Date : August 02, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22G26-PTH02
Customer identification : Cypress - Greece - CL0111R
Type : Essential oil
Source : *Cupressus sempervirens*
Customer : Plant Therapy

Analysis

Method: PC-MAT-014 ISO - 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 2014-005
Analysis date : July 28, 2022

Checked and approved by :

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The results only describe the samples that were submitted to the assays.

Laboratoire PhytoChemia
628 Boulevard du Saguenay Ouest, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid
Refractive index: 1.4703 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

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

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

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
(3*Z*)-Hexenol	tr	Aliphatic alcohol
Cyclofenchene	0.01	Monoterpene
Santene	0.03	Normonoterpene
Bornylene	0.04	Monoterpene
Hashishene	0.02	Monoterpene
Tricyclene	0.16	Monoterpene
α-Thujene	0.48	Monoterpene
α-Pinene	56.60	Monoterpene
Camphene	0.45	Monoterpene
α-Fenchene	0.37	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.05	Monoterpene
β-Pinene	2.48	Monoterpene
Sabinene	0.71	Monoterpene
Pseudolimonene isomer	0.01	Monoterpene
Myrcene	1.23	Monoterpene
Menthatriene isomer I	0.01	Monoterpene
α-Phellandrene	0.06	Monoterpene
Δ3-Carene	21.64	Monoterpene
α-Terpinene	0.23	Monoterpene
meta-Cymene	0.02	Monoterpene
para-Cymene	0.16	Monoterpene
Sylvestrene	0.07	Monoterpene
Limonene	4.02	Monoterpene
β-Phellandrene	0.22	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.02	Monoterpene
Unknown	0.03	Monoterpene
γ-Terpinene	0.36	Monoterpene
meta-Cymenene	0.01	Monoterpene
Isoterpinolene	0.07	Monoterpene
Terpinolene	1.35	Monoterpene
para-Cymenene	0.04	Monoterpene
α-Pinene oxide	0.03	Monoterpenic ether
Linalool	0.40	Monoterpenic alcohol
endo-Fenchol	0.01	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	0.03	Monoterpenic alcohol
Camphor	0.05	Monoterpenic ketone
Epoxyterpinolene	0.04	Monoterpenic ether
meta-Mentha-4,6-dien-8-ol	0.02	Monoterpenic alcohol
Karahanaenone	0.13	Monoterpenic ketone
Borneol	0.04	Monoterpenic alcohol

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

α-Phellandren-8-ol	0.02	Monoterpenic alcohol
Umbellulone	0.04	Monoterpenic ketone
Terpinen-4-ol	1.38	Monoterpenic alcohol
meta-Cymen-8-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
α-Terpineol	0.29	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
Unknown	0.04	Oxygenated monoterpene
Verbenone	0.02	Monoterpenic ketone
trans-Carveol	0.02	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Carvacrol methyl ether	0.02	Monoterpenic ether
Car-3-en-2-one	0.02	Monoterpenic ketone
(*cis*?)-Linalool oxide acetate (fur.)?	0.01	Monoterpenic ester
Linalyl acetate	0.02	Monoterpenic ester
(*trans*?)-Linalool oxide acetate (fur.)?	0.02	Monoterpenic ester
Bornyl acetate	0.34	Monoterpenic ester
Unknown	0.15	Monoterpenic ester
Terpinen-4-yl acetate	0.01	Monoterpenic ester
Unknown	0.02	Oxygenated monoterpene
Unknown	0.01	Unknown
Unknown	0.19	Monoterpenic ester
α-Cubebene	0.13	Sesquiterpene
α-Terpinyl acetate	1.06	Monoterpenic ester
α-Ylangene	0.01	Sesquiterpene
α-Copaene	0.04	Sesquiterpene
β-Bourbonene	0.01	Sesquiterpene
β-Cubebene	0.01	Sesquiterpene
β-Elemene	0.01	Sesquiterpene
α-Cedrene	0.09	Sesquiterpene
β-Funebrene	0.15	Sesquiterpene
β-Cedrene	0.07	Sesquiterpene
β-Caryophyllene	0.15	Sesquiterpene
β-Copaene	0.02	Sesquiterpene
cis-Thujopsene	0.01	Sesquiterpene
cis-Muurola-3,5-diene	0.03	Sesquiterpene
trans-Muurola-3,5-diene	0.01	Sesquiterpene
α-Humulene	0.12	Sesquiterpene
cis-Muurola-4(15),5-diene	0.10	Sesquiterpene
Unknown	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.02	Sesquiterpene
α-Amorphene	0.09	Sesquiterpene
Germacrene D	0.69	Sesquiterpene
trans-Muurola-4(15),5-diene	0.02	Sesquiterpene
β-Alaskene	0.05	Sesquiterpene
Epizonarene	0.04	Sesquiterpene
α-Muurolene	0.06	Sesquiterpene
δ-Amorphene	0.02	Sesquiterpene
α-Alaskene	0.03	Sesquiterpene
γ-Cadinene	0.04	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

