Date : 2026-05-21

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 26D07-PTH09
Customer Identification : Star Anise - China - A20108
Type : Essential Oil
Source : *Illicium verum*
Customer : Plant Therapy

Checked an 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2026-04-14 to make a correction in the sample identification section.

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 : Jean-Christophe Fortin, M. Sc.
Date : 2026-04-14

Physicochemical data

Refractive index : 1.5546 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2026-04-08

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
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
Hexanal	0.01	Aliphatic aldehyde
Furfural	tr	Furan
α-Thujene	0.01	Monoterpene
α-Pinene	0.56	Monoterpene
Camphene	0.01	Monoterpene
α-Fenchene	tr	Monoterpene
β-Pinene	0.05	Monoterpene
Sabinene	0.05	Monoterpene
Myrcene	0.07	Monoterpene
Pseudolimonene	tr	Monoterpene
α-Phellandrene	0.31	Monoterpene
Δ3-Carene	0.14	Monoterpene
α-Terpinene	0.04	Monoterpene
para-Cymene	0.07	Monoterpene
β-Phellandrene	0.21	Monoterpene
Limonene	0.25	Monoterpene
1,8-Cineole	0.14	Monoterpenic ether
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.01	Monoterpene
γ-Terpinene	0.05	Monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.04	Monoterpene
trans-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Methyl benzoate	0.01	Phenolic ester
Linalool	1.06	Monoterpenic alcohol
trans-Pinocarveol	0.01	Monoterpenic alcohol
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.10	Monoterpenic alcohol
α-Terpineol	0.06	Monoterpenic alcohol
Methylchavicol	3.27	Phenylpropanoid
Dihydroanethole	0.01	Phenylpropanoid
(*Z*)-Anethole	0.23	Phenylpropanoid
para-Anisaldehyde	0.49	Simple phenolic
(*E*)-Anethole	88.65	Phenylpropanoid
Methyl *meta*-anisate	0.02	Phenolic ester
α-Copaene	0.10	Sesquiterpene
Unknown	0.19	Phenylpropanoid

para-Acetonylanisole	0.07	Phenylpropanoid
β-Elemene	0.03	Sesquiterpene
β-Caryophyllene	0.45	Sesquiterpene
cis-α-Bergamotene	0.07	Sesquiterpene
trans-α-Bergamotene	0.52	Sesquiterpene
cis-β-Bergamotene?	0.02	Sesquiterpene
α-Humulene	0.05	Sesquiterpene
(*E*)-β-Farnesene	0.07	Sesquiterpene
Methyl (*Z*)-isoeugenol	0.05	Phenylpropanoid
Bicyclogermacrene	0.07	Sesquiterpene
Viridiflorene	0.05	Sesquiterpene
α-Muurolene	0.04	Sesquiterpene
β-Bisabolene	0.08	Sesquiterpene
γ-Cadinene	0.04	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.09	Sesquiterpene
δ-Cadinene	0.07	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene
α-Elemol	0.02	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.17	Sesquiterpenic alcohol
1-(4-Methoxyphenyl)propane-1,2-diol isomer II	0.06	Phenylpropanoid
(*Z*)-Foeniculin	0.01	Phenylpropanoid
Globulol	0.05	Sesquiterpenic alcohol
Viridiflorol	0.04	Sesquiterpenic alcohol
γ-Eudesmol	0.01	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
τ-Cadinol	0.02	Sesquiterpenic alcohol
β-Eudesmol	0.02	Sesquiterpenic alcohol
α-Cadinol	0.05	Sesquiterpenic alcohol
(*E*)-Foeniculin	1.00	Phenylpropanoid
Unknown	0.01	Phenylpropanoid
2,4-Bis-(4-methoxyphenyl)-3,5-dimethyltetrahydrofuran isomer I	0.02	Lignan
2,4-Bis-(4-methoxyphenyl)-3,5-dimethyltetrahydrofuran isomer II	0.02	Lignan
Consolidated total	**99.60**	

