

Date : March 31, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21C23-PTH03

Customer identification : Cananga - CR3100206R

Type : Essential oil

Source : *Cananga odorata* var. *macrophylla* (Cananga)

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 : Sylvain Mercier, M. Sc., Chimiste

Analysis date : March 31, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.5026 ± 0.0003 (20 °C; method PC-MAT-016)

ISO 3523:2002 - OIL OF CANANGA

Compound	Min. %	Max. %	Observed %	Complies?
para-Methylanisole	0.5	2.0	1.0	Yes
Linalool	1.0	3.0	1.2	Yes
β-Caryophyllene	30.0	40.0	31.3	Yes
α-Humulene	7	11	8	Yes
Geranyl acetate	1.0	3.0	1.3	Yes
Geraniol	0.5	1.5	0.9	Yes
α-Cadinol	1.0	2.5	1.6	Yes
(2E,6E)-Farnesol	1.0	2.0	1.3	Yes
Benzyl benzoate	3.0	5.0	4.3	Yes
Benzyl salicylate	0.2	1.0	0.5	Yes
(3E,6E)-α-Farnesene	3.0	7.0	7.3	No
Germacrene D	5.0	9.0	9.9	No
δ-Cadinene	4.0	7.0	4.3	Yes
Refractive index	1.4950	1.5050	1.5026	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
α -Thujene	0.04	Monoterpene
α -Pinene	0.11	Monoterpene
Camphene	0.01	Monoterpene
Sabinene	0.16	Monoterpene
β -Pinene	0.02	Monoterpene
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Myrcene	0.39	Monoterpene
α -Phellandrene	0.02	Monoterpene
α -Terpinene	0.14	Monoterpene
para-Methylanisole	1.03	Simple phenolic
para-Cymene	0.03	Monoterpene
Limonene	0.05	Monoterpene
β -Phellandrene	0.03	Monoterpene
(Z)- β -Ocimene	0.05	Monoterpene
(E)- β -Ocimene	0.04	Monoterpene
γ -Terpinene	0.23	Monoterpene
para-Cresol	0.01	Simple phenolic
Terpinolene	0.07	Monoterpene
Methyl benzoate	0.03	Phenolic ester
Linalool	1.24	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Benzeneacetonitrile	0.01	Simple phenolic
Benzyl acetate	0.01	Phenolic ester
para-Cresyl acetate	0.01	Phenolic ester
Terpinen-4-ol	0.44	Monoterpenic alcohol
α -Terpineol	0.05	Monoterpenic alcohol
Methylchavicol	0.07	Phenylpropanoid
Nerol	0.04	Monoterpenic alcohol
Neral	0.05	Monoterpenic aldehyde
Geraniol	0.93	Monoterpenic alcohol
Geranial	0.07	Monoterpenic aldehyde
4-Vinylguaiacol	0.02	Simple phenolic
Bicycloelemene	0.04	Sesquiterpene
Benzyl butyrate	0.10	Phenolic ester
α -Cubebene	0.24	Sesquiterpene
Eugenol	0.38	Phenylpropanoid
Neryl acetate	0.03	Monoterpenic ester
α -Ylangene	0.20	Sesquiterpene
α -Copaene	1.31	Sesquiterpene
β -Bourbonene	0.01	Sesquiterpene
β -Cubebene	0.05	Sesquiterpene
β -Elemene	0.23	Sesquiterpene
Geranyl acetate	1.29	Monoterpenic ester
Vanillin	0.01	Simple phenolic
Cyperene	0.04	Sesquiterpene