δ-Cadinene	0.19	Sesquiterpene
trans-Cadina-1,4-diene	0.02	Sesquiterpene
α-Cadinene	0.01	Sesquiterpene
Salviadienol?	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
allo-Cedrol	0.02	Sesquiterpenic alcohol
α-Cedrol	1.30	Sesquiterpenic alcohol
epi-Cedrol	0.01	Sesquiterpenic alcohol
Torilenol	0.01	Oxygenated sesquiterpene
α-Acorenol	0.01	Sesquiterpenic alcohol
1-epi-Cubenol	0.01	Sesquiterpenic alcohol
Unknown	0.04	Unknown
τ-Cadinol	0.01	Sesquiterpenic alcohol
τ-Muurolol	0.01	Sesquiterpenic alcohol
α-Muurolol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
Unknown	0.03	Unknown
Manoyl oxide	0.03	Diterpenic ether
7,13-Abietadiene	0.01	Diterpene
Unknown	0.01	Unknown
Isopimaradiene	0.01	Diterpene
Consolidated total	**99.47%**	

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

Note: no correction factor was applied

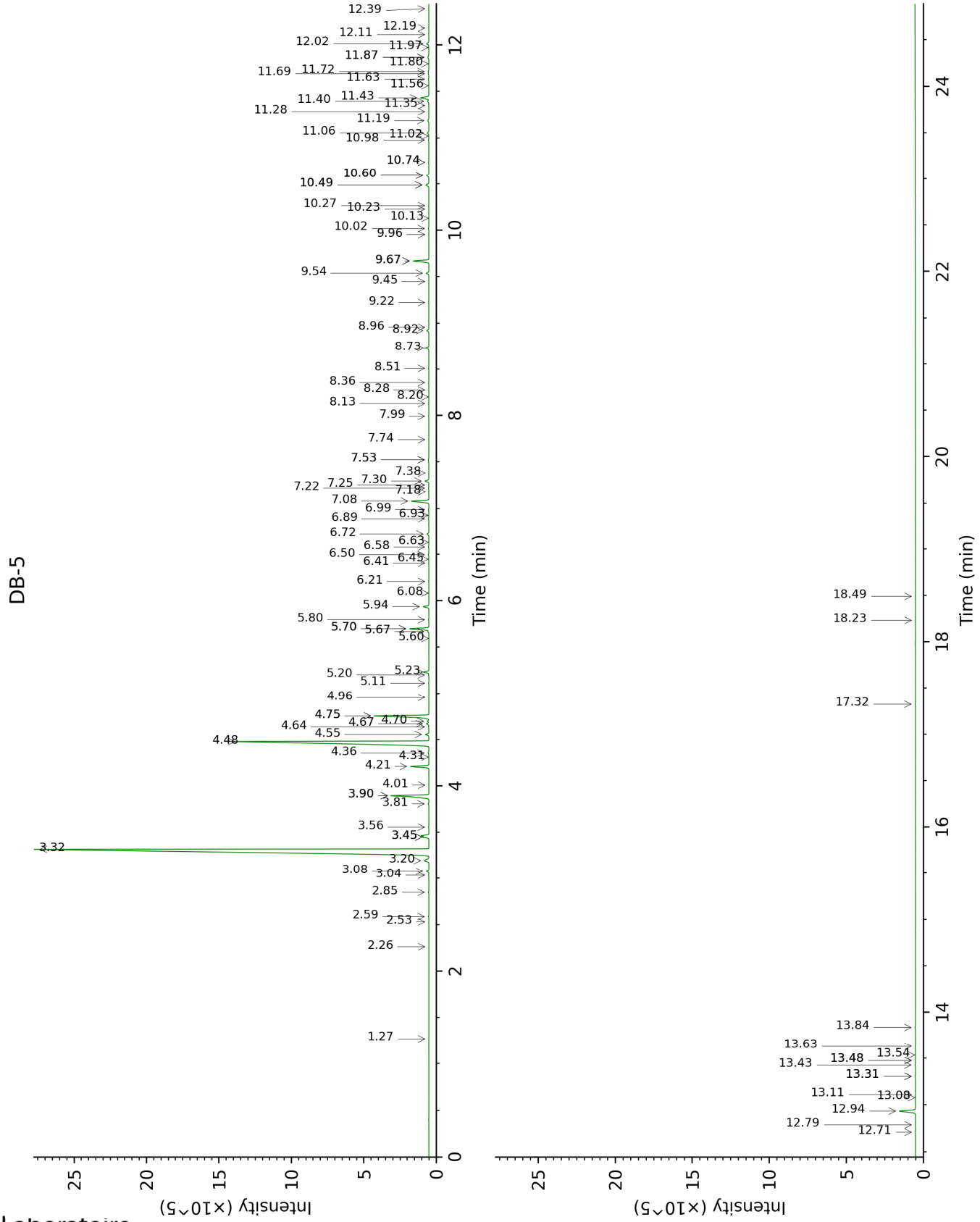
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