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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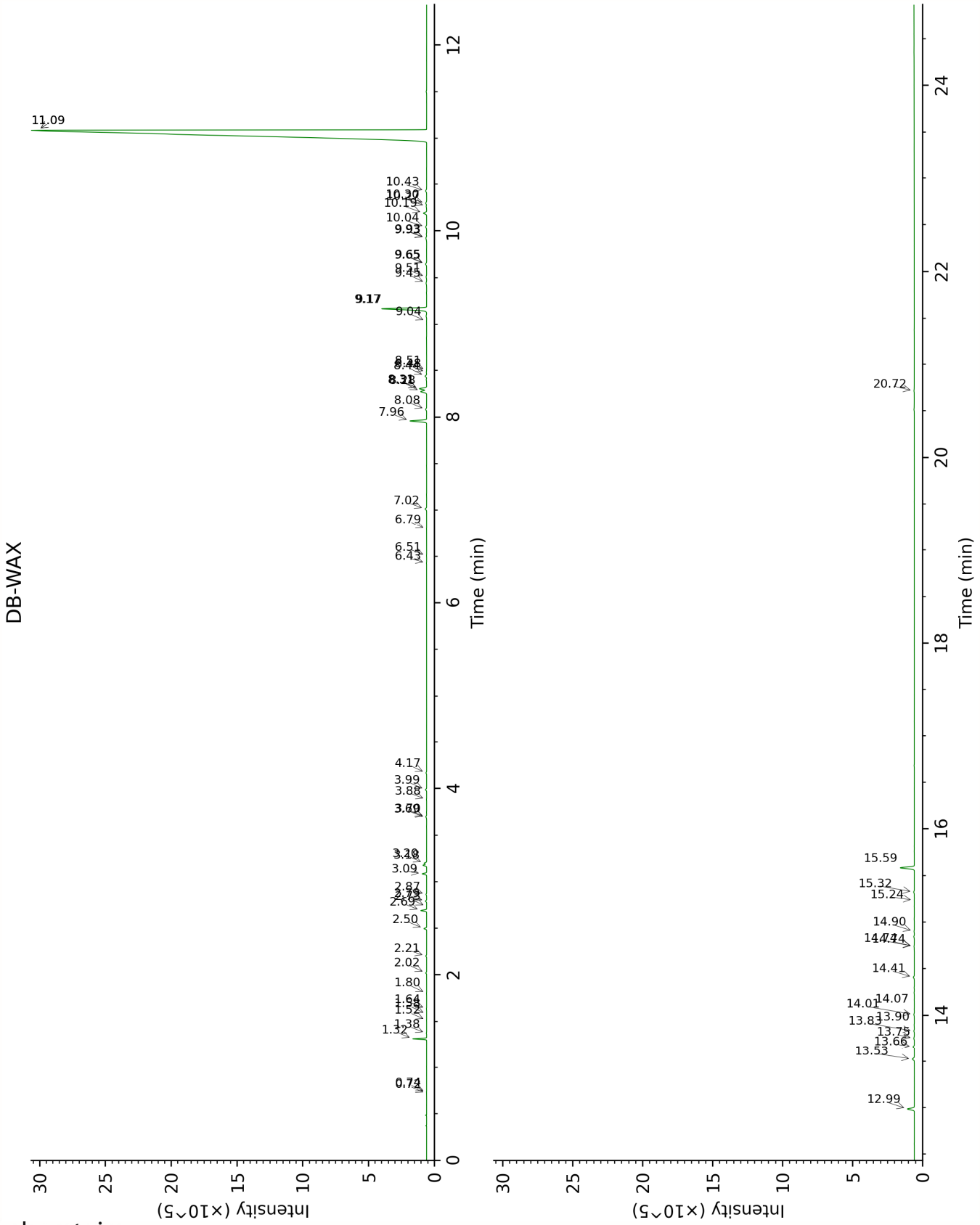
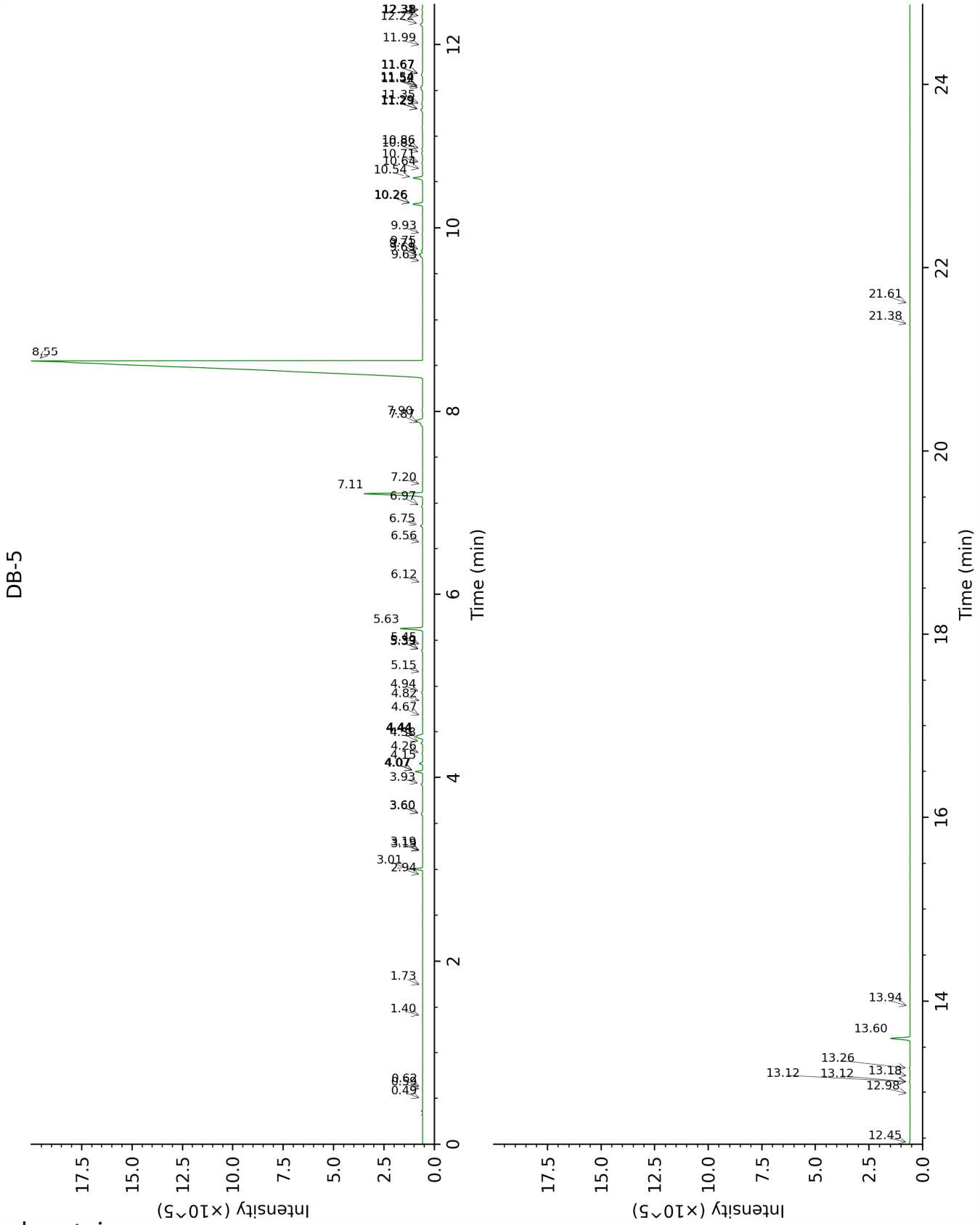