α-Gurjunene	0.02	Sesquiterpene
Methyleugenol	0.14	Phenylpropanoid
β-Caryophyllene	31.29	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.06	Sesquiterpene
β-Copaene	0.52	Sesquiterpene
Aromadendrene	0.11	Sesquiterpene
α-Humulene	7.78	Sesquiterpene
(E)-Isoeugenol	0.02	Phenylpropanoid
α-Patchoulene	0.43	Sesquiterpene
cis-Cadina-1(6),4-diene	0.03	Sesquiterpene
cis-Muurolo-4(15),5-diene	0.27	Sesquiterpene
α-Amorphene	0.45	Sesquiterpene
γ-Muurolo-4(15),5-diene	2.32	Sesquiterpene
Germacrene D	9.93	Sesquiterpene
Prenyl benzoate	0.37	Phenolic ester
Bicyclogermacrene	1.25	Sesquiterpene
(3Z,6E)-α-Farnesene	0.09	Sesquiterpene
Methyl (E)-isoeugenol	0.02	Phenylpropanoid
α-Muurolo-4(15),5-diene	0.30	Sesquiterpene
Unknown	1.00	Sesquiterpene
δ-Amorphene	0.67	Sesquiterpene
Unknown	3.33	Sesquiterpene
γ-Cadinene	1.16	Sesquiterpene
(3E,6E)-α-Farnesene	7.33	Sesquiterpene
trans-Calamenene	0.07	Sesquiterpene
δ-Cadinene	4.32	Sesquiterpene
Zonarene	0.24	Sesquiterpene
trans-Cadina-1,4-diene	0.31	Sesquiterpene
α-Cadinene	0.31	Sesquiterpene
α-Calacorene	0.03	Sesquiterpene
α-Elemol	0.33	Sesquiterpenic alcohol
Germacrene B	0.03	Sesquiterpene
β-Calacorene	0.03	Sesquiterpene
(E)-Nerolidol	0.08	Sesquiterpenic alcohol
(3Z)-Hexenyl benzoate	0.09	Phenolic ester
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.11	Sesquiterpenic ether
Caryophyllene oxide	0.25	Sesquiterpenic ether
Globulol	0.18	Sesquiterpenic alcohol
Viridiflorol	0.07	Sesquiterpenic alcohol
Guaiol	0.13	Sesquiterpenic alcohol
Copaborneol	0.14	Sesquiterpenic alcohol
Humulene epoxide II	0.06	Sesquiterpenic ether
10-epi-Cubenol	0.11	Sesquiterpenic alcohol
Junenol	0.24	Sesquiterpenic alcohol
1-epi-Cubenol	0.37	Sesquiterpenic alcohol
γ-Eudesmol	0.29	Sesquiterpenic alcohol
Cubenol	0.23	Sesquiterpenic alcohol
τ-Cadinol	0.31	Sesquiterpenic alcohol
τ-Muurolo-4(15),5-diene	0.88	Sesquiterpenic alcohol
α-Muurolo-4(15),5-diene	0.52	Sesquiterpenic alcohol
Unknown	0.36	Sesquiterpenic alcohol