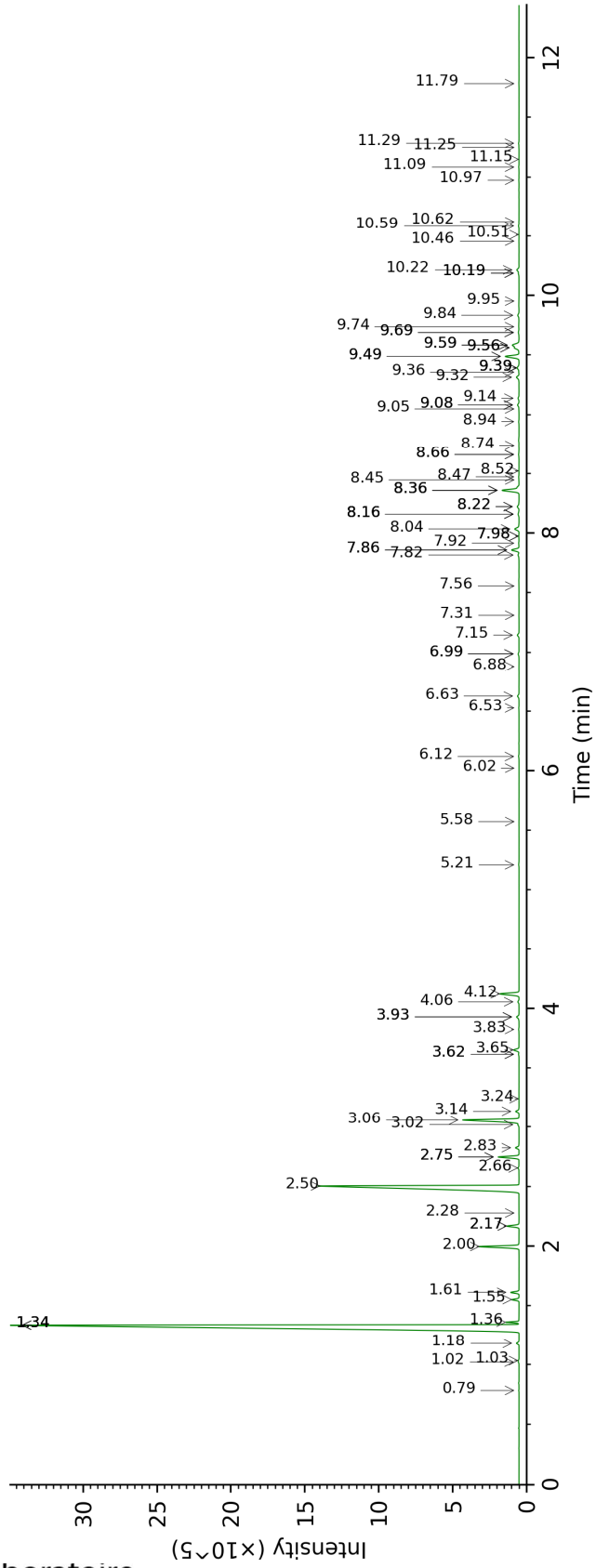
628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

