

Date : 2024-04-03

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24C19-PTH03

Customer Identification : Cinnamon Bark - Sri Lanka - CC0110R

Type : Essential Oil

Source : *Cinnamomum zeylanicum* [syn. *Cinnamomum verum*]

Customer : Plant Therapy

Checked and approved by:

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

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GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

***ISO**

Results : See analysis summary (next page)

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

Date : 2024-04-03

PHYSICOCHEMICAL DATA

Refractive index : 1.5845 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2024-03-20

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
Ethyl 2-methylbutyrate	tr	Aliphatic ester
Ethylbenzene	0.01	Simple phenolic
Styrene	0.03	Simple phenolic
Tricyclene	0.01	Monoterpene
α -Thujene	0.23	Monoterpene
α -Pinene	2.44	Monoterpene
Camphene	0.30	Monoterpene
α -Fenchene	0.01	Monoterpene
Benzaldehyde	0.16	Simple phenolic
β -Pinene	0.28	Monoterpene
Sabinene	0.07	Monoterpene
Myrcene	0.05	Monoterpene
Pseudolimonene	tr	Monoterpene
α -Phellandrene	0.82	Monoterpene
Δ^3 -Carene	0.08	Monoterpene
α -Terpinene	0.47	Monoterpene
<i>meta</i> -Cymene	0.02	Monoterpene
<i>para</i> -Cymene	1.34	Monoterpene
β -Phellandrene	2.33	Monoterpene
Limonene	1.37	Monoterpene
1,8-Cineole	0.95	Monoterpenic ether
(<i>Z</i>)- β -Ocimene	0.04	Monoterpene
Butyl 2-methylbutyrate	0.01	Aliphatic ester
(<i>E</i>)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	0.05	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
<i>para</i> -Cymenene	0.03	Monoterpene
Terpinolene	0.07	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Linalool	2.95	Monoterpenic alcohol
(3 <i>E</i>)-2,7-Dimethyl-3,6-octadien-2-ol	0.03	Monoterpenic alcohol
Phenylethyl alcohol	0.01	Simple phenolic
<i>cis-para</i> -Menth-2-en-1-ol	0.02	Monoterpenic alcohol
α -Campholenal	0.01	Monoterpenic aldehyde
Cosmene	0.01	Monoterpene
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
Camphor	0.06	Monoterpenic ketone
<i>trans</i> -Sabinol	0.02	Monoterpenic alcohol
Camphene hydrate	0.01	Monoterpenic alcohol
Hydrocinnamal	0.23	Phenylpropanoid

Borneol	0.06	Monoterpenic alcohol
3-Methylbenzofuran?	0.01	Phenylpropanoid
Benzyl acetate	0.01	Phenolic ester
Terpinen-4-ol	0.23	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.03	Monoterpenic alcohol
α -Terpineol	0.33	Monoterpenic alcohol
<i>cis</i> -Piperitol	0.02	Monoterpenic alcohol
<i>cis</i> - α -Phellandrene epoxide (iPr vs Me)	0.04	Monoterpenic ether
<i>trans</i> -Piperitol	0.02	Monoterpenic alcohol
(<i>Z</i>)-Cinnamal	0.36	Phenylpropanoid
Hydrocinnamyl alcohol	0.07	Phenylpropanoid
<i>ortho</i> -Anisaldehyde	0.04	Simple phenolic
Phenylethyl acetate	0.01	Phenolic ester
Chavicol	0.04	Phenylpropanoid
(<i>E</i>)-Cinnamal	70.59	Phenylpropanoid
Safrole	tr	Phenylpropanoid
(<i>E</i>)-Cinnamyl alcohol	0.03	Phenylpropanoid
α -Cubebene	0.01	Sesquiterpene
Hydrocinnamic acid	tr	Phenylpropanoid
Eugenol	3.22	Phenylpropanoid
Hydrocinnamyl acetate	0.05	Phenylpropanoid ester
α -Copaene	0.28	Sesquiterpene
β -Cubebene	0.01	Sesquiterpene
β -Elemene	0.04	Sesquiterpene
Isocaryophyllene	0.02	Sesquiterpene
α -Gurjunene	0.01	Sesquiterpene
β -Caryophyllene	2.53	Sesquiterpene
(<i>E</i>)-Cinnamyl acetate	4.20	Phenylpropanoid ester
α -Humulene	0.44	Sesquiterpene
(<i>E</i>)-Cinnamic acid	0.16	Phenylpropanoid
<i>allo</i> -Aromadendrene	0.02	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.01	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
<i>ar</i> -Curcumene	0.03	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
Bicyclgermacrene	0.01	Sesquiterpene
α -Murolene	0.01	Sesquiterpene
2,3-Epoxy-cinnamyl acetate I?	0.01	Phenylpropanoid ester
γ -Cadinene	0.02	Sesquiterpene
Cubebol	0.02	Sesquiterpenic alcohol
<i>trans</i> -Calamenene	0.03	Sesquiterpene
δ -Cadinene	0.06	Sesquiterpene
(<i>E</i>)- <i>ortho</i> -Methoxycinnamal	0.13	Phenylpropanoid
Eugenyl acetate	0.02	Phenylpropanoid ester
α -Calacorene	0.02	Sesquiterpene

