

Date : June 22, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22F09-SDC01

Customer identification : 2yr

Type : Essential oil

Source : *Oplopanax horridus*

Customer : Southeast Devilsclub

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 : Sylvain Mercier, M. Sc., Chimiste 2014-005

Analysis date : June 14, 2022

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.4906 ± 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
Hexanal	0.01	Aliphatic aldehyde
Heptanal	0.01	Aliphatic aldehyde
(E)-1,3-Nonadiene	0.01	Alkene
α-Pinene	0.90	Monoterpene
Allylbenzene	0.02	Phenylpropanoid
β-Pinene	0.02	Monoterpene
Sabinene	0.03	Monoterpene
Myrcene	0.09	Monoterpene
α-Phellandrene	0.03	Monoterpene
Pseudolimonene	0.01	Monoterpene
Octanal	0.05	Aliphatic aldehyde
Δ ³ -Carene	0.02	Monoterpene
para-Cymene	0.02	Monoterpene
β-Phellandrene	0.35	Monoterpene
Limonene	0.10	Monoterpene
2-Heptyl acetate	0.06	Aliphatic ester
2-Heptyl acetate	0.01	Aliphatic ester
γ-Terpinene	0.01	Monoterpene
Octanol	0.01	Aliphatic alcohol
Linalool	0.06	Monoterpenic alcohol
Nonanal	0.03	Aliphatic aldehyde
(E)-4,8-Dimethyl-1,3,7-nonatriene	0.14	Monoterpene
(2E)-Nonenal	0.01	Aliphatic aldehyde
Ectocarpene?	0.01	Alkene
(3E,5Z)-Undeca-1,3,5-triene	1.67	Alkene
(3E,5E)-Undeca-1,3,5-triene	0.10	Alkene
3-Isobutyl-2-methoxypyrazine	0.04	Pyrazine
(2E)-Octenyl acetate?	0.01	Aliphatic ester
Octyl acetate	0.06	Aliphatic ester
Unknown	0.14	Unknown
2-Nonyl acetate	0.02	Aliphatic ester
Decenol isomer	0.01	Aliphatic alcohol
(2E)-Decenal	0.04	Aliphatic aldehyde
(2E)-Decenol	0.01	Aliphatic alcohol
Decanol	0.02	Aliphatic alcohol
4-Vinylguaiaicol	0.04	Simple phenolic
(2E,4E)-Decadienol?	0.06	Aliphatic alcohol
Bicycloelemene analog	0.02	Sesquiterpene
Bicycloelemene	0.21	Sesquiterpene
α-Cubebene	0.04	Sesquiterpene
Cyclosativene II	0.07	Sesquiterpene
α-Ylangene	0.50	Sesquiterpene
α-Copaene	0.19	Sesquiterpene
cis-β-Elemene	0.02	Sesquiterpene
β-Cubebene	0.01	Sesquiterpene

