CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22K01-PTH02
Customer identification : Nutmeg - Sri Lanka - N40111R
Type : Essential oil
Source : *Myristica fragrans*
Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014 ✳ISO - 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 2014-005
Analysis date : November 03, 2022

Checked and approved by :

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

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MÉTHODE CERTIFIÉE
✳ISO 17025:2017
CERTIFIED METHOD

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4791 ± 0.0003 (20 °C; method PC-MAT-016)

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
Tricyclene	0.03	Monoterpene
α-Thujene	2.12	Monoterpene
α-Pinene	19.03	Monoterpene
Camphene	0.31	Monoterpene
α-Fenchene	0.05	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.03	Monoterpene
Sabinene	26.38	Monoterpene
β-Pinene	14.49	Monoterpene
Octen-3-ol	0.01	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	2.12	Monoterpene
2-Carene	0.01	Monoterpene
α-Phellandrene	0.91	Monoterpene
Pseudolimonene	0.05	Monoterpene
Δ3-Carene	0.79	Monoterpene
α-Terpinene	3.08	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
para-Cymene	0.76	Monoterpene
1,8-Cineole	1.94	Monoterpenic ether
Limonene	4.22	Monoterpene
(Z)-β-Ocimene	0.01	Monoterpene
(E)-β-Ocimene	0.03	Monoterpene
γ-Terpinene	4.21	Monoterpene
cis-Sabinene hydrate	0.14	Monoterpenic alcohol
para-Cymenene	0.11	Monoterpene
Terpinolene	1.71	Monoterpene
α-Pinene oxide	0.01	Monoterpenic ether
trans-Sabinene hydrate	0.10	Monoterpenic alcohol
Unknown	0.08	Oxygenated monoterpene
Linalool	0.18	Monoterpenic alcohol
endo-Fenchol	0.03	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.08	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.01	Aliphatic alcohol
trans-Pinocarveol	0.01	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.05	Monoterpenic alcohol
Epoxyterpinolene	0.03	Monoterpenic ether
Unknown	0.01	Unknown
Sabinaketone	0.01	Normonoterpenic ketone
Pinocarvone	0.01	Monoterpenic ketone
Borneol	0.03	Monoterpenic alcohol
δ-Terpineol	0.01	Monoterpenic alcohol
Terpinen-4-ol	4.18	Monoterpenic alcohol

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para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	0.60	Monoterpenic alcohol
cis-Piperitol	0.03	Monoterpenic alcohol
Myrtenol	0.01	Monoterpenic alcohol
trans-Piperitol	0.03	Monoterpenic alcohol
endo-Fenchyl acetate	0.02	Monoterpenic ester
Citronellol	0.01	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
Unknown	0.04	Unknown
Geraniol	0.03	Monoterpenic alcohol
trans-Ascaridole glycol	0.02	Monoterpenic alcohol
Phellandral	0.02	Monoterpenic aldehyde
Bornyl acetate	0.05	Monoterpenic ester
Safrole	0.90	Phenylpropanoid
cis-Ascaridole glycol	0.03	Monoterpenic alcohol
Cuminol	0.02	Monoterpenic alcohol
Terpinen-4-yl acetate	0.02	Monoterpenic ester
Unknown	0.03	Unknown
Thymol	0.01	Monoterpenic alcohol
Unknown	0.13	Simple phenolic
Carvacrol	0.01	Monoterpenic alcohol
Unknown	0.02	Monoterpenic alcohol
1,4-para-Menthadien-7-ol	0.01	Monoterpenic alcohol
Unknown	0.03	Unknown
α-Terpinyl acetate	0.08	Monoterpenic ester
α-Cubebene	0.02	Sesquiterpene
Eugenol	0.16	Phenylpropanoid
Citronellyl acetate	0.06	Monoterpenic ester
Neryl acetate	0.02	Monoterpenic ester
α-Copaene	0.29	Sesquiterpene
Geranyl acetate	0.12	Monoterpenic ester
β-Cubebene	0.01	Sesquiterpene
β-Elemene	0.02	Sesquiterpene
Methyleugenol	0.36	Phenylpropanoid
cis-α-Bergamotene	0.01	Sesquiterpene
β-Caryophyllene	0.19	Sesquiterpene
trans-α-Bergamotene	0.08	Sesquiterpene
(*E*)-Isoeugenol	0.46	Phenylpropanoid
(*E*)-β-Farnesene	0.03	Sesquiterpene
trans-Cadina-1(6),4-diene	0.01	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
Germacrene D	0.04	Sesquiterpene
Bicyclogermacrene	0.02	Sesquiterpene
Methyl (*E*)-isoeugenol	0.46	Phenylpropanoid
(*Z*)-α-Bisabolene	0.01	Sesquiterpene
β-Bisabolene	0.03	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.01	Sesquiterpene
γ-Cadinene	tr	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
Myristicin	6.06	Phenylpropanoid
δ-Cadinene	0.01	Sesquiterpene
trans-Cadina-1,4-diene	0.02	Sesquiterpene