Isocaryophyllene epoxide B	0.03	Sesquiterpenic ether
Unknown	0.01	Phenylpropanoid
Caryophyllenyl alcohol	0.04	Sesquiterpenic alcohol
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.33	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Humulene epoxide II	0.06	Sesquiterpenic ether
Tetradecanal	0.10	Aliphatic aldehyde
1-epi-Cubenol	0.01	Sesquiterpenic alcohol
Caryophylladienol I?	0.02	Sesquiterpenic alcohol
Caryophylladienol II	0.02	Sesquiterpenic alcohol
τ -Cadinol	0.01	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5 β -ol	0.03	Sesquiterpenic alcohol
Benzyl benzoate	0.41	Phenolic ester
Unknown	0.01	Unknown
Unknown	0.09	Unknown
Unknown	0.05	Unknown
Consolidated total	99.15	

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

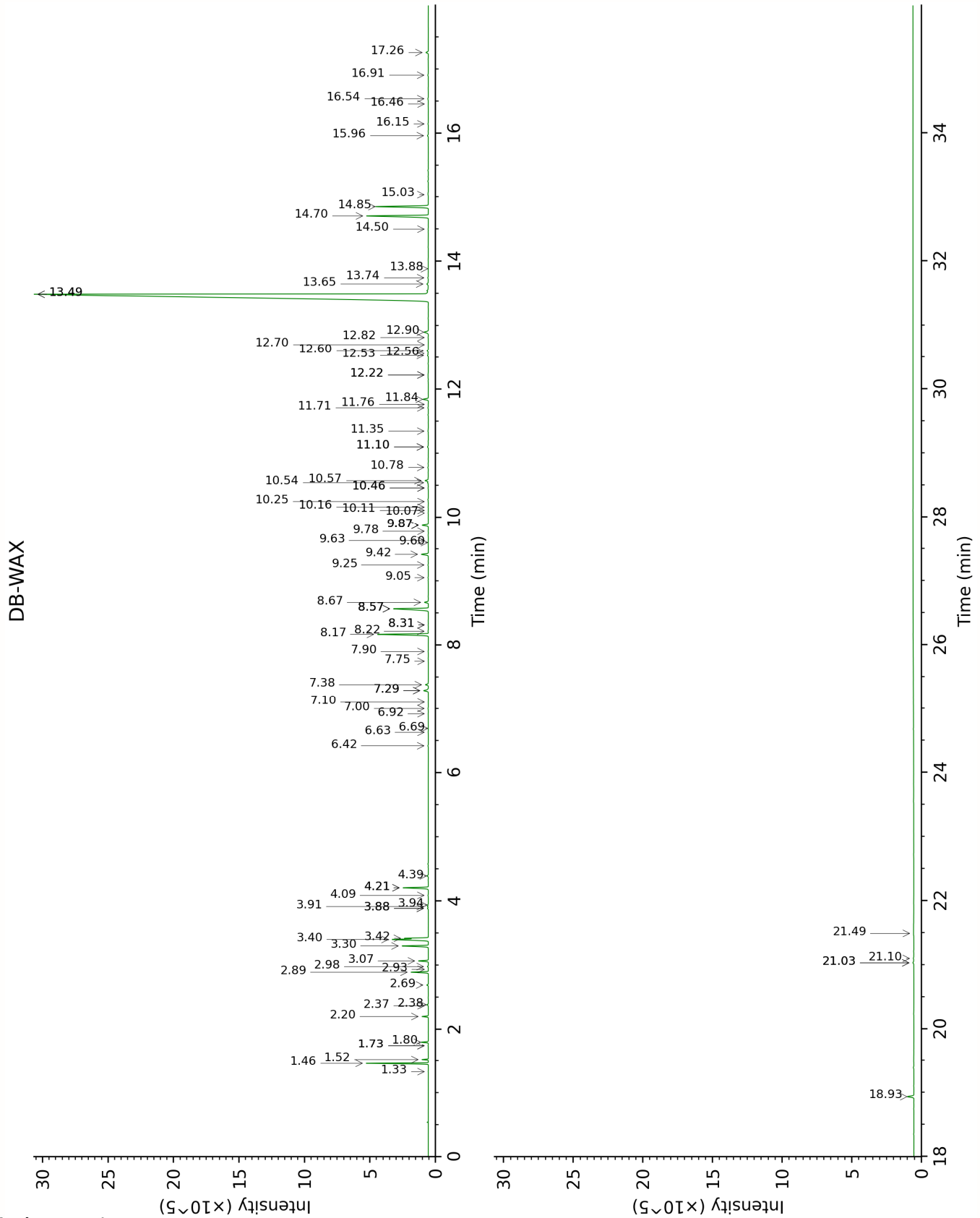
Note: no correction factor was applied

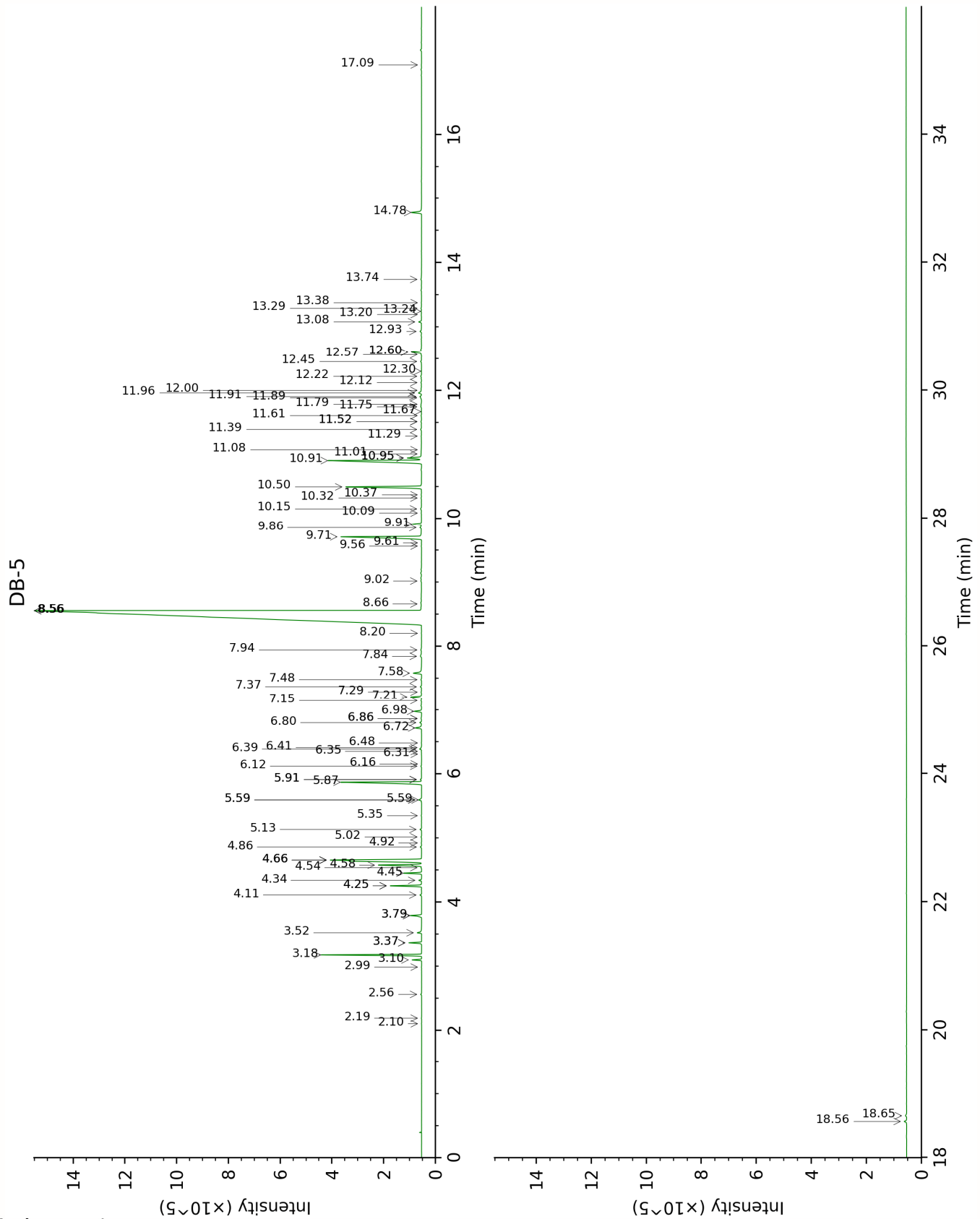
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Bracketed value ([xx]): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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





