Date : 2023-08-11

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 23H04-PTH01
Customer Identification : Cinnamon Leaf - India - CB0107R
Type : Essential Oil
Source : *Cinnamomum zeylanicum [syn. Cinnamomum verum]*
Customer : Plant Therapy

Checked an approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia

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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 : 2023-08-11

Physicochemical data

Refractive index : 1.5338 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2023-08-04

Conclusion

No adulterant, contaminant or diluent has been detected using this method.

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Analysis Summary - Consolidated Contents

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
Toluene	tr	Simple phenolic
Hexanal	tr	Aliphatic aldehyde
Ethyl 2-methylbutyrate	tr	Aliphatic ester
Ethylbenzene	tr	Simple phenolic
Styrene	0.02	Simple phenolic
Tricyclene	0.01	Monoterpene
α-Thujene	0.12	Monoterpene
α-Pinene	0.96	Monoterpene
Camphene	0.32	Monoterpene
α-Fenchene	0.01	Monoterpene
Benzaldehyde	0.19	Simple phenolic
Sabinene	0.01	Monoterpene
β-Pinene	0.30	Monoterpene
Myrcene	0.12	Monoterpene
Octanal	0.03	Aliphatic aldehyde
α-Phellandrene	0.96	Monoterpene
Δ3-Carene	0.09	Monoterpene
α-Terpinene	0.11	Monoterpene
meta-Cymene	0.02	Monoterpene
para-Cymene	0.79	Monoterpene
Limonene	0.31	Monoterpene
1,8-Cineole	0.12	Monoterpenic ether
β-Phellandrene	0.39	Monoterpene
(*Z*)-β-Ocimene	0.04	Monoterpene
(*E*)-β-Ocimene	0.05	Monoterpene
γ-Terpinene	0.03	Monoterpene
Acetophenone	0.01	Simple phenolic
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
para-Cymenene	0.02	Monoterpene
trans-Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Terpinolene	0.09	Monoterpene
trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	2.04	Monoterpenic alcohol
(3*E*)-2,7-Dimethyl-3,6-octadien-2-ol	0.05	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
α-Campholenal	0.01	Monoterpenic aldehyde
trans-Pinocarveol	0.01	Monoterpenic alcohol

Camphor	0.01	Monoterpenic ketone
Camphene hydrate	0.01	Monoterpenic alcohol
Hydrocinnamal	0.06	Phenylpropanoid
Benzyl acetate	0.03	Phenolic ester
Borneol	0.04	Monoterpenic alcohol
Terpinen-4-ol	0.10	Monoterpenic alcohol
Cryptone	0.01	Normonoterpenic ketone
para-Cymen-8-ol	0.04	Monoterpenic alcohol
α-Terpineol	0.24	Monoterpenic alcohol
Myrtenal	0.01	Monoterpenic aldehyde
cis-Piperitol	0.02	Monoterpenic alcohol
cis-α-Phellandrene epoxide (iPr vs Me)	0.04	Monoterpenic ether
trans-Piperitol	0.02	Monoterpenic alcohol
(*Z*)-Cinnamal	0.01	Phenylpropanoid
Hydrocinnamyl alcohol	0.09	Phenylpropanoid
ortho-Anisaldehyde	0.02	Simple phenolic
Geraniol	0.01	Monoterpenic alcohol
(*E*)-Cinnamal	1.22	Phenylpropanoid
Chavicol	0.15	Phenylpropanoid
Safrole	0.92	Phenylpropanoid
(*E*)-Cinnamyl alcohol	0.01	Phenylpropanoid
α-Cubebene	0.02	Sesquiterpene
Eugenol	76.47	Phenylpropanoid
Hydrocinnamyl acetate	0.13	Phenylpropanoid ester
ortho-Methoxyhydrocinnamal?	0.03	Phenylpropanoid
α-Copaene	0.62	Sesquiterpene
β-Cubebene	0.02	Sesquiterpene
β-Elemene	0.03	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
Methyleugenol	0.05	Phenylpropanoid
β-Caryophyllene	3.01	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.01	Sesquiterpene
Aromadendrene	0.05	Sesquiterpene
(*E*)-Cinnamyl acetate	1.00	Phenylpropanoid ester
α-Humulene	0.54	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.01	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
ar-Curcumene	0.02	Sesquiterpene
Viridiflorene	0.06	Sesquiterpene
Bicyclogermacrene	0.03	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.03	Sesquiterpene
δ-Cadinene	0.11	Sesquiterpene