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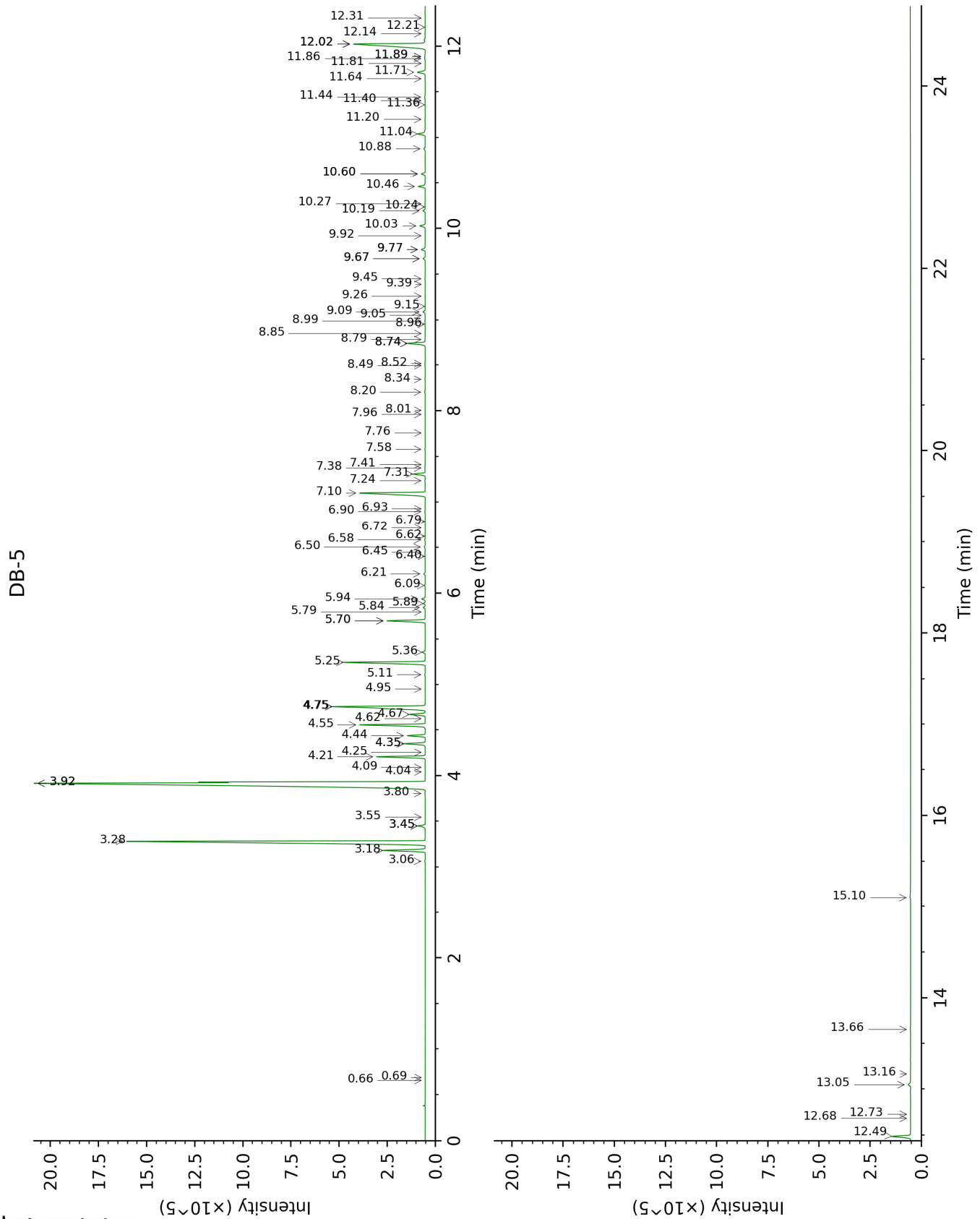| α-Calacorene	0.01	Sesquiterpene
(*E*)-α-Bisabolene	0.01	Sesquiterpene
Elemicin	0.93	Phenylpropanoid
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Methoxyeugenol	0.17	Phenylpropanoid
Unknown	0.02	Phenylpropanoid
(*E*)-Isoelemicin	0.03	Phenylpropanoid
Myristic acid	0.08	Aliphatic acid
Consolidated total	**99.38%**	

