

Date : July 26, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 19L27-PTH02

Customer identification : Basil Linalool ORGANIC - Egypt – B2010299R

Type : Essential oil

Source : *Ocimum basilicum* ct. Linalool

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-007 - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sarah-Eve Tremblay, M. Sc. A., Chimiste

Analysis date : February 11, 2020

Checked and approved by :

Sylvain Mercier, M. Sc., chimiste 2014-005

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

The report was updated from the first version issued on February 11, 2020, to make a minor correction.

PHYSICOCHEMICAL DATA

Refractive index: 1.4758 ± 0.0003 (20 °C)

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	%	Classe
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
(2E)-Hexenal	tr	Aliphatic aldehyde
(3Z)-Hexenol	0.02	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
Hashishene	0.01	Monoterpene
α -Thujene	0.04	Monoterpene
α -Pinene	0.45	Monoterpene
Camphene	0.09	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Benzaldehyde	0.01	Simple phenolic
β -Pinene	0.93	Monoterpene
Sabinene	0.45	Monoterpene
Octen-3-ol	0.04	Aliphatic alcohol
Octan-3-one	0.04	Aliphatic ketone
Myrcene	0.97	Monoterpene
Octan-3-ol	0.01	Aliphatic alcohol
α -Phellandrene	0.03	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
(3Z)-Hexenyl acetate	0.03	Aliphatic ester
α -Terpinene	0.07	Monoterpene
ortho-Cymene	tr	Monoterpene
para-Cymene	0.13	Monoterpene
Limonene	0.42	Monoterpene
1,8-Cineole	9.03	Monoterpenic ether
(Z)- β -Ocimene	0.06	Monoterpene
(E)- β -Ocimene	0.63	Monoterpene
γ -Terpinene	0.08	Monoterpene
cis-Sabinene hydrate	0.11	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.05	Monoterpenic alcohol
Octanol	0.05	Aliphatic alcohol
trans-Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Terpinolene	0.14	Monoterpene
6,7-Epoxyterpinene	0.03	Monoterpenic ether
Phenylethyl alcohol	0.01	Simple phenolic
Linalool	50.11	Monoterpenic alcohol
Octen-3-yl acetate	0.07	Aliphatic ester
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
(Z)-Myroxide	0.01	Monoterpenic ether
Camphor	0.53	Monoterpenic ketone
(E)-Myroxide	0.17	Monoterpenic ether
Isomenthone	0.01	Monoterpenic ketone
Borneol	0.13	Monoterpenic alcohol
δ -Terpineol	0.17	Monoterpenic alcohol
Terpinen-4-ol	0.50	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α -Terpineol	0.91	Monoterpenic alcohol

Methylchavicol	0.78	Phenylpropanoid
Octyl acetate	0.24	Aliphatic ester
Nerol	0.06	Monoterpenic alcohol
Citronellol	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Geraniol	0.11	Monoterpenic alcohol
Linalyl acetate	0.04	Monoterpenic ester
Chavicol	0.01	Phenylpropanoid
Geranial	0.01	Monoterpenic aldehyde
Citronellyl formate	0.02	Monoterpenic ester
Bornyl acetate	1.07	Monoterpenic ester
Lavandulyl acetate	0.01	Monoterpenic ester
<i>trans</i> -Pinocarvyl acetate	0.02	Monoterpenic ester
Geranyl formate	0.01	Monoterpenic ester
exo-2-Hydroxycineole acetate	0.39	Monoterpenic ester
α -Cubebene	0.12	Sesquiterpene
Eugenol	5.67	Phenylpropanoid
Neryl acetate	0.01	Monoterpenic ester
α -Copaene	0.20	Sesquiterpene
β -Bourbonene	0.26	Sesquiterpene
1,5-diepi- β -Bourbonene	0.02	Sesquiterpene
<i>cis</i> - β -Elemene	0.15	Sesquiterpene
Geranyl acetate	0.04	Monoterpenic ester
β -Elemene	3.06	Sesquiterpene
Unknown	0.07	Unknown
α -Gurjunene	tr	Sesquiterpene
Methyleugenol	0.14	Phenylpropanoid
α -Cedrene	0.01	Sesquiterpene
β -Caryophyllene	0.78	Sesquiterpene
<i>cis</i> - α -Bergamotene	0.13	Sesquiterpene
β -Copaene	0.35	Sesquiterpene
β -Gurjunene	0.04	Sesquiterpene
α -Guaiene	5.90*	Sesquiterpene
<i>trans</i> - α -Bergamotene	[5.90]*	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	0.13	Sesquiterpene
Cadina-4,11-diene	0.18	Sesquiterpene
α -Humulene	1.22	Sesquiterpene
allo-Aromadendrene	0.05	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.50	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.11	Sesquiterpene
γ -Muurolole	0.21	Sesquiterpene
Germacrene D	0.54	Sesquiterpene
β -Selinene	0.16	Sesquiterpene
allo-Aromadendr-9-ene	0.36*	Sesquiterpene
<i>trans</i> - β -Bergamotene	[0.36]*	Sesquiterpene
Viridiflorene	0.05	Sesquiterpene
Bicyclogermacrene	0.07	Sesquiterpene
Germacrene A	0.29	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.05	Sesquiterpene
δ -Guaiene	1.22	Sesquiterpene
γ -Cadinene	2.87	Sesquiterpene
(<i>Z</i>)- γ -Bisabolene	0.27	Sesquiterpene

