

Date : November 17, 2020

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20K10-PTH05


Customer identification : Basilic Linalool - Egypt - B10108205R

Type : Essential oil

Source : *Ocimum basilicum* ct. Linalool

Customer : Plant Therapy

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 : Fanny Charlier, B. Sc., chimiste à l'entraînement

Analysis date : November 12, 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: 1.4761 ± 0.0003 (20 °C; method PC-MAT-016)

NFT 75-244:1992 - OIL OF BASIL, LINALOOL TYPE

Compound	Min. %	Max. %	Observed %	Complies?
Eugenol	2	15	6	Yes
Methylchavicol	tr	30.0	0.7	Yes
Terpinen-4-ol	tr	4.00	0.51	Yes
Linalool	45.0	62.0	47.8	Yes
Camphor	0.2	1.5	0.5	Yes
(E)-β-Ocimene	0.2	2.0	0.8	Yes
1,8-Cineole	2.0	8.0	9.6	No
Refractive index	1.4750	1.4950	1.4761	Yes

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
Ethanol	0.04	Aliphatic alcohol
Isobutyral	tr	Aliphatic aldehyde
Isovaleral	0.02	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
(2E)-Hexenal	tr	Aliphatic aldehyde
(3Z)-Hexenol	0.01	Aliphatic alcohol
α -Thujene	0.03	Monoterpene
α -Pinene	0.53	Monoterpene
Camphene	0.10	Monoterpene
α -Fenchene	tr	Monoterpene
β -Pinene	1.01	Monoterpene
Sabinene	0.52	Monoterpene
Octan-3-one	0.04	Aliphatic ketone
Myrcene	1.06	Monoterpene
Octan-3-ol	0.01	Aliphatic alcohol
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.02	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
(3Z)-Hexenyl acetate	0.03	Aliphatic ester
α -Terpinene	0.08	Monoterpene
ortho-Cymene	0.01	Monoterpene
para-Cymene	0.11	Monoterpene
Limonene	0.44	Monoterpene
1,8-Cineole	9.58	Monoterpenic ether
(Z)- β -Ocimene	0.07	Monoterpene
(E)- β -Ocimene	0.82	Monoterpene
γ -Terpinene	0.10	Monoterpene
cis-Sabinene hydrate	0.14	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.04	Monoterpenic alcohol
Octanol	0.07	Aliphatic alcohol
Terpinolene	0.16	Monoterpene
trans-Linalool oxide (fur.)	0.04	Monoterpenic alcohol
6,7-Epoxymyrcene	0.04	Monoterpenic ether
Linalool	47.79	Monoterpenic alcohol
Octen-3-yl acetate	0.07	Aliphatic ester
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
(Z)-Myroxide	0.02	Monoterpenic ether
Camphor	0.52	Monoterpenic ketone
(E)-Myroxide	0.21	Monoterpenic ether
Borneol	0.13	Monoterpenic alcohol
δ -Terpineol	0.17	Monoterpenic alcohol
Terpinen-4-ol	0.51	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol