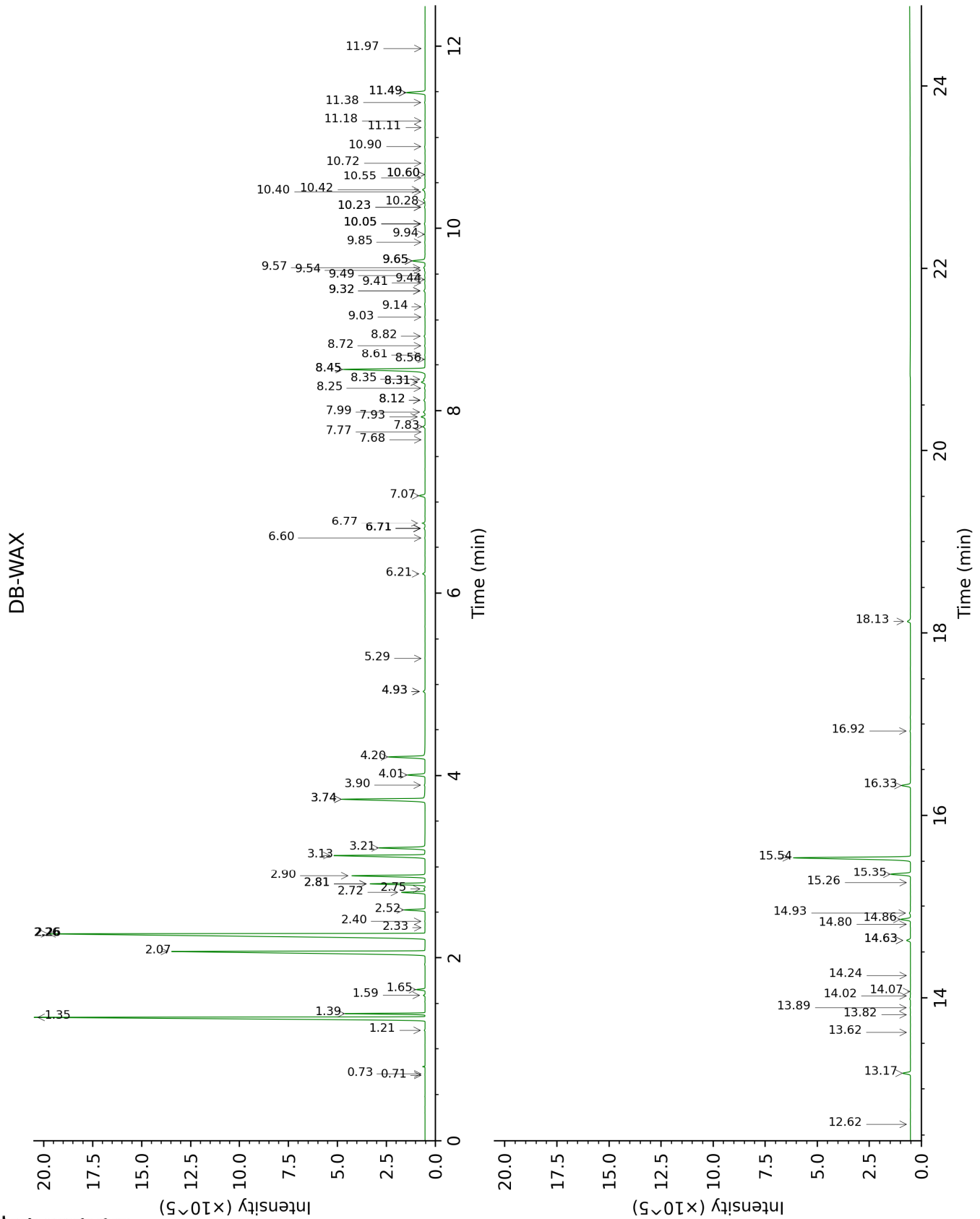tr: The compound has been detected below 0.005% of total signal.