<i>trans</i> -Calamenene	0.01	Sesquiterpene
δ-Cadinene	0.48	Sesquiterpene
β-Sesquiphellandrene	0.15	Sesquiterpene
α-Cadinene	0.16	Sesquiterpene
Maaliol	0.14	Sesquiterpenic alcohol
(<i>E</i>)-Nerolidol	0.12	Sesquiterpenic alcohol
Spathulenol	0.14	Sesquiterpenic alcohol
Globulol	tr	Sesquiterpenic alcohol
Viridiflorol	0.01	Sesquiterpenic alcohol
10-epi-γ-Eudesmol	0.02	Sesquiterpenic alcohol
10-epi-Cubenol	0.34	Sesquiterpenic alcohol
τ-Cadinol	1.52	Sesquiterpenic alcohol
β-Eudesmol	0.07	Sesquiterpenic alcohol
α-Eudesmol	0.02	Sesquiterpenic alcohol
α-Cadinol	0.05	Sesquiterpenic alcohol
α-Bisabolol	0.02	Sesquiterpenic alcohol
Unknown	0.01	Lignan
Mint sulfide?	tr	Sesquiterpenic sulfide
Consolidated total	97.92%	

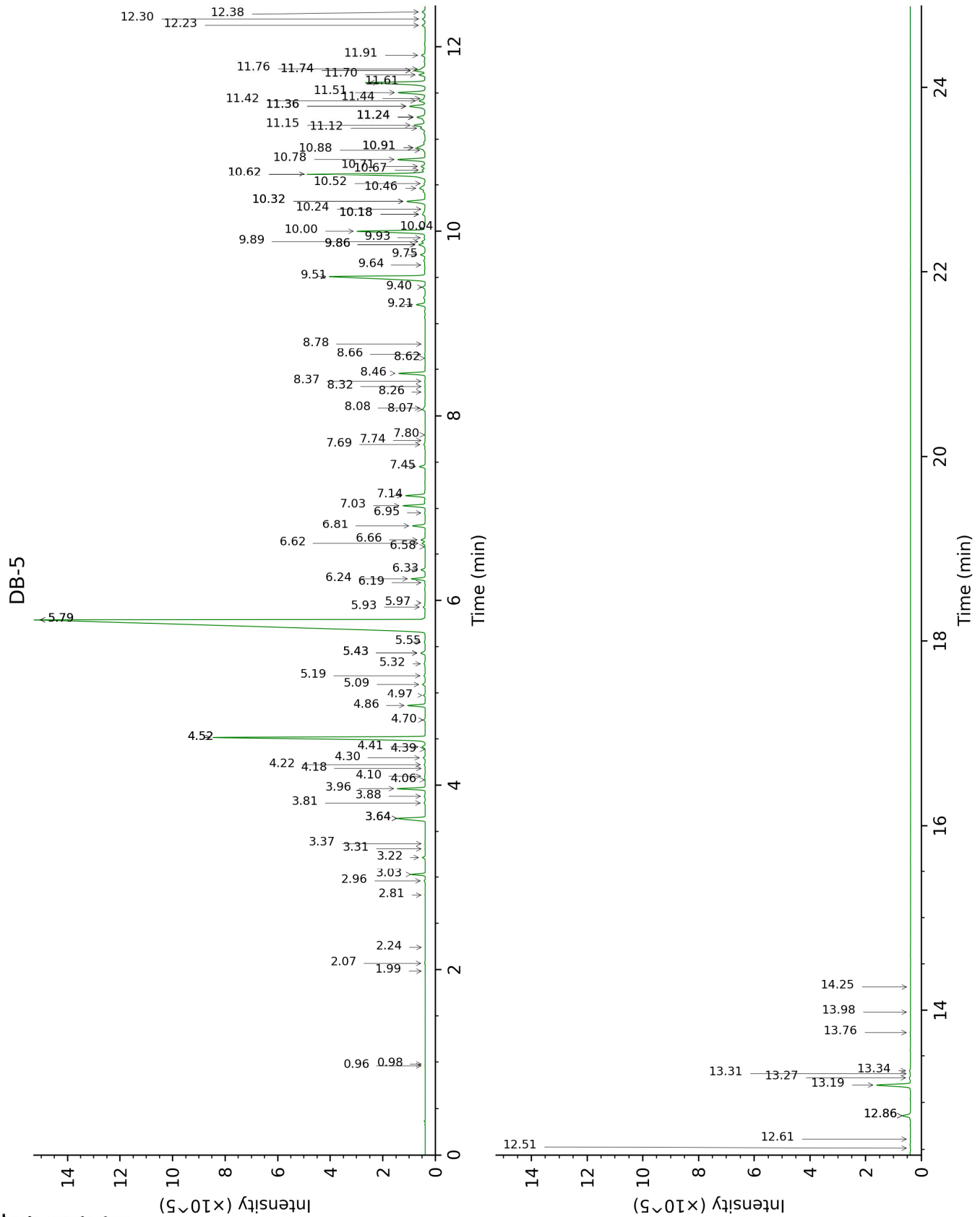
*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered [xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of total signal.