FULL ANALYSIS DATA

Ethyl 2-methylbutyrate	Column DB-WAX			Column DB-5		
	1.73*	1025.0	[0.01]	2.10	850.1	tr
Ethylbenzene	2.37	1084.7	0.01	2.19	857.3	0.01
Styrene	3.94	1207.6	0.03	2.56	887.7	0.03
Tricyclene	1.33	975.4	0.01	2.99	919.2	0.01
α -Thujene	1.52	1003.5	0.23	3.10	926.6	0.23
α -Pinene	1.46	995.0	2.42	3.18	931.7	2.44
Camphene	1.80	1031.2	0.30	3.37*	944.1	[0.31]
α -Fenchene	1.73*	1025.0	[0.01]	3.37*	944.1	[0.31]
Benzaldehyde	7.38	1457.0	0.17	3.52	954.4	0.16
β -Pinene	2.20	1068.9	0.28	3.79*	972.1	[0.35]
Sabinene	2.38	1086.1	0.07	3.79*	972.1	[0.35]
Myrcene	2.98	1135.0	0.04	4.11	993.2	0.05
Pseudolimonene	2.93	1131.7	tr	4.26*	1002.6	[0.84]
α -Phellandrene	2.89	1128.3	0.82	4.26*	1002.6	[0.84]
Δ^3 -Carene	2.69	1113.2	0.07	4.34	1008.1	0.08
α -Terpinene	3.07	1141.7	0.47	4.45	1015.1	0.47
<i>meta</i> -Cymene	4.21*	1226.7	[1.35]	4.54	1020.5	0.02
<i>para</i> -Cymene	4.21*	1226.7	[1.35]	4.58	1022.9	1.34
β -Phellandrene	3.40	1167.0	2.33	4.66*	1027.8	[4.71]
Limonene	3.30	1159.4	1.37	4.66*	1027.8	[4.71]
1,8-Cineole	3.42	1168.4	0.95	4.66*	1027.8	[4.71]
(<i>Z</i>)- β -Ocimene	3.88*	1203.8	[0.05]	4.86	1040.6	0.04
Butyl 2-methylbutyrate	3.88*	1203.8	[0.05]	4.92	1044.6	0.01
(<i>E</i>)- β -Ocimene	4.09	1218.3	0.02	5.02	1050.4	0.02
γ -Terpinene	3.91	1206.0	0.05	5.13	1057.7	0.05
<i>cis</i> -Linalool oxide (fur.)	6.63	1400.7	0.01	5.35	1071.1	0.01
<i>para</i> -Cymenene	6.42	1385.5	0.03	5.59*	1086.5	[0.11]
Terpinolene	4.39	1239.9	0.07	5.59*	1086.5	[0.11]
<i>trans</i> -Linalool oxide (fur.)	7.00	1428.4	0.02	5.59*	1086.5	[0.11]
Linalool	8.17	1516.4	2.95	5.87	1103.8	2.95
(3 <i>E</i>)-2,7-Dimethyl-3,6-octadien-2-ol	8.31*	1527.9	[0.01]	5.91*	1106.4	[0.04]
Phenylethyl alcohol	12.22*	1846.3	[0.04]	5.91*	1106.4	[0.04]
<i>cis-para</i> -Menth-2-en-1-ol	8.22	1520.2	0.02	6.12	1119.7	0.02
α -Campholenal	7.10	1436.0	0.01	6.16	1121.9	0.01
Cosmene	6.69	1405.1	0.01	6.31	1131.6	0.01
<i>trans</i> -Pinocarveol	9.25	1601.4	0.03	6.35	1134.4	0.01
Camphor	7.29*	1450.0	[0.34]	6.39	1136.7	0.06