DB-WAX
Time (min)
Intensity (×10^5)
11.09
10.43
10.30
10.19
10.04
9.93
9.65
9.51
9.45
9.17
9.04
8.51
8.48
8.31
8.18
8.08
7.96
7.02
6.79
6.51
6.43
4.17
3.99
3.88
3.69
3.20
3.09
2.87
2.79
2.69
2.50
2.21
2.02
1.80
1.64
1.58
1.52
1.38
1.32
0.74
0.72
20.72
15.59
15.32
15.24
14.90
14.74
14.41
14.07
14.01
13.90
13.83
13.75
13.66
13.53
12.99


DB-5
Time (min)
Intensity (×10^5)
8.55
7.11
5.63
1.73
1.40
0.63
0.49
21.61
21.38
13.94
13.60
13.26
13.12
13.12
13.18
12.98
12.45

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
2-Methyl-3-buten-2-ol	1.52	1014.7	tr	0.49	605.8	tr
Isovaleral	0.74	885.4	0.01	0.59	642.8	0.01
2-Methylbutyral	0.72	879.2	tr	0.62	652.9	tr
Hexanal	1.80	1043.1	0.01	1.40	799.8	0.01
Furfural	6.51	1405.9	0.01	1.73	829.8	tr
α-Thujene	1.38	999.2	0.01	2.94	926.2	0.01
α-Pinene	1.32	989.5	0.56	3.01	930.9	0.56
Camphene	1.64	1026.9	0.01	3.19*	943.4	[0.01]
α-Fenchene	1.58	1021.2	tr	3.19*	943.4	[0.01]
β-Pinene	2.02	1064.6	0.05	3.60*†	970.6	[0.05]
Sabinene	2.20	1082.7	0.05	3.60*†	970.6	[0.05]
Myrcene	2.79	1133.2	0.06	3.93	992.8	0.07
Pseudolimonene	2.73	1128.5	tr	4.07*	1002.0	[0.32]
α-Phellandrene	2.69	1125.3	0.31	4.07*	1002.0	[0.32]
Δ3-Carene	2.50	1110.1	0.14	4.15	1007.8	0.14
α-Terpinene	2.86	1138.8	0.04	4.26	1014.6	0.04
para-Cymene	3.99	1226.1	0.07	4.38	1021.9	0.07
β-Phellandrene	3.18	1163.5	0.21	4.44*†	1026.0	[0.20]
Limonene	3.09	1156.3	0.25	4.44*†	1026.0	[0.20]
1,8-Cineole	3.20	1165.2	0.14	4.44*†	1026.0	[0.20]
(*Z*)-β-Ocimene	3.69	1203.8	0.01	4.67	1040.3	0.01
(*E*)-β-Ocimene	3.88	1218.3	0.01	4.82	1050.1	0.01
γ-Terpinene	3.70	1204.7	0.05	4.94	1057.4	0.05
cis-Linalool oxide (fur.)	6.43	1400.0	0.01	5.15	1070.7	0.01
Terpinolene	4.17	1239.4	0.04	5.39*	1086.5	[0.05]
trans-Linalool oxide (fur.)	6.79	1427.3	0.01	5.39*	1086.5	[0.05]
Methyl benzoate	8.50	1557.9	0.01	5.45	1090.2	0.01
Linalool	7.96	1515.4	1.07	5.63	1101.7	1.06
trans-Pinocarveol	9.04	1599.4	0.01	6.12	1133.2	0.01
Borneol	9.65*	1649.3	[0.09]	6.56	1161.8	0.01
Terpinen-4-ol	8.44	1553.0	0.10	6.75	1174.1	0.10
α-Terpineol	9.65*	1649.3	[0.09]	6.97	1188.4	0.06
Methylchavicol	9.17*	1610.2	[3.31]	7.11	1197.5	3.27
Dihydroanethole	8.48	1556.2	0.02	7.20	1203.6	0.01
(*Z*)-Anethole	10.19	1693.7	0.23	7.87†	1248.9	0.11
para-Anisaldehyde	12.99	1939.2	0.49	7.90†	1251.3	0.60
(*E*)-Anethole	11.09*	1769.8	[88.60]	8.55	1295.9	88.65
Methyl *meta*-anisate				9.63	1368.9	0.02
α-Copaene	7.02	1444.1	0.11	9.69	1373.1	0.10
Unknown FOVU I [121, 91 (60), 120 (39), 164 (37), 77 (34), 135 (26)]	13.52	1989.1	0.15	9.71	1374.8	0.19
para-Acetonylanisole	14.41	2074.1	0.08	9.75	1377.7	0.07