Geranyl acetate	0.05	Monoterpenic ester
β-Elemene	0.37	Sesquiterpene
α-Gurjunene	0.10	Sesquiterpene
β-Caryophyllene	0.19	Sesquiterpene
α-Santalene	0.04	Sesquiterpene
β-Copaene	0.06	Sesquiterpene
β-Gurjunene	0.04	Sesquiterpene
γ-Elemene	0.32	Sesquiterpene
Aromadendrene	0.30	Sesquiterpene
Cadina-3,5-diene isomer I?	0.03	Sesquiterpene
Unknown	0.10	Sesquiterpene
Cadina-3,5-diene?	0.07	Sesquiterpene
α-Humulene	0.27	Sesquiterpene
allo-Aromadendrene	0.07	Sesquiterpene
cis-Muurolo-4(15),5-diene	0.20	Sesquiterpene
(E)-β-Farnesene	0.55	Sesquiterpene
trans-Cadina-1(6),4-diene	0.06	Sesquiterpene
γ-Murolene	0.19	Sesquiterpene
Germacrene D	1.85	Sesquiterpene
ar-Curcumene	0.55	Sesquiterpene
Unknown	0.11	Sesquiterpene
Bicyclogermacrene	10.12	Sesquiterpene
α-Zingiberene	0.84	Sesquiterpene
Bicyclosesquiphellandrene?	0.27	Sesquiterpene
α-Murolene	0.27	Sesquiterpene
Germacrene A	0.20	Sesquiterpene
Cubebol	0.11	Sesquiterpenic alcohol
γ-Cadinene	2.82	Sesquiterpene
(3E,6E)-α-Farnesene	1.04	Sesquiterpene
δ-Cadinene	1.81	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
β-Sesquiphellandrene	0.82	Sesquiterpene
Unknown	0.03	Sesquiterpene
α-Cadinene	0.19	Sesquiterpene
α-Calacorene	0.04	Sesquiterpene
Germacrene B	2.48	Sesquiterpene
Epiglobulol	0.04	Sesquiterpenic alcohol
Palustrol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
(E)-Nerolidol	52.15	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Spathulenol	1.68	Sesquiterpenic alcohol
Unknown	0.09	Unknown
Globulol	0.27	Sesquiterpenic alcohol
Gleenol	0.08	Sesquiterpenic alcohol
Viridiflorol	0.26	Sesquiterpenic alcohol
Unknown	0.20	Oxygenated sesquiterpene
Guaial	0.18	Sesquiterpenic alcohol
Eudesm-5-en-11-ol analog	0.18	Sesquiterpenic alcohol
10-epi-Cubenol	1.00	Sesquiterpenic alcohol
Rosifoliol	0.04	Sesquiterpenic alcohol
1-epi-Cubenol	0.07	Sesquiterpenic alcohol

Alismol	0.01	Sesquiterpenic alcohol
Cubenol	0.49	Sesquiterpenic alcohol
Isospathulenol	0.29	Sesquiterpenic alcohol
τ -Muurolol	0.27	Sesquiterpenic alcohol
τ -Cadinol	5.75	Sesquiterpenic alcohol
α -Muurolol	0.09	Sesquiterpenic alcohol
β -Eudesmol	0.01	Sesquiterpenic alcohol
Unknown	0.20	Oxygenated sesquiterpene
α -Eudesmol	0.03	Sesquiterpenic alcohol
Ylangenol	0.06	Sesquiterpenic alcohol
α -Cadinol	0.42	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Bulnesol	0.18	Sesquiterpenic alcohol
Unknown	0.21	Oxygenated sesquiterpene
Shyobunol	0.10	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Aromadendrane-4,10-diol	0.03	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
(Z)-Falcarinol	0.10	Polyne
Octadecanol	0.02	Aliphatic alcohol
Unknown	0.11	Oxygenated sesquiterpene
Nootkatol	0.04	Sesquiterpenic alcohol
Consolidated total	96.72%	