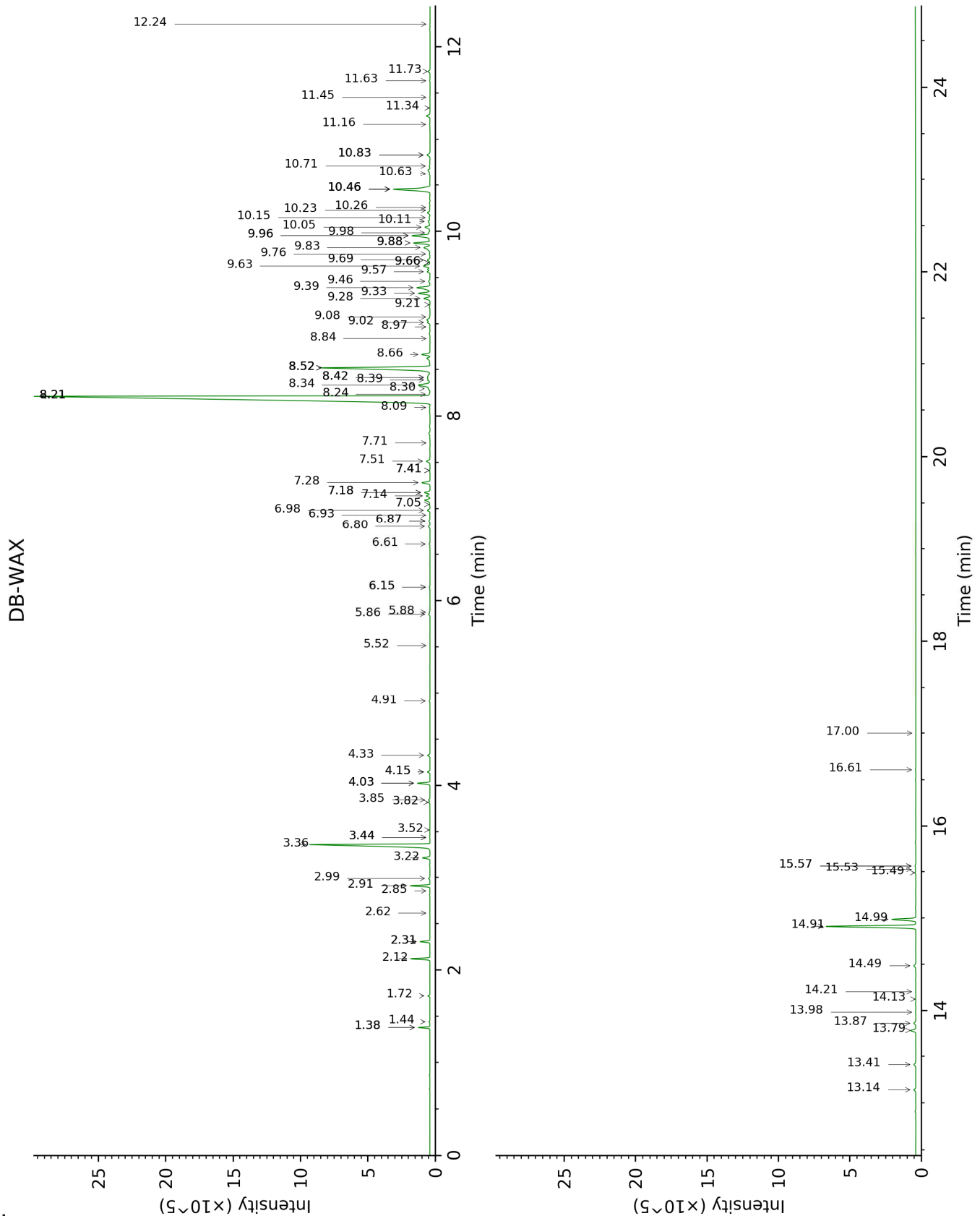
Note: no correction factor was applied

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.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isoamyl alcohol	0.96	736	0.01	3.52	1180	0.01
2-Methylbutanol	0.98	739	tr	3.44*	1173	0.02
(2E)-Hexenal	1.99	849	tr	3.44*	1173	[0.02]
(3Z)-Hexenol	2.07	856	0.02	5.88	1350	0.03
Hexanol	2.24	870	tr	5.52	1324	0.01
Hashishene	2.81	914	0.01	1.38*	989	0.46
α -Thujene	2.96	924	0.04	1.44	996	0.04
α -Pinene	3.03	928	0.45	1.38*	989	[0.46]
Camphene	3.22	941	0.09	1.72	1024	0.09
Thuja-2,4(10)-diene	3.31	947	0.01	2.31*	1082	0.48
Benzaldehyde	3.37	951	0.01	7.41*	1462	0.03
β -Pinene	3.64*	969	1.38	2.12	1064	0.93
Sabinene	3.64*	969	[1.38]	2.31*	1082	[0.48]
Octen-3-ol	3.81	980	0.04	6.87*	1422	0.09
Octan-3-one	3.88	985	0.04	4.02*	1217	0.68
Myrcene	3.96	990	0.97	2.91	1132	0.98
Octan-3-ol	4.06	997	0.01	6.15*	1369	0.04
α -Phellandrene	4.10	999	0.03	2.86	1128	0.01
Δ^3 -Carene	4.18	1005	0.01	2.62	1109	0.01
(3Z)-Hexenyl acetate	4.22	1007	0.03	4.91	1282	0.04