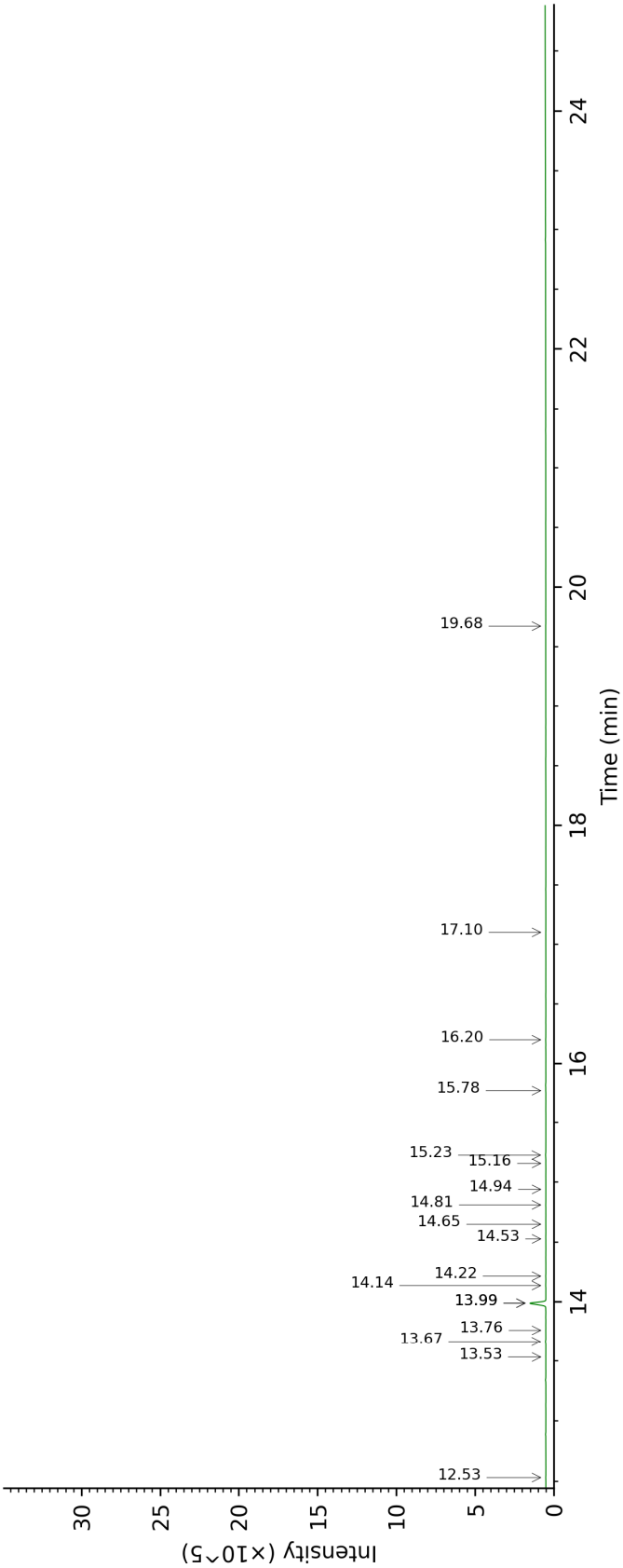
This page was intentionally left blank. The following pages present the complete data of the analysis.