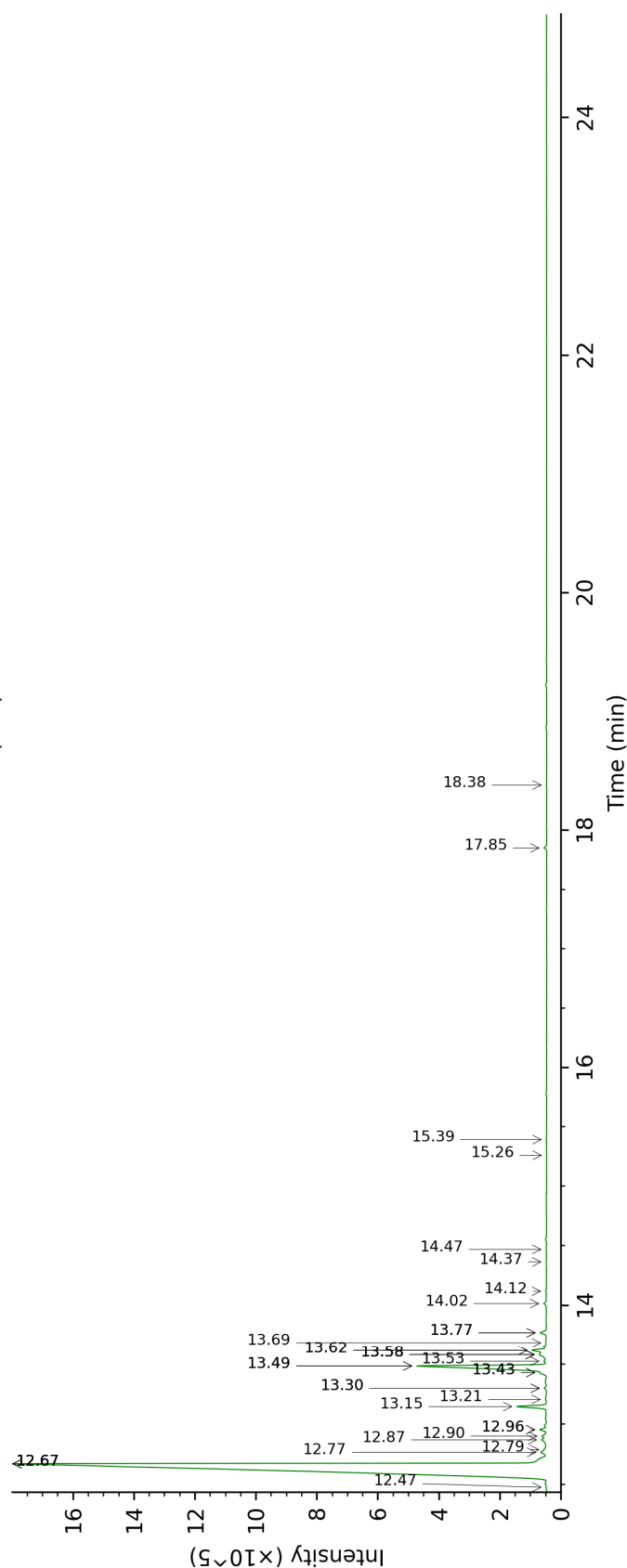
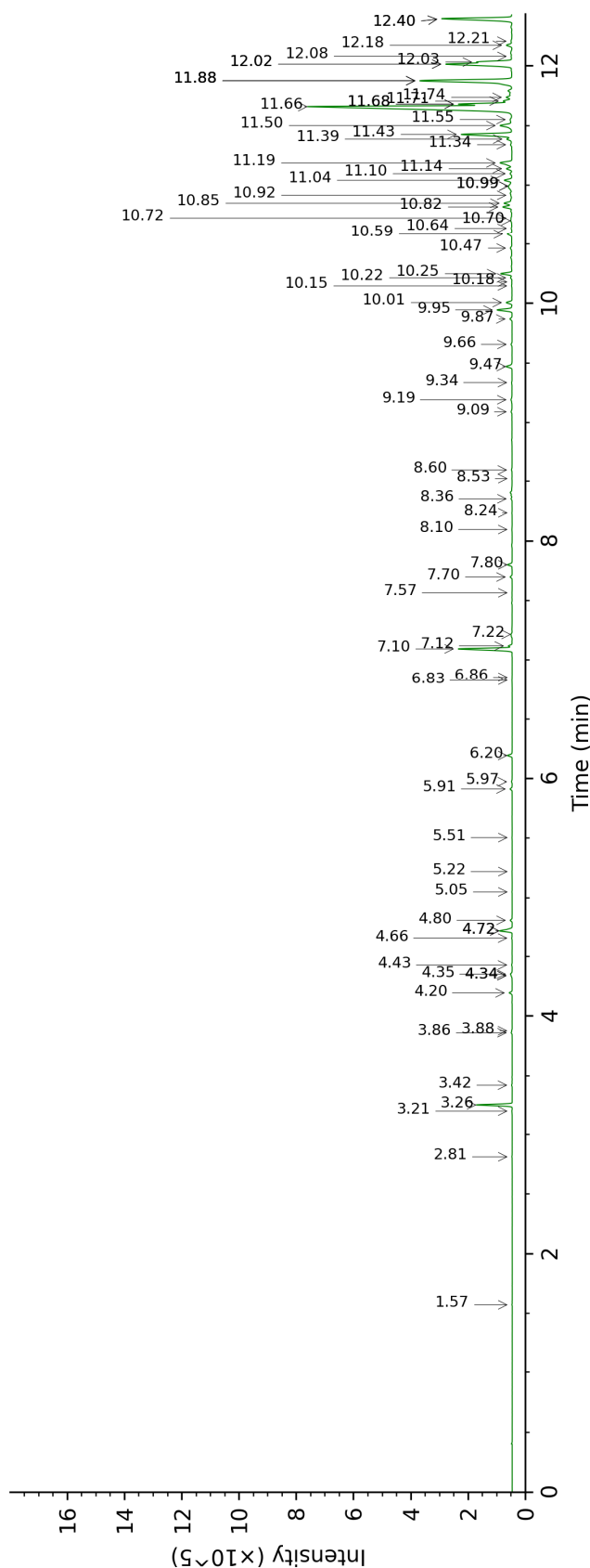
Note: no correction factor was applied