α -Terpinene	4.30	1012	0.07	2.99	1138	0.07
ortho-Cymene	4.39	1018	tr	4.15*	1226	0.14
para-Cymene	4.41	1020	0.13	4.15*	1226	[0.14]
Limonene	4.52*	1026	9.61	3.22	1156	0.42
1,8-Cineole	4.52*	1026	[9.61]	3.36	1167	9.03
(Z)- β -Ocimene	4.70	1038	0.06	3.82	1202	0.06
(E)- β -Ocimene	4.86	1048	0.63	4.02*	1217	[0.68]
γ -Terpinene	4.97	1055	0.08	3.84	1204	0.08
cis-Sabinene hydrate	5.10	1063	0.11	6.98	1430	0.19
cis-Linalool oxide (fur.)	5.19	1069	0.05	6.61	1403	0.05
Octanol	5.32	1077	0.05	8.24	1524	0.03
trans-Linalool oxide (fur.)	5.43*	1085	0.20	6.93	1426	0.03
Terpinolene	5.43*	1085	[0.20]	4.33	1239	0.14
6,7-Epoxyterpinene	5.55	1092	0.03	6.15*	1369	[0.04]
Phenylethyl alcohol	5.79*†	1108	50.12	12.24	1853	0.01
Linalool	5.79*†	1108	[50.12]	8.21*	1522	50.25
Octen-3-yl acetate	5.93	1117	0.07	5.86	1348	0.08
cis-para-Menth-2-en-1-ol	5.98	1120	0.01	8.21*	1522	[50.25]
(Z)-Myroxide	6.19	1134	0.01	6.87*	1422	[0.09]
Camphor	6.24	1137	0.53	7.28	1452	0.53
(E)-Myroxide	6.33	1144	0.17	7.18*	1444	0.36
Isomenthone	6.58	1160	0.01	7.05	1435	0.04
Borneol	6.62	1163	0.13	9.88*	1653	1.04