(*E*)-*ortho*-Methoxycinnamal	0.01	Phenylpropanoid
Eugenyl acetate	1.25	Phenylpropanoid ester
α-Calacorene	0.01	Sesquiterpene
Isocaryophyllene epoxide B	0.03	Sesquiterpenic ether
Unknown	0.01	Phenylpropanoid
Caryophyllenyl alcohol	0.01	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.01	Sesquiterpenic alcohol
Spathulenol	0.07	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.49	Sesquiterpenic ether
Unknown	0.01	Oxygenated sesquiterpene
Humulene epoxide II	0.11	Sesquiterpenic ether
Tetradecanal	0.03	Aliphatic aldehyde
1,10-diepi-Cubenol	0.02	Sesquiterpenic alcohol
Caryophylladienol I	0.02	Sesquiterpenic alcohol
Caryophylladienol II	0.03	Sesquiterpenic alcohol
τ-Muurolol	0.01	Sesquiterpenic alcohol
τ-Cadinol	0.03	Sesquiterpenic alcohol
α-Muurolol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.05	Sesquiterpenic alcohol
(*E*)-Coniferyl alcohol	0.02	Phenylpropanoid
(*E*)-Coniferaldehyde	0.05	Phenylpropanoid
Benzyl benzoate	3.51	Phenolic ester
Consolidated total	**98.61**	

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.