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com


DB-5
Intensity (×10^5)
Time (min)
12.39
12.19
12.11
12.02
11.97
11.87
11.80
11.69
11.72
11.63
11.56
11.40
11.43
11.35
11.28
11.19
11.06
11.02
10.98
10.74
10.60
10.49
10.27
10.23
10.13
10.02
9.96
9.67
9.54
9.45
9.22
8.96
8.92
8.73
8.51
8.36
8.28
8.20
8.13
7.99
7.74
7.53
7.38
7.30
7.25
7.22
7.18
7.08
6.99
6.93
6.89
6.72
6.63
6.58
6.50
6.45
6.41
6.21
6.08
5.94
5.80
5.70
5.67
5.60
5.23
5.20
5.11
4.96
4.75
4.70
4.67
4.64
4.55
4.48
4.36
4.31
4.21
4.01
3.90
3.81
3.56
3.45
3.32
3.20
3.08
3.04
2.85
2.59
2.53
2.26
1.27
18.49
18.23
17.32
13.84
13.63
13.54
13.48
13.43
13.31
13.11
13.08
12.94
12.79
12.71

DB-WAX


Intensity (×10^5)
Time (min)
11.79
11.29
11.25
11.15
11.09
10.97
10.59
10.62
10.46
10.51
10.22
10.19
9.95
9.84
9.74
9.69
9.59
9.56
9.49
9.36
9.32
9.39
9.05
9.08
9.14
8.94
8.66
8.74
8.45
8.47
8.52
8.36
8.16
8.22
8.04
7.98
7.92
7.86
7.82
7.56
7.31
7.15
6.99
6.88
6.63
6.53
6.12
6.02
5.58
5.21
4.06
4.12
3.93
3.83
3.62
3.65
3.24
3.14
3.06
3.02
2.83
2.75
2.66
2.50
2.28
2.17
2.00
1.61
1.55
1.34
1.36
1.18
1.02
1.03
0.79


Intensity (×10^5)
Time (min)
19.68
17.10
16.20
15.78
15.23
15.16
14.94
14.81
14.65
14.53
14.22
14.14
13.99
13.76
13.67
13.53
12.53

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.27	759	0.01	1.34*	1000	56.40
(3*Z*)-Hexenol	2.26	857	tr	5.58	1344	0.01
Cyclofenchene	2.53	879	0.01	0.79	910	0.01
Santene	2.59	883	0.03	1.04	950	0.03
Bornylene	2.85	904	0.04	1.02	948	0.03
Hashishene	3.04	916	0.02	1.34*	1000	[56.40]
Tricyclene	3.08	919	0.16	1.18	974	0.16
α-Thujene	3.20	927	0.48	1.36	1004	0.53
α-Pinene	3.32	935	56.60	1.34*	1000	[56.40]
Camphene	3.45*†	944	0.83	1.61	1030	0.45
α-Fenchene	3.45*†	944	[0.83]	1.55	1023	0.37
Thuja-2,4(10)-diene	3.56	951	0.02	2.17*	1085	0.73
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.81	967	0.05	2.75*	1135	1.28
β-Pinene	3.90*	973	3.20	2.00	1068	2.48
Sabinene	3.90*	973	[3.20]	2.17*	1085	[0.73]
Pseudolimonene isomer	4.01	980	0.01	2.28	1096	0.01
Myrcene	4.21	993	1.23	2.75*	1135	[1.28]
Menthatriene isomer I	4.31	1000	0.01	3.24	1174	0.01
α-Phellandrene	4.36	1003	0.06	2.66	1127	0.07
Δ3-Carene	4.48	1010	21.64	2.50	1116	21.58
α-Terpinene	4.56	1015	0.23	2.83	1141	0.23
meta-Cymene	4.64	1020	0.02	3.93*	1227	0.19
para-Cymene	4.67	1022	0.16	3.93*	1227	[0.19]
Sylvestrene	4.70†	1024	4.29	3.02	1156	0.07
Limonene	4.76*†	1028	[4.29]	3.06	1159	4.02
β-Phellandrene	4.76*†	1028	[4.29]	3.14	1166	0.22
(*Z*)-β-Ocimene	4.96	1040	0.01	3.62*	1204	0.04
(*E*)-β-Ocimene	5.11	1050	0.02	3.82	1219	0.03
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	5.20	1056	0.03	3.62*	1204	[0.04]
γ-Terpinene	5.23	1058	0.36	3.65	1206	0.37
meta-Cymenene	5.60	1080	0.01	6.02	1377	0.01
Isoterpinolene	5.67	1085	0.07	4.06	1236	0.08
Terpinolene	5.70*	1087	1.38	4.12	1241	1.35
para-Cymenene	5.70*	1087	[1.38]	6.12	1384	0.04
α-Pinene oxide	5.80	1093	0.03	5.21	1317	0.03
Linalool	5.94	1101	0.40	7.86*	1515	0.55
endo-Fenchol	6.08	1111	0.01	8.16*	1539	0.09
cis-para-Menth-2-en-1-ol	6.21	1118	0.02	7.92	1520	0.04