<i>trans</i> -Sabinol	9.87*	1652.5	[0.39]	6.41	1138.2	0.02
Camphene hydrate	8.57*	1547.7	[2.54]	6.48	1142.8	0.01
Hydrocinnamal	10.58	1710.9	0.21	6.72	1157.7	0.23
Borneol	9.87*	1652.5	[0.39]	6.80	1163.1	0.06
3-Methylbenzofuran?	10.25	1683.8	0.01	6.86*	1167.1	[0.03]
Benzyl acetate	10.07	1668.9	0.01	6.86*	1167.1	[0.03]
Terpinen-4-ol	8.67	1555.6	0.23	6.98	1174.3	0.23
<i>para</i> -Cymen-8-ol	11.71	1799.7	0.03	7.15	1185.2	0.03
α -Terpineol	9.87*	1652.5	[0.39]	7.21	1189.0	0.33
<i>cis</i> -Piperitol	9.60	1630.0	0.01	7.28	1194.0	0.02
<i>cis</i> - α -Phellandrene epoxide (iPr vs Me)	11.10*	1756.5	[0.06]	7.37	1199.3	0.04
<i>trans</i> -Piperitol	10.46*	1701.4	[0.02]	7.48	1206.5	0.02
(<i>Z</i>)-Cinnamal	11.84	1811.8	0.34	7.58	1213.3	0.36
Hydrocinnamyl alcohol	13.65	1978.9	0.10	7.84	1230.9	0.07
<i>ortho</i> -Anisaldehyde	12.56	1877.1	0.03	7.94	1237.5	0.04
Phenylethyl acetate	11.10*	1756.5	[0.06]	8.20	1254.8	0.01
Chavicol	16.54	2269.6	0.04	8.56*	1278.4	[70.63]
(<i>E</i>)-Cinnamal	13.49*	1963.9	[70.17]	8.56*	1278.4	[70.63]
Safrole	11.76	1804.5	0.01	8.66	1285.4	tr
(<i>E</i>)-Cinnamyl alcohol	15.96	2209.0	0.06	9.02	1309.5	0.03
α -Cubebene	6.92	1422.3	0.01	9.56	1348.0	0.01
Hydrocinnamic acid				9.61	1351.5	tr
Eugenol	14.85	2095.9	3.26	9.71	1358.2	3.22
Hydrocinnamyl acetate	12.53	1874.2	0.05	9.86	1368.5	0.05
α -Copaene	7.29*	1450.0	[0.34]	9.91	1372.6	0.28
β -Cubebene	7.90	1495.9	0.02	10.09	1385.0	0.01
β -Elemene	8.57*	1547.7	[2.54]	10.15	1389.6	0.04
Isocaryophyllene	8.31*	1527.9	[0.01]	10.32	1401.6	0.02
α -Gurjunene	7.75	1484.4	0.01	10.37	1405.1	0.01
β -Caryophyllene	8.57*	1547.7	[2.54]	10.50	1414.3	2.53
(<i>E</i>)-Cinnamyl acetate	14.70	2081.7	4.20	10.91*†	1444.8	[4.18]
α -Humulene	9.42	1614.9	0.44	10.95*†	1447.8	[0.53]
(<i>E</i>)-Cinnamic acid	21.49	2840.1	0.16	10.95*†	1447.8	[0.53]
allo-Aromadendrene	9.05	1585.9	0.02	11.01	1452.5	0.02
(<i>E</i>)- β -Farnesene	9.63	1632.7	0.01	11.08	1457.3	0.01