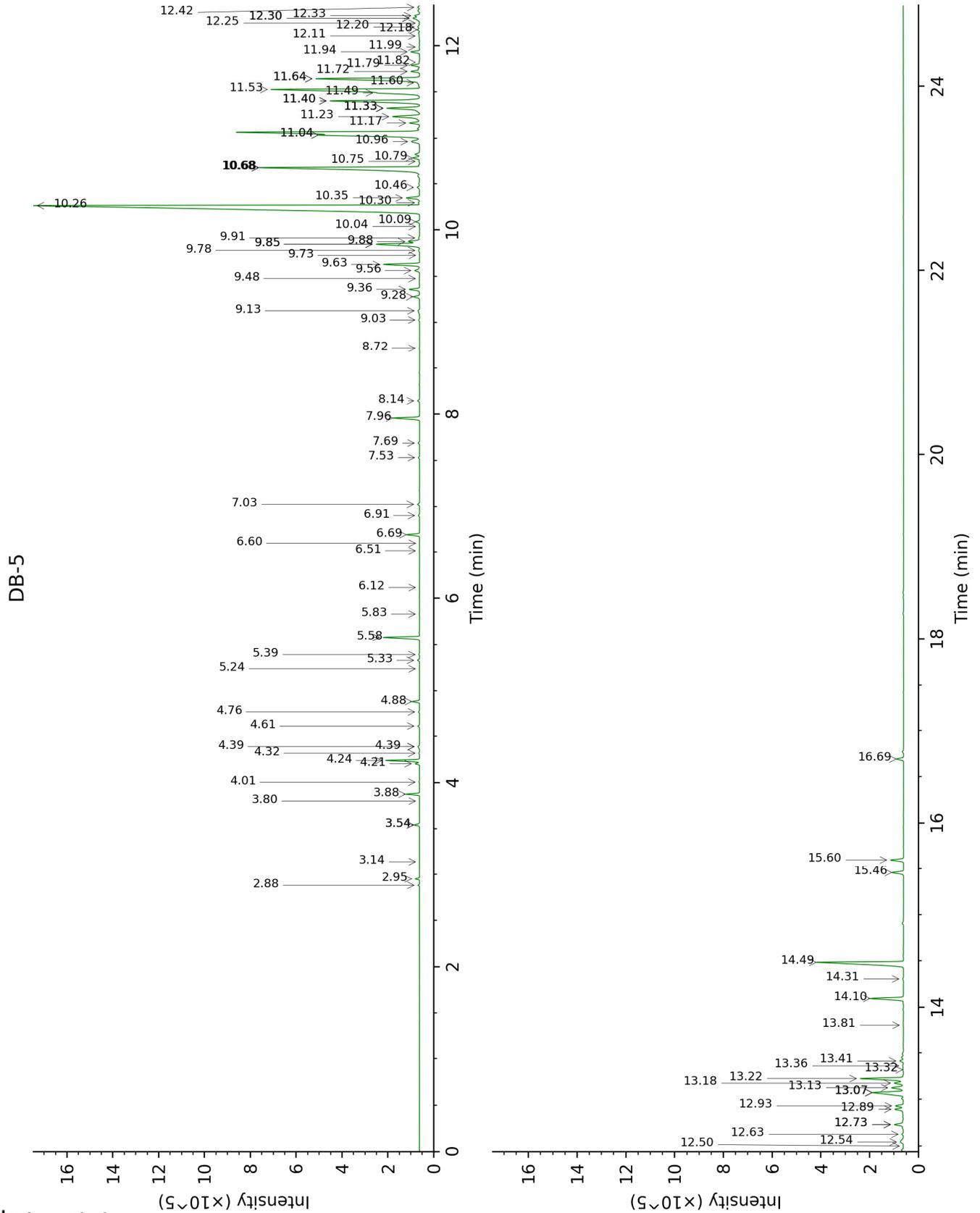
α -Cadinol	1.62	Sesquiterpenic alcohol
<i>trans</i> -Calamene-10-ol	0.03	Sesquiterpenic alcohol
Bulnesol	0.04	Sesquiterpenic alcohol
Unknown	0.14	Oxygenated sesquiterpene
(2E,6Z)-Farnesol	0.02	Sesquiterpenic alcohol
(2E,6E)-Farnesol	1.26	Sesquiterpenic alcohol
(2E,6E)-Farnesal	0.03	Sesquiterpenic aldehyde
Benzyl benzoate	4.31	Phenolic ester
(2E,6E)-Farnesyl acetate	0.45	Sesquiterpenic ester
Benzyl salicylate	0.48	Phenolic ester
Geranyl benzoate	0.26	Phenolic ester
Consolidated total	97.04%	