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.

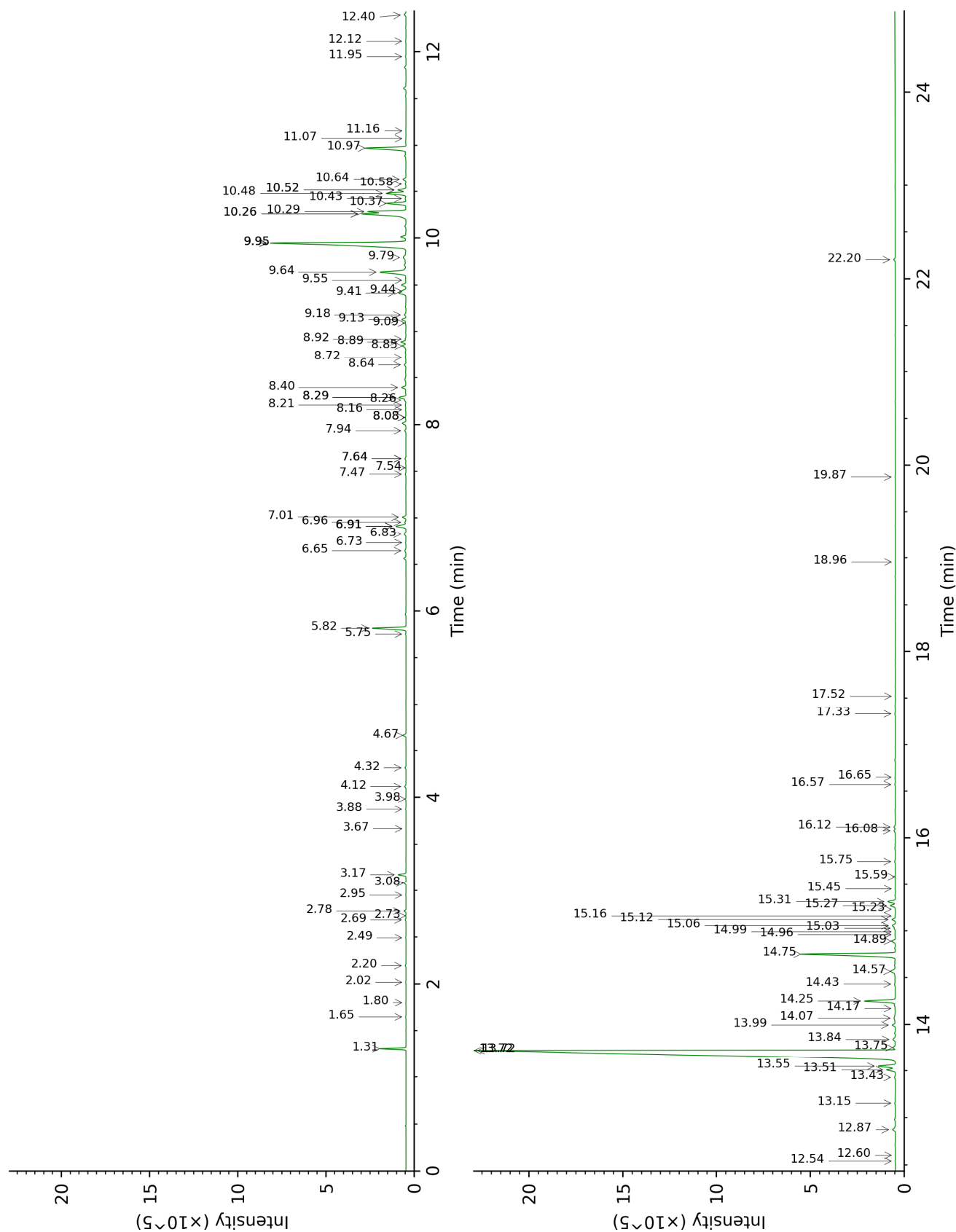
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