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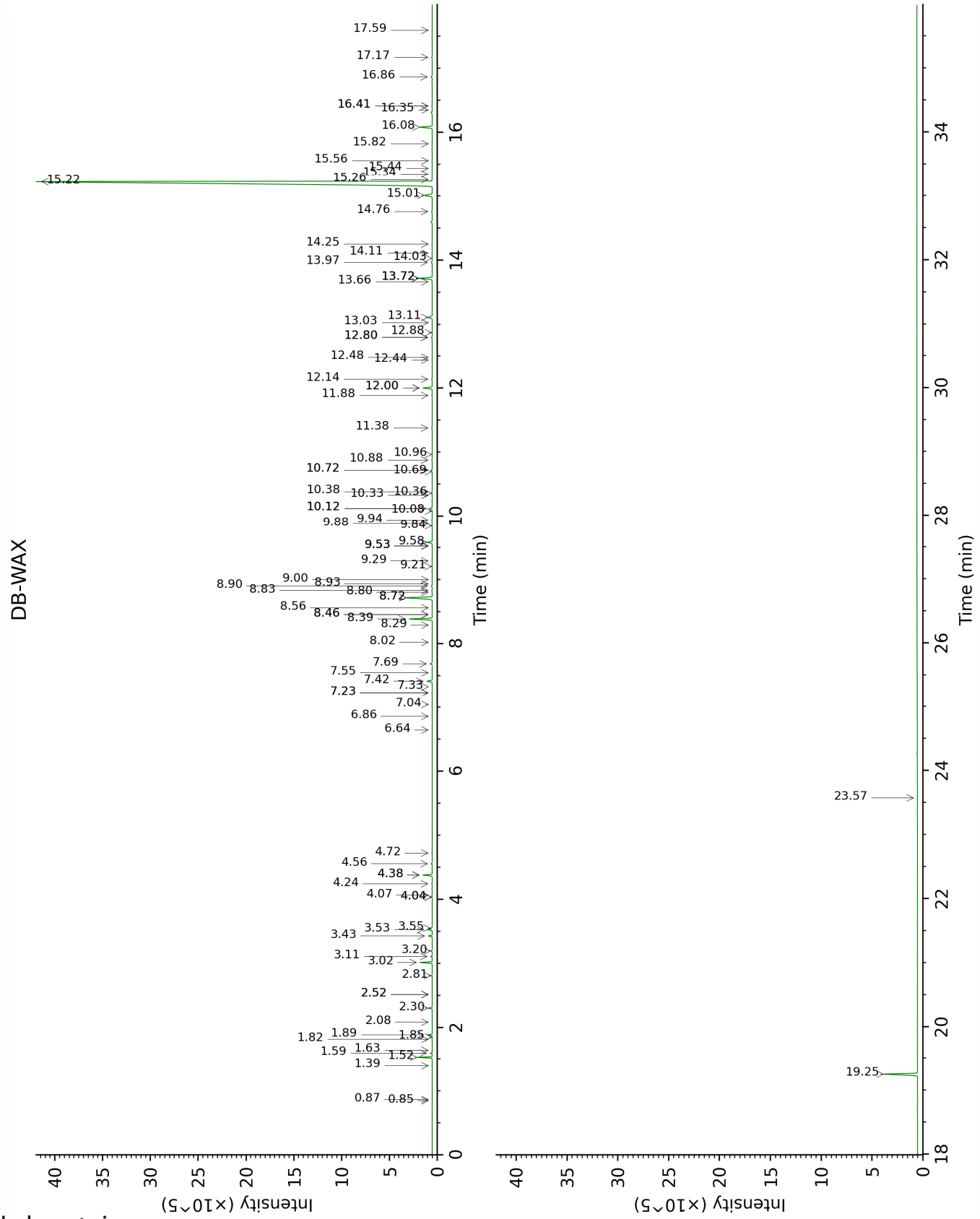
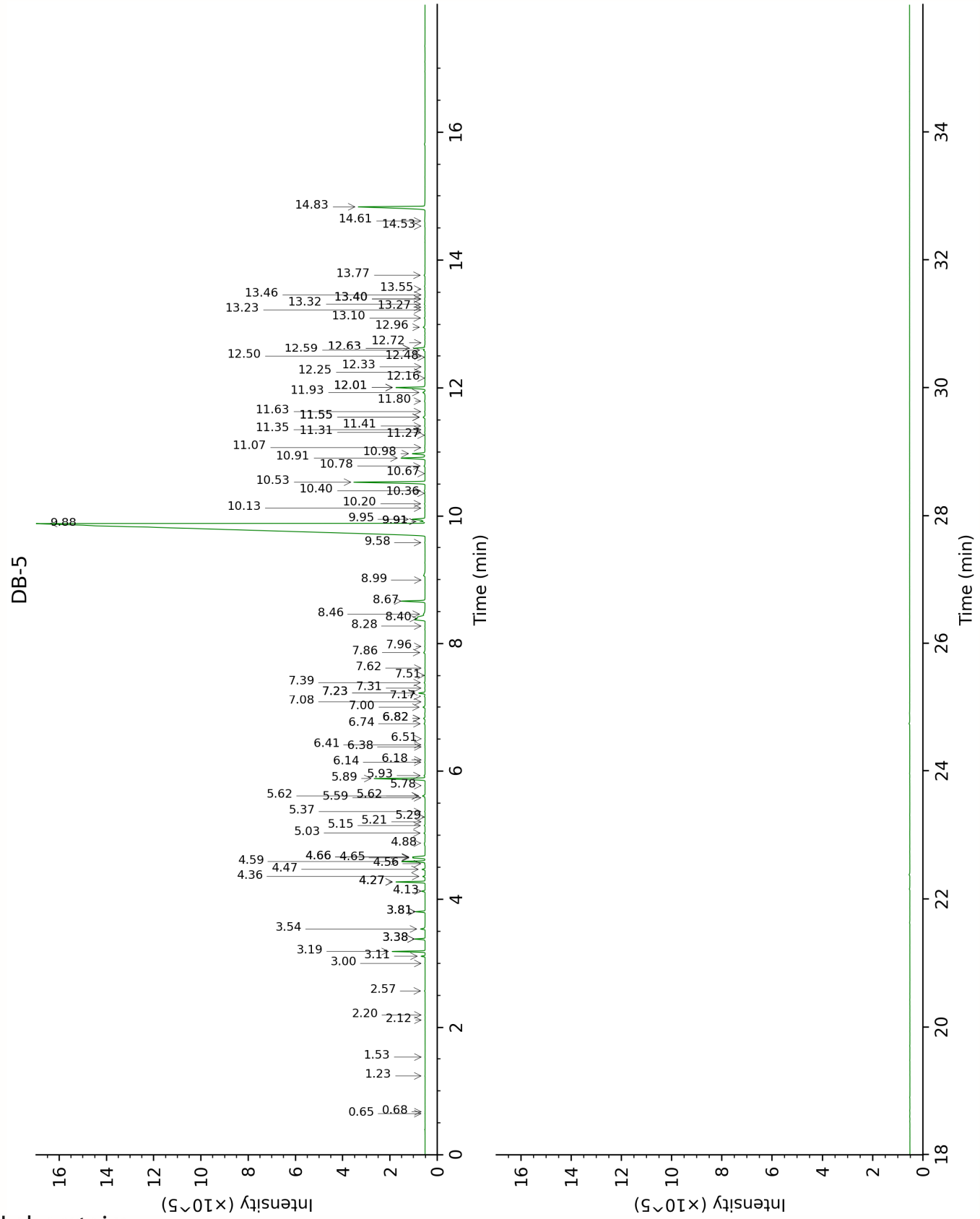