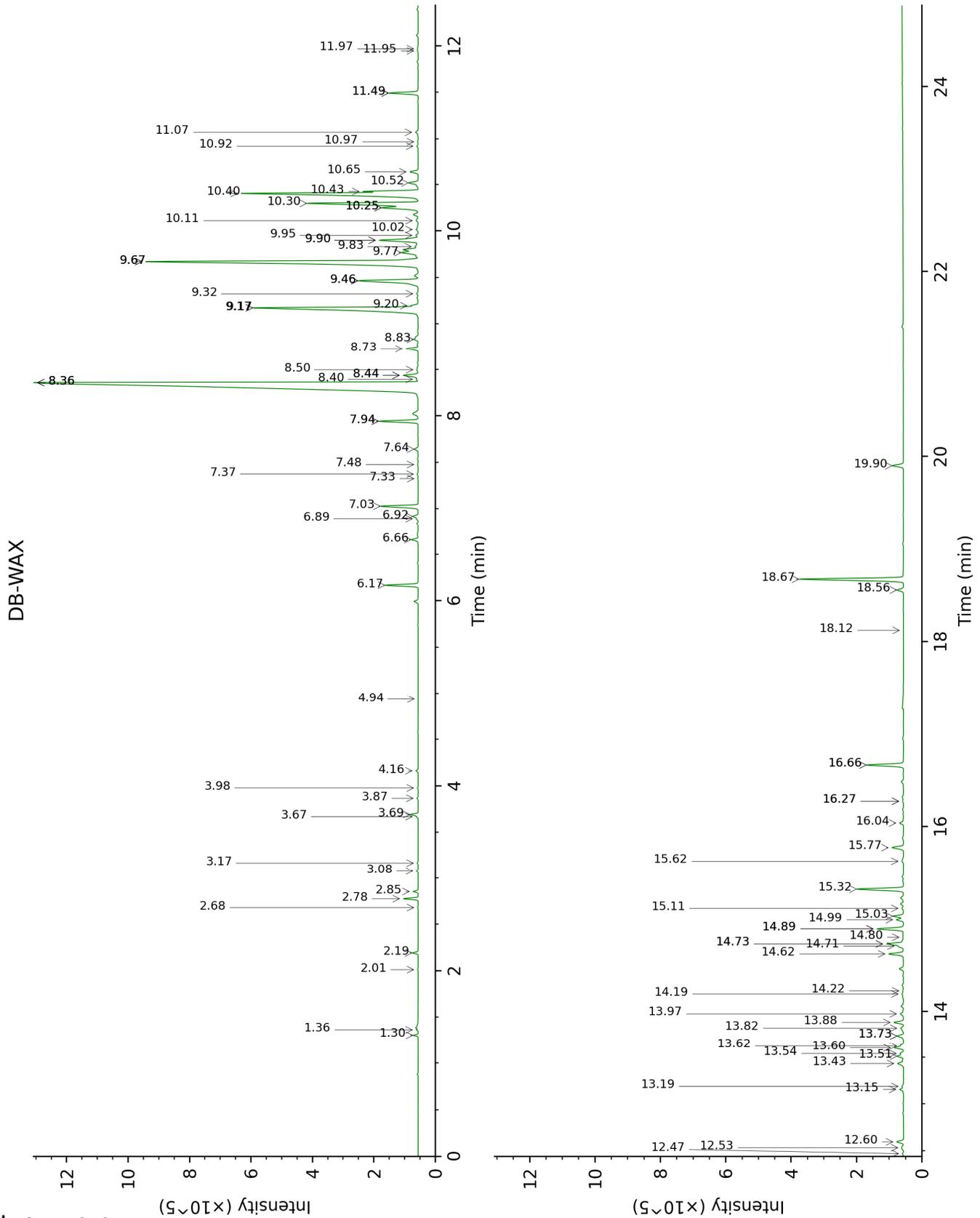
Note: no correction factor was applied

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	%
α-Thujene	2.88	927	0.04	1.36	1002	0.04
α-Pinene	2.95	932	0.11	1.30	994	0.11
Camphene	3.14	944	0.01			
Sabinene	3.54*	971	0.17	2.19	1086	0.16
β-Pinene	3.54*	971	[0.17]	2.01	1068	0.02
6-Methyl-5-hepten-2-one	3.80	989	0.01	4.94	1296	0.01
Myrcene	3.88	994	0.39	2.78	1135	0.39
α-Phellandrene	4.01	1003	0.02	2.68	1128	0.02
α-Terpinene	4.20	1015	0.14	2.86	1141	0.14
para-Methylanisole	4.24	1018	1.03	6.17	1386	1.02
para-Cymene	4.32	1022	0.03	3.98	1227	0.02
Limonene	4.39*	1027	0.07	3.08	1158	0.05
β-Phellandrene	4.39*	1027	[0.07]	3.17	1165	0.03
(Z)-β-Ocimene	4.61	1041	0.05	3.67	1204	0.04
(E)-β-Ocimene	4.76	1051	0.04	3.87	1219	0.04
γ-Terpinene	4.88	1058	0.23	3.69	1206	0.24
para-Cresol	5.24	1081	0.01	13.74*	2016	0.24
Terpinolene	5.33	1087	0.07	4.16	1240	0.07
Methyl benzoate	5.39	1091	0.03	8.50	1563	0.10
Linalool	5.58	1102	1.24	7.94*	1520	1.26
cis-para-Menth-2-en-1-ol	5.83	1118	0.02	7.94*	1520	[1.26]
