	[0.16]
Epizonarene	11.42	1495	0.07	9.92	1662	0.06
α-Muurolene	11.44	1497	0.11	10.02	1670	0.16
δ-Amorphene	11.52	1503	0.03	10.00	1668	0.02
α-Alaskene	11.59*	1509	0.16	9.96	1665	0.01
γ-Cadinene	11.59*	1509	[0.16]	10.38	1699	0.11
trans-Calamenene	11.74*	1520	0.32	11.22	1770	0.02
δ-Cadinene	11.74*	1520	[0.32]	10.41	1702	0.29
trans-Cadina-1,4-diene	11.84	1528	0.04	10.66	1722	0.03
α-Cadinene	11.91	1533	0.03	10.78	1732	0.02
α-Calacorene	11.94	1536	0.03	12.11	1847	0.02
Salviadienol?	12.11	1549	0.06	14.39	2057	0.03
Caryophyllene oxide	12.42*	1573	0.04	12.77	1905	0.04
Caryophyllene oxide isomer	12.42*	1573	[0.04]	12.69	1898	0.01
allo-Cedrol	12.49	1579	0.03	14.23*	2042	1.17
α-Cedrol	12.64	1591	1.19	14.23*	2042	[1.17]
epi-Cedrol	12.82	1605	0.02	14.79	2096	0.02
10-epi-Cubenol	12.86	1608	0.02	13.72	1993	0.01
1-epi-Cubenol	13.02*	1622	0.03	13.77	1998	0.02
α-Acorenol	13.02*	1622	[0.03]	14.47	2064	0.02
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.14	1631	0.04	13.90	2011	0.04
τ-Cadinol	13.20*	1636	0.03	14.90	2106	0.02
τ-Muurolol	13.20*	1636	[0.03]	15.06	2122	0.02
α-Muurolol	13.26	1641	0.02	15.20	2137	0.02
α-Cadinol	13.34	1648	0.03	15.49	2165	0.06
Unknown [m/z 85, 57 (59), 79 (26), 67 (18), 41 (16), 80 (15), 81 (10), 77 (8), 238 (7)]	13.57	1667	0.02			
Eudesma-4(15),7-dien-1β-ol	13.70	1678	tr			
Manoyl oxide	17.03	1975	0.09	16.37	2255	0.06
Unknown [m/z 191, 81 (47), 95 (41), 69 (39), 109 (32), 93 (32)...]	18.20	2089	0.01	19.96	2655	0.01

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Isopimaradiene			16.04	2222	0.03
Total identified	**98.64%**			**97.39%**	
Total reported	**99.16%**			**98.34%**	

*: 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

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