DB-WAX
Time (min)
Intensity (×10^5)
17.59
17.17
16.86
16.41
16.35
16.08
15.82
15.56
15.44
15.34
15.26
15.22
15.01
14.76
14.25
14.11
14.03
13.97
13.72
13.66
13.11
13.03
12.88
12.80
12.48
12.44
12.14
12.00
11.88
11.38
10.96
10.88
10.72
10.69
10.38
10.36
10.33
10.12
10.08
9.94
9.88
9.84
9.58
9.53
9.29
9.21
9.00
8.93
8.90
8.83
8.80
8.72
8.56
8.46
8.39
8.29
8.02
7.69
7.55
7.42
7.33
7.23
7.04
6.86
6.64
4.72
4.56
4.38
4.24
4.07
4.04
3.53
3.55
3.43
3.20
3.11
3.02
2.81
2.52
2.30
2.08
1.89
1.85
1.82
1.63
1.59
1.52
1.39
0.87
0.85
23.57
19.25


DB-5
Time (min)
Intensity (×10^5)
14.83
14.61
14.53
13.77
13.55
13.46
13.40
13.32
13.27
13.23
13.10
12.96
12.72
12.63
12.59
12.50
12.48
12.33
12.25
12.16
12.01
11.93
11.80
11.63
11.55
11.41
11.35
11.31
11.27
11.07
10.98
10.91
10.78
10.67
10.53
10.40
10.36
10.20
10.13
9.95
9.91
9.88
9.58
8.99
8.67
8.46
8.40
8.28
7.96
7.86
7.62
7.51
7.39
7.31
7.23
7.17
7.08
7.00
6.82
6.74
6.51
6.41
6.38
6.18
6.14
5.93
5.89
5.78
5.62
5.59
5.62
5.37
5.29
5.21
5.15
5.03
4.88
4.66
4.65
4.59
4.56
4.47
4.36
4.27
4.13
3.81
3.54
3.38
3.19
3.11
3.00
2.57
2.20
2.12
1.53
1.23
0.65
0.68