Benzeneacetonitrile	6.12	1137	0.01	11.95	1852	0.02
Benzyl acetate	6.52	1162	0.01	9.83	1670	0.13
para-Cresyl acetate	6.60	1168	0.01			
Terpinen-4-ol	6.69	1174	0.44	8.44*	1558	0.55
α-Terpineol	6.90	1188	0.05	9.67*	1657	13.30
Methylchavicol	7.03	1195	0.07	9.20†	1618	[8.48]
Nerol	7.53	1229	0.04	10.92	1762	0.04
Neral	7.69	1239	0.05	9.32	1629	0.05
Geraniol	7.96	1258	0.93	11.49*	1811	0.93
Geranial	8.14	1270	0.07	9.95	1680	0.07
4-Vinylguaiaacol	8.72	1309	0.02	14.89*	2130	0.90
Bicycloelemene	9.03	1331	0.04	6.89	1440	0.04
Benzyl butyrate	9.13	1338	0.10	11.49*	1811	[0.93]
α-Cubebene	9.28	1349	0.24	6.66	1423	0.22
Eugenol	9.36	1354	0.38	14.62	2102	0.52
Neryl acetate	9.48	1363	0.03	10.02	1686	0.08
α-Ylangene	9.56	1369	0.20	6.92	1442	0.20
α-Copaene	9.63	1373	1.31	7.03	1450	1.32
β-Bourbonene	9.73	1380	0.01	7.32	1473	0.02
β-Cubebene	9.78	1384	0.05	7.64	1496	0.14
β-Elemene	9.85*†	1389	2.42	8.36*	1552	32.04
Geranyl acetate	9.85*†	1389	[2.42]	10.43	1720	1.29
Vanillin	9.88†	1391	[2.42]	18.12	2473	0.01
Cyperene	9.92	1394	0.04	7.37	1476	0.04
α-Gurjunene	10.04	1402	0.02	7.48	1484	0.03