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β-Elemene	8.31*	1542.4	[0.51]	9.93	1390.4	0.03
β-Caryophyllene	8.28	1540.0	0.45	10.26*	1414.1	[0.51]
cis-α-Bergamotene	8.08	1525.0	0.07	10.26*	1414.1	[0.51]
trans-α-Bergamotene	8.31*	1542.4	[0.51]	10.54	1435.4	0.52
cis-β-Bergamotene?				10.64	1442.9	0.02
α-Humulene	9.17*	1610.2	[3.31]	10.71	1448.2	0.05
(*E*)-β-Farnesene	9.44	1632.7	0.06	10.82	1456.3	0.07
Methyl (*Z*)-isoeugenol	14.01	2035.4	0.04	10.86	1459.6	0.05
Bicyclogermacrene	9.93*	1672.0	[0.08]	11.29*	1491.5	[0.12]
Viridiflorene	9.51	1638.0	0.05	11.29*	1491.5	[0.12]
α-Muurolene	9.93*	1672.0	[0.08]	11.35	1496.1	0.04
β-Bisabolene	10.04	1681.7	0.08	11.52	1508.6	0.08
γ-Cadinene	10.26	1699.7	0.04	11.54*	1510.5	[0.11]
(3*E*,6*E*)-α-Farnesene	10.43	1713.5	0.09	11.54*	1510.5	[0.11]
δ-Cadinene	10.30	1702.5	0.07	11.67*	1521.2	[0.09]
trans-Calamenene	11.09*	1769.8	[88.60]	11.67*	1521.2	[0.09]
α-Elemol	13.90	2024.6	0.02	11.99	1546.0	0.02
(*E*)-Nerolidol	13.66	2001.8	0.08	12.22	1564.4	0.17
1-(4-Methoxyphenyl)propane-1,2-diol isomer II	20.72	2771.7	0.02	12.31	1571.2	0.06
(*Z*)-Foeniculin	14.07	2041.2	0.01	12.38*	1577.4	[0.04]
Globulol	13.75	2010.4	0.05	12.38*	1577.4	[0.04]
Viridiflorol	13.83	2018.2	0.04	12.45	1582.6	0.04
γ-Eudesmol	14.74*	2106.3	[0.03]	12.98	1625.7	0.01
τ-Muurolol	14.90	2122.5	0.02	13.12*	1636.6	[0.04]
τ-Cadinol	14.74*	2106.3	[0.03]	13.12*	1636.6	[0.04]
β-Eudesmol	15.24	2156.3	0.01	13.18	1641.8	0.02
α-Cadinol	15.32	2165.2	0.05	13.26	1649.0	0.05
(*E*)-Foeniculin	15.58	2191.4	1.00	13.60	1676.7	1.00
Unknown FOVU VII [m/z 137, 109 (15), 43 (10), 164 (9), 138 (9)...]				13.94	1705.4	0.01
2,4-Bis-(4-methoxyphenyl)-3,5-dimethyltetrahydrofuran isomer I				21.38	2446.9	0.02
2,4-Bis-(4-methoxyphenyl)-3,5-dimethyltetrahydrofuran isomer II				21.61	2473.0	0.02
Total reported		99.22%			99.09%	

*: 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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