Germacrene D	9.87*	1652.5	[0.39]	11.29	1473.1	0.01
ar-Curcumene	10.78	1728.8	0.04	11.39	1480.9	0.03
Viridiflorene	9.78	1644.7	0.01	11.52*	1490.0	[0.02]
Bicyclogermacrene	10.11	1672.3	0.01	11.52*	1490.0	[0.02]
α -Muurolene	10.16	1676.4	0.01	11.61	1497.0	0.01
2,3-Epoxy-cinnamyl acetate I?	16.46	2260.9	0.01	11.67	1501.6	0.01
γ -Cadinene	10.46*	1701.4	[0.02]	11.75	1507.3	0.02
Cubebol	12.70	1890.0	0.01	11.79	1510.4	0.02
<i>trans</i> -Calamenene	11.35	1767.9	0.03	11.89	1518.3	0.03
δ -Cadinene	10.54	1708.2	0.05	11.91	1519.8	0.06
(<i>E</i>)- <i>ortho</i> -Methoxycinnamal	17.26	2346.6	0.16	11.96	1524.3	0.13
Eugenyl acetate				12.00	1527.4	0.02
α -Calacorene	12.22*	1846.3	[0.04]	12.12	1536.9	0.02
Isocaryophyllene epoxide B				12.22	1544.6	0.03
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]	21.03*	2783.0	[0.09]	12.30	1550.9	0.01
Caryophyllenyl alcohol	13.74	1988.1	0.03	12.45	1562.8	0.04
Spathulenol	14.50	2061.6	0.02	12.57	1571.5	0.01
Caryophyllene oxide	12.90	1908.2	0.33	12.60*	1574.4	[0.34]
Caryophyllene oxide isomer	12.82	1900.3	0.02	12.60*	1574.4	[0.34]
Humulene epoxide II	13.49*	1963.9	[70.17]	12.93	1600.2	0.06
Tetradecanal	12.60	1880.8	0.08	13.08	1612.2	0.10
1- <i>epi</i> -Cubebol	13.88	2001.3	0.01	13.20	1621.7	0.01
Caryophylladienol I?				13.24	1625.7	0.02
Caryophylladienol II	16.15	2228.3	0.03	13.29	1629.6	0.02
τ -Cadinol	15.03	2114.2	0.02	13.38	1636.7	0.01
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	16.91	2308.2	0.04	13.74	1666.6	0.03
Benzyl benzoate	18.93	2533.0	0.43	14.78	1754.8	0.41
Unknown CIZE I [m/z 93, 92 (57), 136 (34), 91 (23), 77 (13), 134 (11)...]				17.09	1964.9	0.01
Unknown CIZE II	21.03*	2783.0	[0.09]	18.56	2109.3	0.09

[m/z 69, 91 (57), 41 (49), 181 (32), 169 (25), 167 (22)...] Unknown CIZE III						
[m/z 69, 91 (56), 41 (49), 169 (34), 239 (28), 93 (23)...]	21.10	2791.3	0.04	18.65	2118.5	0.05
Total reported	98.51%			99.11%		

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is 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