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

4-Hydroxy-4-methylcyclohex-2-enone	6.41	1131	0.02	13.76	2025	0.01
trans-Pinocarveol	6.45	1134	0.03	8.94	1601	0.03
Camphor	6.50	1137	0.05	6.99*	1449	0.07
Epoxyterpinolene	6.58	1142	0.04	6.53	1414	0.02
meta-Mentha-4,6-dien-8-ol	6.63	1145	0.02	9.08*	1612	0.13
Karahanaenone	6.72	1151	0.13	7.15	1461	0.13
Borneol	6.89	1162	0.04	9.56*†	1652	1.00
α-Phellandren-8-ol	6.93	1164	0.02	9.95	1684	0.01
Umbellulone	6.99	1168	0.04	8.66*	1578	0.05
Terpinen-4-ol	7.08	1174	1.38	8.36*	1555	1.48
meta-Cymen-8-ol	7.18	1180	0.02	11.25	1794	0.01
para-Cymen-8-ol	7.22	1183	0.03	11.28	1798	0.03
Unknown [m/z 93, 59 (85), 81 (36), 92 (35), 43 (34), 121 (20), 136 (16)...]	7.25	1185	0.02	9.49*	1646	1.10
α-Terpineol	7.30	1188	0.29	9.56*†	1652	[1.00]
Myrtenol	7.38	1193	0.02	10.62	1740	0.01
Unknown [m/z 109, 91 (100), 81 (88), 94 (75), 119 (74), 96 (73), 41 (63)... 150 (2)]	7.52*	1202	0.07	10.59	1737	0.04
Verbenone	7.52*	1202	[0.07]	9.36	1635	0.02
trans-Carveol	7.74	1217	0.02	11.15	1786	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.99	1234	0.03	11.08	1780	0.02
Carvacrol methyl ether	8.13	1243	0.02	8.36*	1555	[1.48]
Car-3-en-2-one	8.20	1248	0.02	10.19*	1703	0.05
(*cis*?)-Linalool oxide acetate (fur.)?	8.28	1252	0.01	7.98*	1524	0.03
Linalyl acetate	8.36	1258	0.02	7.98*	1524	[0.03]
(*trans*?)-Linalool oxide acetate (fur.)?	8.51	1268	0.02	8.47	1564	0.03
Bornyl acetate	8.73	1283	0.34	8.04	1529	0.37
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107 (47), 108 (44)...]	8.92	1296	0.15	8.36*	1555	[1.48]
Terpinen-4-yl acetate	8.96	1298	0.01	8.52	1568	0.01
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	9.22	1316	0.02	11.78	1842	0.02
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...]	9.45	1332	0.01			