FULL ANALYSIS DATA

Isovaleral	Column DB-WAX			Column DB-5		
	0.87	887.8	tr	0.64	641.1	tr
2-Methylbutyral	0.85	881.5	tr	0.68	651.2	tr
Toluene	1.63	1000.4	0.01	1.23	759.4	tr
Hexanal	2.08	1043.3	tr	1.53	799.9	tr
Ethyl 2-methylbutyrate	1.85	1020.9	tr	2.12	849.7	tr
Ethylbenzene	2.52*	1084.5	[0.01]	2.20	856.4	tr
Styrene	4.07*†	1204.9	[0.03]	2.57	887.1	0.02
Tricyclene	1.39	969.5	0.01	3.00	918.6	0.01
α-Thujene	1.59	996.1	0.12	3.11	926.0	0.12
α-Pinene	1.52	989.4	0.97	3.19	930.9	0.96
Camphene	1.89	1024.4	0.32	3.38*	943.7	[0.34]
α-Fenchene	1.82	1017.8	0.01	3.38*	943.7	[0.34]
Benzaldehyde	7.69	1463.1	0.20	3.54	954.0	0.19
Sabinene	2.52*	1084.5	[0.01]	3.81*	971.7	[0.31]
β-Pinene	2.30	1064.2	0.30	3.81*	971.7	[0.31]
Myrcene	3.11	1131.5	0.12	4.13	992.7	0.12
Octanal	4.72	1252.8	0.03	4.27*	1002.2	[0.96]
α-Phellandrene	3.02	1124.4	0.96	4.27*	1002.2	[0.96]
Δ3-Carene	2.81	1108.5	0.08	4.36	1007.6	0.09
α-Terpinene	3.20	1138.2	0.11	4.47	1014.5	0.11
meta-Cymene	4.38*	1227.7	[0.81]	4.56	1020.0	0.02
para-Cymene	4.38*	1227.7	[0.81]	4.59	1022.2	0.79
Limonene	3.43	1156.3	0.31	4.65*†	1025.8	[0.37]
1,8-Cineole	3.55	1165.8	0.12	4.66*†	1026.5	[0.44]
β-Phellandrene	3.53	1164.0	0.39	4.66*†	1026.5	[0.44]
(*Z*)-β-Ocimene	4.04*†	1202.6	[0.03]	4.88	1040.0	0.04
(*E*)-β-Ocimene	4.24	1217.8	0.04	5.03	1049.8	0.05
γ-Terpinene	4.04*†	1202.6	[0.03]	5.15	1057.1	0.03
Acetophenone	9.21	1579.0	0.01	5.21	1060.9	0.01
cis-Sabinene hydrate	7.23*	1429.5	[0.03]	5.29	1065.5	0.01
cis-Linalool oxide (fur.)	6.86	1401.7	0.02	5.37	1070.8	0.02
para-Cymenene	6.64	1386.0	0.02	5.59	1084.2	0.02
trans-Linalool oxide (fur.)	7.23*	1429.5	[0.03]	5.62*	1086.0	[0.12]
Terpinolene	4.56	1240.6	0.09	5.62*	1086.0	[0.12]
trans-Sabinene hydrate	8.29	1508.6	0.01	5.78	1096.1	0.01
Linalool	8.39	1516.0	2.05	5.89	1103.0	2.04
(3*E*)-2,7-Dimethyl-3,6-octadien-2-ol	8.56	1529.2	0.01	5.93	1105.9	0.05
cis-para-Menth-2-en-1-ol	8.46*	1521.2	[0.03]	6.14	1119.2	0.02
α-Campholenal	7.33	1436.6	0.01	6.18	1121.5	0.01
trans-Pinocarveol	9.53*	1604.3	[0.02]	6.38	1134.4	0.01
Camphor	7.55	1452.8	0.01	6.41	1136.5	0.01
Camphene hydrate	8.80	1548.0	0.01	6.51	1142.5	0.01

Hydrocinnamal	10.88	1713.8	0.05	6.74	1157.4	0.06
Benzyl acetate	10.38	1673.0	0.03	6.82*	1162.7	[0.08]
Borneol	10.12*	1651.9	[0.29]	6.82*	1162.7	[0.08]
Terpinen-4-ol	8.90	1555.5	0.09	7.00	1173.9	0.10
Cryptone	9.53*	1604.3	[0.02]	7.08	1179.2	0.01
para-Cymen-8-ol	11.88	1798.8	0.04	7.17	1184.7	0.04
α-Terpineol	10.12*	1651.9	[0.29]	7.23*	1188.6	[0.25]
Myrtenal	9.00	1563.2	0.01	7.23*	1188.6	[0.25]
cis-Piperitol	9.88	1632.6	0.03	7.31	1193.6	0.02
cis-α-Phellandrene epoxide (iPr vs Me)	11.38	1755.8	0.04	7.39	1199.0	0.04
trans-Piperitol	10.69	1698.6	0.02	7.51	1206.3	0.02
(*Z*)-Cinnamal	12.14	1820.9	0.06	7.62	1213.9	0.01
Hydrocinnamyl alcohol	13.97	1984.3	0.10	7.86	1230.1	0.09
ortho-Anisaldehyde	12.88	1885.2	0.01	7.96	1236.5	0.02
Geraniol	12.00*	1809.0	[0.93]	8.28	1257.7	0.01
(*E*)-Cinnamal	13.72*	1961.8	[1.38]	8.40†	1265.7	0.61
Chavicol	16.86	2267.4	0.12	8.46	1270.1	0.15
Safrole	12.00*	1809.0	[0.93]	8.67	1283.7	0.92
(*E*)-Cinnamyl alcohol	16.35	2215.3	0.01	8.99	1305.7	0.01
α-Cubebene	7.04	1415.5	0.02	9.58	1346.8	0.02
Eugenol	15.22	2103.6	76.78	9.88	1367.8	76.47
Hydrocinnamyl acetate	12.80*	1878.8	[0.07]	9.91*	1370.3	[0.16]
ortho-Methoxyhydrocinnamal?	14.25	2011.2	0.03	9.91*	1370.3	[0.16]
α-Copaene	7.42	1443.1	0.51	9.95	1373.2	0.62
β-Cubebene	8.02	1487.9	0.01	10.13	1385.5	0.02
β-Elemene	8.72*	1541.6	[3.02]	10.20	1390.3	0.03
Isocaryophyllene	8.46*	1521.2	[0.03]	10.36	1401.8	0.03
Methyleugenol	13.66	1956.9	0.03	10.40	1404.6	0.05
β-Caryophyllene	8.72*	1541.6	[3.02]	10.53	1414.6	3.01
Caryophylla-4(12),8(13)-diene	8.93	1558.0	0.01	10.67	1424.6	0.01
Aromadendrene	8.83	1550.1	0.04	10.78	1433.3	0.05
(*E*)-Cinnamyl acetate	15.01	2082.5	1.04	10.91	1442.5	1.00
α-Humulene	9.58	1608.9	0.51	10.98	1447.7	0.54
allo-Aromadendrene	9.29	1585.6	0.03	11.07	1454.6	0.02
trans-Cadina-1(6),4-diene	9.53*	1604.3	[0.02]	11.26	1469.0	0.01
γ-Muurolene	9.84	1629.8	0.01	11.31	1472.4	0.02
Germacrene D	10.08	1648.8	0.01	11.35	1475.4	0.01
ar-Curcumene	10.96	1721.3	0.03	11.41	1479.7	0.02
Viridiflorene	9.94	1637.5	0.06	11.55*	1489.9	[0.10]
Bicyclogermacrene	10.36	1671.3	0.03	11.55*	1489.9	[0.10]
α-Muurolene	10.33	1668.6	0.02	11.63	1496.3	0.02