Methyleugenol	10.09	1406	0.14	13.16	1962	0.12
β-Caryophyllene	10.26	1419	31.29	8.36*	1552	[32.04]
Caryophylla-4(12),8(13)-diene	10.30	1422	0.06	8.40	1555	0.06
β-Copaene	10.35	1425	0.52	8.36*	1552	[32.04]
Aromadendrene	10.46	1434	0.11	8.44*	1558	[0.55]
α-Humulene	10.68*	1450	8.23	9.17*†	1616	8.48
(E)-Isoeugenol	10.68*	1450	[8.23]	16.27*	2271	0.04
α-Patchoulene	10.68*	1450	[8.23]	8.73	1581	0.43
cis-Cadina-1(6),4-diene	10.75	1456	0.03	8.83	1589	0.17
cis-Muurolo-4(15),5-diene	10.79	1458	0.27	9.17*†	1616	[8.48]
α-Amorphene	10.96	1472	0.45	9.46*	1640	2.77
γ-Muurolo-4(15),5-diene	11.04*†	1477	12.11	9.46*	1640	[2.77]
Germacrene D	11.04*†	1477	[12.11]	9.67*	1657	[13.30]
Prenyl benzoate	11.17	1486	0.37	13.60	2004	0.32
Bicyclogermacrene	11.24	1492	1.25	9.90*	1676	1.55
(3Z,6E)-α-Farnesene	11.33*	1498	1.42	10.11	1693	0.09
Methyl (E)-isoeugenol	11.33*	1498	[1.42]	14.80	2120	0.02
α-Muurolo-4(15),5-diene	11.33*	1498	[1.42]	9.90*	1676	[1.55]
Unknown [m/z 119, 41 (95), 123 (53), 80 (49), 161 (44), 105 (42)... 204 (2)]	11.33*	1498	[1.42]			
δ-Amorphene	11.40*	1504	4.00	9.77	1665	0.67
Unknown, not seen in MS	11.40*	1504	[4.00]	9.67*	1657	[13.30]
γ-Cadinene	11.49	1511	1.16	10.25*	1705	1.40
(3E,6E)-α-Farnesene	11.53	1514	7.33	10.40	1718	7.54
trans-Calamenene	11.60	1520	0.07	11.07	1775	0.09
δ-Cadinene	11.64*	1523	4.70	10.30	1709	4.32
Zonarene	11.64*	1523	[4.70]	10.25*	1705	[1.40]
trans-Cadina-1,4-diene	11.72	1529	0.31	10.52	1728	0.36
α-Cadinene	11.79	1535	0.31	10.65	1739	0.29
α-Calacorene	11.82	1537	0.03	11.97	1854	0.03
α-Elemol	11.94	1546	0.33	13.88	2031	0.32
Germacrene B	11.99	1550	0.03	10.97	1766	0.03
β-Calacorene	12.11	1560	0.03	12.47	1898	0.04
(E)-Nerolidol	12.18	1565	0.08	13.62	2006	0.08
(3Z)-Hexenyl benzoate	12.20	1567	0.09	14.19	2060	0.07
Spathulenol	12.25	1571	0.02	14.22	2064	0.03
Caryophyllene oxide isomer	12.30*	1575	0.35	12.53	1904	0.11
Caryophyllene oxide	12.30*	1575	[0.35]	12.60	1910	0.25
Globulol	12.33	1577	0.18	13.74*	2016	[0.24]
Viridiflorol	12.42	1584	0.07	13.82	2025	0.11
Guaiol	12.50†	1590	0.24	13.97	2040	0.13

Copaborneol	12.54†	1594	[0.24]	14.70	2111	0.14
Humulene epoxide II	12.63	1600	0.06	13.19	1965	0.06
10-epi-Cubanol	12.73*	1609	0.40	13.54	1998	0.11
Junenol	12.73*	1609	[0.40]	13.43	1988	0.24
1-epi-Cubanol	12.89	1622	0.37			
γ-Eudesmol	12.93	1626	0.29	14.73*	2113	0.61
Cubanol	13.07*	1637	1.59	13.51	1995	0.23
τ-Cadinol	13.07*	1637	[1.59]	14.73*	2113	[0.61]
τ-Muurolol	13.07*	1637	[1.59]	14.89*	2130	[0.90]
α-Muurolol	13.13	1642	0.52	14.99†	2140	0.59
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	13.18	1646	0.36	15.03†	2143	[0.59]
α-Cadinol	13.22	1650	1.62	15.32	2173	1.61
trans-Calamenen-10-ol	13.32	1658	0.03	16.66*	2312	1.24
Bulnesol	13.36	1661	0.04	15.11	2152	0.07
Unknown [m/z 123, 95 (31), 81 (29), 105 (27)... 222 (5)]	13.41	1666	0.14	16.04	2247	0.15
(2E,6Z)-Farnesol	13.81	1698	0.02	16.27*	2271	[0.04]
(2E,6E)-Farnesol	14.10	1723	1.26	16.66*	2312	[1.24]
(2E,6E)-Farnesal	14.31	1741	0.03	15.62	2204	0.09
Benzyl benzoate	14.49	1757	4.31	18.67	2536	3.68
(2E,6E)-Farnesyl acetate	15.46	1843	0.45	15.77	2219	0.44
Benzyl salicylate	15.60	1856	0.48	19.90	2682	0.39
Geranyl benzoate	16.69	1958	0.26	18.56	2522	0.23
Total identified		97.60%			95.60%	
Total reported		98.10%			95.75%	

*: 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