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...]	9.54	1339	0.19	9.32	1631	0.23
α-Cubebene	9.67*	1348	1.19	6.63	1422	0.13
α-Terpinyl acetate	9.67*	1348	[1.19]	9.49*	1646	[1.10]
α-Ylangene	9.96	1368	0.01	6.88	1441	0.01
α-Copaene	10.02	1372	0.04	6.99*	1449	[0.07]
β-Bourbonene	10.13	1380	0.01	7.31	1473	0.02
β-Cubebene	10.23	1387	0.01	7.56	1492	0.01
β-Elemene	10.27	1390	0.01	8.22*	1544	0.16
α-Cedrene	10.49*	1406	0.26	7.82	1512	0.09
β-Funebrene	10.49*	1406	[0.26]	7.86*	1515	[0.55]
β-Cedrene	10.60*	1414	0.22	8.16*	1539	[0.09]
β-Caryophyllene	10.60*	1414	[0.22]	8.22*	1544	[0.16]
β-Copaene	10.74*	1424	0.03	8.16*	1539	[0.09]
cis-Thujopsene	10.74*	1424	[0.03]	8.45	1562	0.01
cis-Muurola-3,5-diene	10.98	1442	0.03	8.74	1585	0.02
trans-Muurola-3,5-diene	11.02	1445	0.01	8.66*	1578	[0.05]
α-Humulene	11.06	1448	0.12	9.08*	1612	[0.13]
cis-Muurola-4(15),5-diene	11.19	1458	0.10	9.14	1617	0.08
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.28	1465	0.02	9.39*	1638	0.19
trans-Cadina-1(6),4-diene	11.35	1470	0.02	9.05	1609	0.02
α-Amorphene	11.40	1473	0.09	9.39*	1638	[0.19]
Germacrene D	11.43	1476	0.69	9.58*†	1654	[1.00]
trans-Muurola-4(15),5-diene	11.56	1485	0.02	9.58*†	1654	[1.00]
β-Alaskene	11.63	1490	0.05	9.39*	1638	[0.19]
Epizonarene	11.69	1495	0.04	9.69*	1662	0.07
α-Muurolene	11.72	1497	0.06	9.84	1674	0.11
δ-Amorphene	11.80	1503	0.02	9.69*	1662	[0.07]
α-Alaskene	11.87*	1508	0.11	9.74	1666	0.03
γ-Cadinene	11.87*	1508	[0.11]	10.19*	1703	[0.05]
trans-Calamenene	11.98	1517	0.02	10.98	1771	0.02
δ-Cadinene	12.02	1520	0.19	10.22	1706	0.19
trans-Cadina-1,4-diene	12.11	1528	0.02	10.46	1726	0.02
α-Cadinene	12.18	1533	0.01	10.51	1731	0.01
Salviadienol?	12.39	1550	0.02	14.14	2061	0.02
Caryophyllene oxide	12.71	1574	0.01	12.53	1909	0.01
allo-Cedrol	12.79	1580	0.02	13.99*	2047	1.31
α-Cedrol	12.94	1592	1.30	13.99*	2047	[1.31]
epi-Cedrol	13.08	1603	0.01	14.53	2099	0.01
Torilenol	13.11	1606	0.01	15.16	2163	0.01
α-Acorenol	13.31*	1622	0.03	14.22	2069	0.01

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

1-epi-Cubenol	13.31*	1622	[0.03]	13.53	2003	0.01
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.43	1632	0.04	13.67	2016	0.04
τ-Cadinol	13.48*	1636	0.02	14.65	2111	0.01
τ-Muurolol	13.48*	1636	[0.02]	14.81	2128	0.01
α-Muurolol	13.54	1641	0.01	14.94	2141	0.01
α-Cadinol	13.63	1649	0.02	15.23	2170	0.04
Unknown [m/z 85, 57 (59), 79 (26), 67 (18), 41 (16), 80 (15), 81 (10), 77 (8), 238 (7)]	13.84	1666	0.03			
Manoyl oxide	17.32	1977	0.03	16.20	2271	0.02
7,13-Abietadiene	18.23	2066	0.01	17.10	2367	0.01
Unknown [m/z 191, 81 (47), 95 (41), 69 (39), 109 (32), 93 (32)...]	18.49	2091	0.01	19.68	2662	0.01
Isopimaradiene				15.78	2226	0.01
Total identified		**99.00%**			**98.79%**	
Total reported		**99.55%**			**99.15%**	

*: 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

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com