α-Terpineol	0.90	Monoterpenic alcohol
Methylchavicol	0.72	Phenylpropanoid
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.04	Monoterpenic alcohol
Octyl acetate	0.26	Aliphatic ester
Nerol	0.02	Monoterpenic alcohol
Citronellol	0.14	Monoterpenic alcohol
Carvone	0.02	Monoterpenic ketone
Geraniol	0.16	Monoterpenic alcohol
Dihydrolinalyl acetate	0.01	Synthetic
Citronellyl formate	0.01	Monoterpenic ester
Bornyl acetate	1.07	Monoterpenic ester
Lavandulyl acetate	0.01	Monoterpenic ester
Geranyl formate	0.02	Monoterpenic ester
δ-Elemene isomer	0.02	Sesquiterpene
exo-2-Hydroxycineole acetate	0.09	Monoterpenic ester
α-Cubebene	0.08	Sesquiterpene
Eugenol	5.78	Phenylpropanoid
Neryl acetate	0.02	Monoterpenic ester
α-Copaene	0.18	Sesquiterpene
β-Bourbonene	0.26	Sesquiterpene
1,5-diepi-β-Bourbonene	0.01	Sesquiterpene
cis-β-Elemene	0.08	Sesquiterpene
β-Cubebene	0.15	Sesquiterpene
β-Elemene	1.43	Sesquiterpene
Unknown	0.09	Unknown
Methyleugenol	0.12	Phenylpropanoid
α-Gurjunene	0.02	Sesquiterpene
β-Caryophyllene	0.30	Sesquiterpene
β-Cedrene	0.08	Sesquiterpene
β-Copaene	0.05	Sesquiterpene
β-Gurjunene	0.17	Sesquiterpene
trans-α-Bergamotene	5.59*	Sesquiterpene
α-Guaiene	[5.59]*	Sesquiterpene
cis-Muurolo-3,5-diene	0.19	Sesquiterpene
cis-β-Bergamotene?	0.03	Sesquiterpene
Cadina-4,11-diene	0.01	Sesquiterpene
α-Humulene	0.74	Sesquiterpene
(E)-β-Farnesene	0.57	Sesquiterpene
Germacrene D	3.02	Sesquiterpene
β-Selinene	0.50	Sesquiterpene
Viridiflorene	0.02	Sesquiterpene
Bicyclogermacrene	0.73	Sesquiterpene
α-Muurolole	0.16	Sesquiterpene
(Z)-α-Bisabolene	1.39	Sesquiterpene
δ-Guaiene	1.11	Sesquiterpene
γ-Cadinene	2.35	Sesquiterpene
β-Bisabolene	0.16	Sesquiterpene
δ-Cadinene	0.09	Sesquiterpene
trans-Calamenene	0.19	Sesquiterpene
β-Sesquiphellandrene	0.19	Sesquiterpene
10-epi-Cubebol?	0.10	Sesquiterpenic alcohol
α-Cadinene	0.06	Sesquiterpene

Maaliol	0.14	Sesquiterpenic alcohol
(E)-Nerolidol	0.14	Sesquiterpenic alcohol
Spathulenol	0.15	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Globulol	0.03	Sesquiterpenic alcohol
Viridiflorol	0.02	Sesquiterpenic alcohol
Humulene epoxide II	0.02	Sesquiterpenic ether
10-epi-Cubenol	0.28	Sesquiterpenic alcohol
10-epi- γ -Eudesmol	0.05	Sesquiterpenic alcohol
1,10-diepi-Cubenol	0.01	Sesquiterpenic alcohol
τ -Cadinol	2.16	Sesquiterpenic alcohol
β -Eudesmol	0.07	Sesquiterpenic alcohol
α -Eudesmol	0.02	Sesquiterpenic alcohol
α -Cadinol	0.04	Sesquiterpenic alcohol
Unknown	0.01	Lignan
Geranyl tiglate	0.04	Monoterpenic ester
Mint sulfide?	0.03	Sesquiterpenic sulfide
Phytone	0.02	Terpenic ketone
Phytol	0.01	Diterpenic alcohol
Consolidated total	97.44%	