γ-Cadinene	10.72*	1700.6	[0.10]	11.80	1508.7	0.03
δ-Cadinene	10.72*	1700.6	[0.10]	11.93	1519.4	0.11
(*E*)-*ortho*-Methoxycinnamal	17.59	2343.6	0.01	12.01*	1525.5	[1.25]
Eugenyl acetate	16.08	2188.2	1.25	12.01*	1525.5	[1.25]
α-Calacorene	12.44	1847.0	0.01	12.16	1536.9	0.01
Isocaryophyllene epoxide B	12.48	1850.7	0.01	12.25	1544.2	0.03
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]				12.33	1550.8	0.01
Caryophyllenyl alcohol	14.03	1990.3	0.01	12.48	1562.4	0.01
(*E*)-Nerolidol	14.11	1997.9	0.03	12.50	1563.8	0.01
Spathulenol	14.76	2058.7	0.08	12.59	1571.1	0.07
Caryophyllene oxide isomer	13.03	1899.3	0.02	12.63*	1574.1	[0.49]
Caryophyllene oxide	13.11	1906.7	0.49	12.63*	1574.1	[0.49]
Unknown CYSC XX [m/z 161, 159 (69), 91 (41), 187 (38), 105 (37), 146 (35), 131 (34)...]	15.34	2115.5	0.02	12.72	1580.9	0.01
Humulene epoxide II	13.72*	1961.8	[1.38]	12.96	1599.8	0.11
Tetradecanal	12.80*	1878.8	[0.07]	13.10	1611.5	0.03
1,10-diepi-Cubenol	13.72*	1961.8	[1.38]	13.23	1621.8	0.02
Caryophylladienol I	16.41*	2221.6	[0.04]	13.27	1625.3	0.02
Caryophylladienol II	16.41*	2221.6	[0.04]	13.32	1629.3	0.03
τ-Muurolol	15.44	2124.7	0.01	13.40*	1635.9	[0.03]
τ-Cadinol	15.26	2106.8	0.03	13.40*	1635.9	[0.03]
α-Muurolol	15.56	2136.4	0.01	13.46	1641.0	0.01
α-Cadinol	15.82	2162.3	0.01	13.55	1648.5	0.02
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	17.17	2299.4	0.05	13.77	1666.2	0.05
(*E*)-Coniferyl alcohol	23.58	3048.9	0.01	14.53	1730.5	0.02
(*E*)-Coniferaldehyde				14.61	1737.4	0.05
Benzyl benzoate	19.25	2524.5	3.54	14.83	1756.4	3.51
Total reported		98.50%			98.57%	

*: 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

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