DB-5



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Hexanal	1.57	799	0.01	1.80	1044	0.01
Heptanal	2.81	901	0.01	2.95	1147	0.01
(E)-1,3-Nonadiene	3.20	927	0.01	1.65	1028	0.02
α-Pinene	3.26	930	0.90	1.31	991	0.88
Allylbenzene	3.42	941	0.02	3.88	1219	0.02
β-Pinene	3.86†	970	0.04	2.02	1065	0.02
Sabinene	3.88†	971	[0.04]	2.20	1083	0.03
Myrcene	4.20	992	0.09	2.78	1133	0.08
α-Phellandrene	4.34*†	1002	0.09	2.68	1126	0.03
Pseudolimonene	4.34*†	1002	[0.09]	2.73	1129	0.01
Octanal	4.35†	1002	[0.09]	4.32	1251	0.05
Δ3-Carene	4.43	1007	0.02	2.49	1111	0.02
para-Cymene	4.66	1022	0.02	3.98	1227	0.02
β-Phellandrene	4.72*	1025	0.45	3.18	1164	0.35
Limonene	4.72*	1025	[0.45]	3.08	1157	0.10
2-Heptyl acetate	4.80	1031	0.06			
2-Heptyl acetate	5.05	1046	0.01	4.12	1237	0.07
γ-Terpinene	5.22	1057	0.01	3.67	1203	0.01
Octanol	5.51	1075	0.01	8.08*	1527	0.05
Linalool	5.91	1101	0.06	7.94	1516	0.07
Nonanal	5.98	1104	0.03	5.76	1354	0.02
(E)-4,8-Dimethyl-1,3,7-nonatriene	6.20	1119	0.14	4.66	1277	0.14
(2E)-Nonenal	6.83	1160	0.01	7.54	1486	0.01
Ectocarpene?	6.86	1162	0.01			
(3E,5Z)-Undeca-1,3,5-triene	7.10	1177	1.67	5.82	1358	1.67
(3E,5E)-Undeca-1,3,5-triene	7.12	1179	0.10			
3-Isobutyl-2-methoxypyrazine	7.22	1185	0.04	7.64*	1493	0.05
(2E)-Octenyl acetate?	7.57	1208	0.01			
Octyl acetate	7.70	1217	0.06	6.96	1442	0.06
Unknown [m/z 79, 71 (69), 59 (66), 43 (59), 81 (53), 41 (52), 93 (50)...]	7.80	1224	0.14			
2-Nonyl acetate	8.10	1244	0.02	6.91*	1439	0.66
Decenol isomer	8.24	1253	0.01			
(2E)-Decenal	8.36	1261	0.04	8.92	1593	0.04
(2E)-Decenol	8.52	1273	0.01	11.16	1778	0.01
Decanol	8.60	1278	0.02	10.58	1729	0.03
4-Vinylguaiaacol	9.09	1307	0.04	14.96	2131	0.05
(2E,4E)-Decadienol?	9.19	1314	0.06			
Bicycloelemene analog	9.34	1325	0.02	6.73	1425	0.03
Bicycloelemene	9.47	1334	0.21	6.91*	1439	[0.66]
α-Cubebene	9.66	1347	0.04	6.65	1419	0.08
Cyclosativene II	9.87	1362	0.07	6.82	1432	0.10
α-Ylangene	9.95	1368	0.50	6.91*	1439	[0.66]
α-Copaene	10.01	1372	0.19	7.01	1446	0.19
cis-β-Elemene	10.15	1382	0.02	8.16	1534	0.03