*: 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

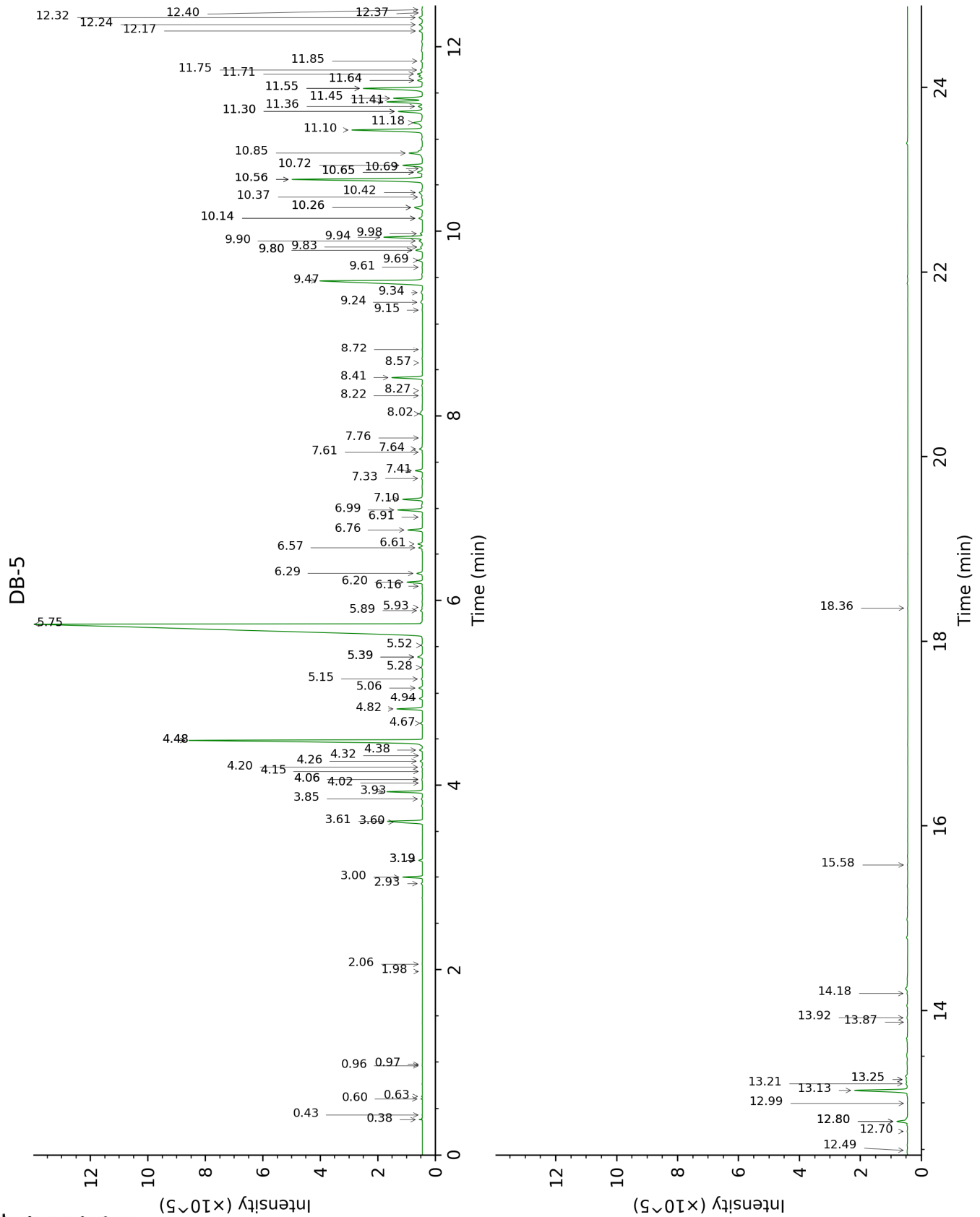
tr: The compound has been detected below 0.005% of total signal.