δ-Terpineol	6.66	1165	0.17	9.57	1628	0.17
Terpinen-4-ol	6.81	1175	0.50	8.66	1557	0.51
para-Cymen-8-ol	6.95	1185	0.02	11.63	1800	0.03
α-Terpineol	7.03	1190	0.91	9.88*	1653	[1.04]
Methylchavicol	7.14	1198	0.78	9.33	1609	0.79
Octyl acetate	7.45	1219	0.24	7.14	1442	0.24
Nerol	7.69	1232	0.06	11.16	1760	0.03
Citronellol	7.74	1235	0.01	10.83*	1732	0.24
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.80	1239	0.01	11.45	1784	0.01
Geraniol	8.07	1257	0.11	11.73	1808	0.14
Linalyl acetate	8.08	1258	0.04	8.21*	1522	[50.25]
Chavicol	8.26	1270	0.01	16.61	2271	0.02
Geranial	8.32	1274	0.01	10.23	1681	0.02
Citronellyl formate	8.37	1278	0.02	8.97	1580	0.01
Bornyl acetate	8.46	1283	1.07	8.34	1532	1.08
Lavandulyl acetate	8.62	1294	0.01	8.84	1571	tr
<i>trans</i> -Pinocarvyl acetate	8.66	1297	0.02	9.21	1599	0.01
Geranyl formate	8.78	1305	0.01	9.98	1662	0.09
exo-2-Hydroxycineole acetate	9.21	1334	0.39	10.05	1667	0.39
α-Cubebene	9.40	1348	0.12	6.80	1417	0.12
Eugenol	9.51	1356	5.67	14.91	2101	5.70
Neryl acetate	9.64	1364	0.01	10.26	1684	0.02
α-Copaene	9.75	1372	0.20	7.18*	1444	[0.36]
β-Bourbonene	9.86*	1380	0.31	7.51	1469	0.26
1,5-diepi-β-Bourbonene	9.86*	1380	[0.31]	7.41*	1462	[0.03]
<i>cis</i> -β-Elemene	9.89	1382	0.15	8.39†	1536	0.52
Geranyl acetate	9.93	1385	0.04	10.63	1715	0.04
β-Elemene	10.00	1390	3.06	8.52*	1546	8.92
Unknown [m/z 161, 105 (83), 119 (69), 81 (34), 91 (29), 93 (28)...204]	10.04	1392	0.07			
α-Gurjunene	10.18*	1403	0.18	7.71	1484	tr
Methyleugenol	10.18*	1403	[0.18]	13.41	1959	0.14
α-Cedrene	10.24	1407	0.01	8.09	1513	0.03
β-Caryophyllene	10.32*	1413	0.91	8.52*	1546	[8.92]
<i>cis</i> -α-Bergamotene	10.32*	1413	[0.91]	8.30	1529	0.13
β-Copaene	10.46	1423	0.35	8.42*†	1538	[0.52]
β-Gurjunene	10.52	1427	0.04	8.42*†	1538	[0.52]
α-Guaiene	10.62*	1435	5.90	8.52*	1546	[8.92]
<i>trans</i> -α-Bergamotene	10.62*	1435	[5.90]	8.52*	1546	[8.92]
<i>cis</i> -Muurolo-3,5-diene	10.67	1438	0.13	9.02	1584	0.17
Cadina-4,11-diene	10.71	1442	0.18	9.28	1605	0.46