β-Cubebene	10.18	1384	0.01	7.64*	1493	[0.05]
Geranyl acetate	10.22	1387	0.05	10.42	1716	0.05
β-Elementene	10.25	1389	0.37	8.29*†	1544	[0.46]
α-Gurjunene	10.47	1404	0.10	7.47	1481	0.04
β-Caryophyllene	10.59	1414	0.19	8.29*†	1544	[0.46]
α-Santalene	10.64	1417	0.04	8.08*	1527	[0.05]
β-Copaene	10.70	1422	0.06	8.26†	1542	0.46
β-Gurjunene	10.72	1424	0.04	8.21	1537	0.05
γ-Elementene	10.82	1431	0.32	8.89	1591	0.28
Aromadendrene	10.85	1433	0.30	8.40	1552	0.27
Cadina-3,5-diene isomer I?	10.92	1438	0.03			
Unknown [m/z 91, 161 (92), 105 (85), 119 (63), 133 (53), 79 (49), 204 (46)]	10.99*	1444	0.29	8.64	1571	0.10
Cadina-3,5-diene?	10.99*	1444	[0.29]	8.72	1578	0.07
α-Humulene	11.04	1447	0.27	9.13	1610	0.24
allo-Aromadendrene	11.10	1452	0.07	8.85	1587	0.24
cis-Muurolo-4(15),5-diene	11.14	1455	0.20	9.18	1614	0.09
(E)-β-Farnesene	11.19	1458	0.55	9.42†	1633	0.68
trans-Cadina-1(6),4-diene	11.34	1470	0.06	9.09	1607	0.05
γ-Muuroloene	11.39	1473	0.19	9.44†	1635	[0.68]
Germacrene D	11.43	1476	1.85	9.64	1651	1.96
ar-Curcumene	11.50	1482	0.55	10.52*†	1724	[1.57]
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.55	1485	0.11	9.55	1644	0.04
Bicyclogermacrene	11.66	1493	10.12	9.95*	1676	11.24
α-Zingiberene	11.68*	1495	1.52	9.95*	1676	[11.24]
Bicyclosesquiphellandrene?	11.68*	1495	[1.52]	9.80	1664	0.27
α-Muuroloene	11.71	1497	0.27	9.95*	1676	[11.24]
Germacrene A	11.74	1499	0.20	10.26*	1702	3.16
Cubebol	11.88*	1510	3.97	12.40	1888	0.11
γ-Cadinene	11.88*	1510	[3.97]	10.26*	1702	[3.16]
(3E,6E)-α-Farnesene	11.88*	1510	[3.97]	10.37	1711	1.04
δ-Cadinene	12.02*	1521	2.61	10.28	1704	1.81
trans-Calamenene	12.02*	1521	[2.61]	11.07	1771	0.01
β-Sesquiphellandrene	12.03	1522	0.82	10.48†	1721	1.57
Unknown [m/z 119, 105 (53), 161 (33), 93 (28), 91 (25), 40 (20)...204]	12.08	1526	0.03	10.52*†	1724	[1.57]
α-Cadinene	12.18	1533	0.19	10.64	1734	0.17
α-Calacorene	12.21	1536	0.04	11.95	1848	0.03
Germacrene B	12.40*	1551	2.50	10.97	1762	2.48
Epiglobulol	12.40*	1551	[2.50]	13.16	1958	0.04
Palustrol	12.48	1557	0.02	12.12	1863	0.02
Caryophyllene oxide	12.67*	1572	54.54	12.60	1906	0.02
(E)-Nerolidol	12.67*	1572	[54.54]	13.72*	2010	52.22
Caryophyllene oxide isomer	12.67*	1572	[54.54]	12.54	1901	0.02
Spathulenol	12.67*	1572	[54.54]	14.25	2062	1.68