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	%
Ethanol	0.38	507	0.04	0.74	911	0.04
Isobutyral	0.43	540	tr			
Isovaleral	0.60	643	0.02	0.67	889	0.01
2-Methylbutyral	0.63	654	0.01			
Isoamyl alcohol	0.96	734	tr	3.06*	1172	0.01
2-Methylbutanol	0.98	736	tr	3.06*	1172	[0.01]
(2E)-Hexenal	1.98	851	tr	3.12	1178	0.02
(3Z)-Hexenol	2.06	857	0.01	5.40	1348	0.02
α -Thujene	2.93	925	0.03	1.28	1005	0.04
α -Pinene	3.00	930	0.53	1.22	997	0.55
Camphene	3.19*	943	0.11	1.52	1030	0.10
α -Fenchene	3.19*	943	[0.11]	1.46	1024	tr
β -Pinene	3.60†	970	1.53	1.89	1069	1.01
Sabinene	3.61†	971	[1.53]	2.06	1086	0.52
Octan-3-one	3.85	987	0.04	3.68*	1222	0.84
Myrcene	3.93	992	1.06	2.62	1136	1.08
Octan-3-ol	4.02	999	0.01	5.72*	1371	0.05
Pseudolimonene	4.06*	1001	0.02	2.56	1132	0.01
α -Phellandrene	4.06*	1001	[0.02]	2.53	1129	0.02
Δ^3 -Carene	4.15	1007	0.01	2.34	1114	0.01
(3Z)-Hexenyl acetate	4.20	1010	0.03	4.50	1285	0.04
α -Terpinene	4.26	1014	0.08	2.70	1142	0.08
ortho-Cymene	4.32	1018	0.01	3.78*	1229	0.12
para-Cymene	4.38	1022	0.11	3.78*	1229	[0.12]
Limonene	4.48*	1028	9.99	2.91	1160	0.44
1,8-Cineole	4.48*	1028	[9.99]	3.04	1171	9.58
(Z)- β -Ocimene	4.67	1040	0.07	3.49	1207	0.07
(E)- β -Ocimene	4.82	1050	0.82	3.68*	1222	[0.84]
γ -Terpinene	4.94	1057	0.10	3.51	1209	0.11
cis-Sabinene hydrate	5.06	1064	0.14	6.53	1430	0.20
cis-Linalool oxide (fur.)	5.15	1071	0.04	6.16	1403	0.05
Octanol	5.28	1079	0.07	7.83	1528	0.11
Terpinolene	5.39*	1086	0.21	3.96	1244	0.16
trans-Linalool oxide (fur.)	5.39*	1086	[0.21]	6.48*	1426	0.06
6,7-Epoxyterpinene	5.52	1094	0.04	5.72*	1371	[0.05]
Linalool	5.75	1108	47.79	7.76	1523	47.58
Octen-3-yl acetate	5.89	1118	0.07	5.47	1352	0.07
cis-para-Menth-2-en-1-ol	5.93	1120	0.02	7.80	1526	0.05
(Z)-Myroxide	6.16	1135	0.02	6.42	1422	0.05
Camphor	6.20	1138	0.52	6.80	1450	0.52
(E)-Myroxide	6.29	1144	0.21	6.74*	1446	0.46
Borneol	6.57	1162	0.13	9.38*†	1652	4.10
δ -Terpineol	6.61	1164	0.17	9.06	1626	0.19

Terpinen-4-ol	6.76	1174	0.51	8.18	1556	0.57
para-Cymen-8-ol	6.91	1184	0.02	11.09	1796	0.02
α-Terpineol	6.99	1189	0.90	9.38*†	1652	[4.10]
Methylchavicol	7.10	1196	0.72	8.88	1611	0.87
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	7.33	1211	0.04	10.94	1783	0.05
Octyl acetate	7.41	1217	0.26	6.74*	1446	[0.46]
Nerol	7.61	1231	0.02	10.64	1758	0.03
Citronellol	7.64	1233	0.14	10.33	1731	0.16
Carvone	7.76	1241	0.02	9.59	1669	0.01
Geraniol	8.02	1259	0.16	11.21	1807	0.16
Dihydrolinalyl acetate	8.22	1272	0.01	7.40	1495	0.01
Citronellyl formate	8.27	1276	0.01	8.56	1586	0.03
Bornyl acetate	8.42	1286	1.07	7.90*	1534	1.15
Lavandulyl acetate	8.57	1296	0.01	8.36	1570	0.01
Geranyl formate	8.72	1303	0.02	9.55	1666	0.05
δ-Elemene isomer	9.15	1333	0.02	6.48*	1426	[0.06]
exo-2-Hydroxycineole acetate	9.24	1339	0.09	9.67*	1676	0.99
α-Cubebene	9.34	1347	0.08			
Eugenol	9.47	1356	5.78	14.30	2098	5.71
Neryl acetate	9.61	1366	0.02	9.72	1680	0.03
α-Copaene	9.69	1372	0.18	6.83	1453	0.15
β-Bourbonene	9.80*	1379	0.27	7.16	1477	0.26
1,5-diepi-β-Bourbonene	9.80*	1379	[0.27]	7.00	1465	0.01
cis-β-Elemene	9.83	1382	0.08	7.97	1539	0.07
β-Cubebene	9.90	1386	0.15	7.45	1499	0.18
β-Elemene	9.94	1389	1.43	8.12†	1551	[7.09]
Unknown [m/z 161, 105 (83), 119 (69), 81 (34), 91 (29), 93 (28)...204]	9.98	1392	0.09			
Methyleugenol	10.14*	1404	0.15	12.87	1958	0.12
α-Gurjunene	10.14*	1404	[0.15]	7.28	1486	0.02
β-Caryophyllene	10.26*	1412	0.38	8.02*	1543	0.22
β-Cedrene	10.26*	1412	[0.38]	7.90*	1534	[1.15]
β-Copaene	10.37	1421	0.05	8.02*	1543	[0.22]
β-Gurjunene	10.42	1424	0.17	8.02*	1543	[0.22]
trans-α-Bergamotene	10.56*	1435	5.59	8.11*†	1550	7.09
α-Guaiene	10.56*	1435	[5.59]	8.11*†	1550	[7.09]
cis-Muurolo-3,5-diene	10.65*	1441	0.22	8.61	1589	0.19
cis-β-Bergamotene?	10.65*	1441	[0.22]			
Cadina-4,11-diene	10.69	1444	0.01	8.71	1597	0.02
α-Humulene	10.72	1447	0.74	8.90	1613	0.61
(E)-β-Farnesene	10.85	1457	0.57	9.21	1638	0.49
Germacrene D	11.10	1475	3.02	9.41†	1654	[4.10]