α-Humulene	10.78	1447	1.22	9.39	1614	1.12
allo-Aromadendrene	10.88	1454	0.05	9.08	1589	0.01
(E)-β-Farnesene	10.91*	1456	0.56	9.63	1633	0.50
cis-Muurolo-4(15),5-diene	10.91*	1456	[0.56]	9.46	1620	0.11
γ-Muurolole	11.12	1472	0.21	9.69	1638	0.19
Germacrene D	11.15	1474	0.54	9.83	1649	0.62
β-Selinene	11.24*†	1481	0.53	9.96*	1659	1.38
allo-Aromadendr-9-ene	11.24*†	1481	[0.53]	9.66*	1636	0.02
trans-β-Bergamotene	11.24*†	1481	[0.53]	9.66*	1636	[0.02]
Viridiflorene	11.36*	1490	0.81	9.76	1643	0.05
Bicyclogermacrene	11.36*	1490	[0.81]	10.15	1675	0.07
Germacrene A	11.42	1494	0.29	10.46*	1700	3.10
(Z)-α-Bisabolene	11.44	1496	0.05	10.46*	1700	[3.10]
δ-Guaiene	11.50	1501	1.22	9.96*	1659	[1.38]
γ-Cadinene	11.61	1509	2.87	10.46*	1700	[3.10]
(Z)-γ-Bisabolene	11.70	1515	0.27	10.11	1672	0.14
trans-Calamenene	11.74*	1519	0.49	11.34	1774	0.01
δ-Cadinene	11.74*	1519	[0.49]	10.46*	1700	[3.10]
β-Sesquiphellandrene	11.76	1520	0.15	10.71	1722	0.06
α-Cadinene	11.91	1532	0.16	10.83*	1732	[0.24]
Maaliol	12.23	1557	0.14	13.14	1934	0.12
(E)-Nerolidol	12.30	1563	0.12	13.86	2000	0.13
Spathulenol	12.38	1569	0.14	14.49	2060	0.14
Globulol	12.51	1579	tr	13.98	2012	0.02
Viridiflorol	12.61	1587	0.01	14.13	2025	0.01
10-epi-γ-Eudesmol	12.86*	1607	0.36	14.21	2033	0.02
10-epi-Cubenol	12.86*	1607	[0.36]	13.79	1993	0.34
τ-Cadinol	13.19	1634	1.52	14.99	2108	1.50
β-Eudesmol	13.27	1640	0.07	15.53	2162	0.03
α-Eudesmol	13.31	1644	0.02	15.49	2158	0.04
α-Cadinol	13.34	1647	0.05	15.57*	2166	0.05
α-Bisabolol	13.76	1681	0.02	15.57*	2166	[0.05]
Unknown [m/z 133, 93 (97), 131 (85), 145 (83), 107 (69)...220]	13.98	1699	0.01	17.00	2313	tr
Mint sulfide?	14.25	1723	tr			
Total identified		98.74%			96.58%	
Total reported		98.84%			96.60%	

*: 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