Unknown [m/z 43, 96 (56), 81 (46), 79 (43), 91 (42), 69 (39)...]	12.67*	1572	[54.54]	14.43	2079	0.09
Globulol	12.77	1580	0.27	13.75	2014	0.16
Gleenol	12.79	1582	0.08	13.43	1983	0.07
Viridiflorol	12.87	1588	0.26	13.84	2022	0.19
Unknown [m/z 120, 59 (55), 121 (24), 93 (24), 81 (23), 107 (20)...]	12.90	1591	0.20	14.57	2092	0.44
Guaiol	12.96*	1595	0.23	13.99	2037	0.18
Eudesm-5-en-11-ol analog	12.96*	1595	[0.23]	14.07	2044	0.18
10-epi-Cubenol	13.15	1610	1.00	13.55	1994	0.95
Rosifolol	13.21	1615	0.04	14.17	2054	0.04
1-epi-Cubenol	13.30*	1623	0.08	13.72*	2010	[52.22]
Alismol	13.30*	1623	[0.08]	15.59	2195	0.01
Cubenol	13.43*†	1634	6.35	13.51	1991	0.49
Isospathulenol	13.43*†	1634	[6.35]	15.27	2163	0.29
τ-Muurolol	13.49*†	1638	[6.35]	14.89	2124	0.27
τ-Cadinol	13.49*†	1638	[6.35]	14.75	2110	5.75
α-Muurolol	13.53	1642	0.09	15.03	2138	0.07
β-Eudesmol	13.58*	1646	0.40	15.23	2159	0.01
Unknown [m/z 204, 161 (97), 59 (87), 189 (78), 105 (45)...]	13.58*	1646	[0.40]	15.06	2141	0.20
α-Eudesmol	13.58*	1646	[0.40]	15.16	2152	0.03
Ylangenol	13.58*	1646	[0.40]	15.75	2212	0.06
α-Cadinol	13.62*	1649	0.55	15.31	2167	0.42
Unknown [m/z 202, 187 (89), 121 (45), 105 (42), 93 (40), 95 (38)...]	13.62*	1649	[0.55]	15.45	2181	0.04
Unknown [m/z 59, 81 (40), 149 (34), 161 (34), 107 (29)... 204 (19)]	13.68	1655	0.03	14.99	2135	0.01
Bulnesol	13.77*	1662	0.26	15.12	2148	0.18
Unknown [m/z 93, 43 (82), 119 (62), 162 (51), 91 (50), 147 (42)... 220 (2)]	13.77*	1662	[0.26]	12.87	1932	0.21
Shyobunol	14.02	1682	0.10	16.12	2250	0.10
Unknown [m/z 69, 41 (59), 118 (33), 43 (32), 55 (31)... 234? (t)]	14.12	1691	0.03	16.57	2298	0.04
Aromadendrane-4,10-diol	14.37	1711	0.03	16.65	2306	0.02
Unknown [m/z 159, 220 (92), 93 (88), 177 (63), 91 (57), 107 (55)]	14.47	1720	0.03	17.52	2400	0.02
Unknown [m/z 69, 41 (96), 43 (90), 109 (51), 55 (42), 81 (33)...]	15.26	1789	0.01			
Unknown [m/z 69, 43 (95), 41 (84), 109 (78), 95 (54), 93 (49)... 177 (36), 220 (2)...]	15.39	1800	0.02	19.87	2672	0.02
(Z)-Falcarinol	17.85	2031	0.10	22.20	2968	0.09

Octadecanol	18.38	2083	0.02	18.96	2564	0.02
Unknown [m/z 159, 93 (89), 205 (88), 91 (81), 107 (75), 105 (74), 119 (70)... 220 (16)]				16.08	2246	0.11
Nootkatol				17.33	2379	0.04
Total identified		97.31%			95.04%	
Total reported		97.89%			96.36%	

*: 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

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index