β-Selinene	11.18	1481	0.50	9.53*	1664	1.17
Viridiflorene	11.30*	1490	0.98	9.30	1646	0.02
Bicyclogermacrene	11.30*	1490	[0.98]	9.67*	1676	[0.99]
α-Muurolene	11.36	1494	0.16	9.67*	1676	[0.99]
(Z)-α-Bisabolene	11.41	1498	1.39	9.98*	1701	1.48
δ-Guaiene	11.44	1501	1.11	9.53*	1664	[1.17]
γ-Cadinene	11.55*	1509	2.45	10.02	1704	2.35
β-Bisabolene	11.55*	1509	[2.45]	9.79	1686	0.16
δ-Cadinene	11.64*†	1516	0.32	9.98*	1701	[1.48]
<i>trans</i> -Calamenene	11.64*†	1516	[0.32]	10.78	1770	0.19
β-Sesquiphellandrene	11.71	1522	0.19	10.24	1723	0.20
10-epi-Cubebol?	11.75	1525	0.10	13.38	2007	0.12
α-Cadinene	11.85	1532	0.06	10.39	1736	0.06
Maaliol	12.17	1558	0.14	12.63	1936	0.15
(E)-Nerolidol	12.24	1564	0.14	13.27*	1997	0.42
Spathulenol	12.32	1570	0.15	13.95	2063	0.15
Caryophyllene oxide	12.37	1574	0.01	12.33	1908	0.01
Globulol	12.40	1576	0.03	13.46	2015	0.01
Viridiflorol	12.49	1583	0.02	13.55	2023	0.01
Humulene epoxide II	12.70	1599	0.02	12.91*	1963	0.02
10-epi-Cubenol	12.80*	1608	0.49	13.27*	1997	[0.42]
10-epi-γ-Eudesmol	12.80*	1608	[0.49]	13.67	2035	0.05
1,10-diepi-Cubenol	13.00	1624	0.01	12.91*	1963	[0.02]
τ-Cadinol	13.13	1636	2.16	14.46	2113	2.15
β-Eudesmol	13.21	1642	0.07	14.94	2162	0.06
α-Eudesmol	13.25*†	1645	0.20	14.87	2156	0.02
α-Cadinol	13.25*†	1645	[0.20]	14.98	2167	0.04
Unknown [m/z 133, 93 (97), 131 (85), 145 (83), 107 (69)...220]	13.87	1697	0.01	16.41	2319	0.01
Geranyl tiglate	13.92	1701	0.04	14.03	2071	0.05
Mint sulfide?	14.18	1724	0.03			
Phytone	15.58	1847	0.02	14.20	2088	0.03
Phytol	18.36	2115	0.01	18.82	2596	0.02
Total identified		97.83%			96.58%	
Total reported		97.92%			96.59%	

*: 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