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.

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

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DB-5

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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DB-WAX

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.66	642	tr	0.73	887	tr
2-Methylbutyral	0.69	652	tr	0.71	881	tr
Tricyclene	3.06	919	0.03	1.21	974	0.02
α-Thujene	3.18	926	2.12	1.39	1002	2.13
α-Pinene	3.28	933	19.03	1.35	998	19.06
Camphene	3.45*	944	0.37	1.65	1028	0.31
α-Fenchene	3.45*	944	[0.37]	1.59	1022	0.05
Thuja-2,4(10)-diene	3.55	950	0.01	2.26*	1090	26.53
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.80	967	0.03	2.81*	1135	2.13
Sabinene	3.92*	975	40.87	2.26*	1090	[26.53]
β-Pinene	3.92*	975	[40.87]	2.07	1070	14.49
Octen-3-ol	4.04	983	0.01	6.71*	1423	0.05
6-Methyl-5-hepten-2-one	4.09	986	0.02	4.93*	1300	0.09
Myrcene	4.21	994	2.12	2.81*	1135	[2.13]
2-Carene	4.25	997	0.01	2.33	1097	0.01
α-Phellandrene	4.35*	1003	0.97	2.72	1128	0.91
Pseudolimonene	4.35*	1003	[0.97]	2.75	1131	0.05
Δ3-Carene	4.44	1008	0.79	2.52	1112	0.77
α-Terpinene	4.55	1016	3.08	2.90	1142	3.08
Carvomenthene	4.62	1020	0.01	2.40	1102	0.01
para-Cymene	4.67	1023	0.76	4.01	1230	0.76
1,8-Cineole	4.75*	1028	6.21	3.21	1168	1.94
Limonene	4.75*	1028	[6.21]	3.13	1161	4.22
(*Z*)-β-Ocimene	4.95	1041	0.01	3.74*	1210	4.18
(*E*)-β-Ocimene	5.11	1051	0.03	3.90	1222	0.04
γ-Terpinene	5.24	1059	4.21	3.74*	1210	[4.18]
cis-Sabinene hydrate	5.36	1066	0.14	6.77	1428	0.15
para-Cymenene	5.70*	1087	1.85	6.21	1386	0.11
Terpinolene	5.70*	1087	[1.85]	4.20	1245	1.71
α-Pinene oxide	5.80	1093	0.01	5.29	1319	0.01
trans-Sabinene hydrate	5.84	1096	0.10	7.83	1508	0.10
Unknown [m/z 95, 152 (20), 67 (17), 96 (16), 41 (12)]	5.89	1099	0.08	4.93*	1300	[0.09]
Linalool	5.94	1102	0.18	7.94	1516	0.18
endo-Fenchol	6.09	1112	0.03	8.25	1540	0.03
cis-para-Menth-2-en-1-ol	6.21	1120	0.08	7.99	1520	0.08
4-Hydroxy-4-methylcyclohex-2-enone	6.40	1132	0.01	13.89	2028	0.02
trans-Pinocarveol	6.45	1135	0.01	9.03	1602	0.02
trans-para-Menth-2-en-1-ol	6.50	1138	0.05	8.82	1585	0.05

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Epoxyterpinolene	6.58	1143	0.03	6.60	1416	0.01
Unknown [m/z 109, 124 (45), 119 (41), 43 (35), 91 (28), 95 (25)...]	6.62	1146	0.01	6.71*	1423	[0.05]
Sabinaketone	6.72	1152	0.01	8.56	1565	0.01
Pinocarvone	6.79	1156	0.01	7.77	1503	0.01
Borneol	6.90	1164	0.03	9.65*	1652	0.66
δ-Terpineol	6.93	1166	0.01	9.32*	1625	0.07
Terpinen-4-ol	7.10	1176	4.18	8.45*	1556	4.33
para-Cymen-8-ol	7.24	1185	0.03	11.38	1798	0.02
α-Terpineol	7.31	1190	0.60	9.65*	1652	[0.66]
cis-Piperitol	7.38	1194	0.03	9.44	1635	0.02
Myrtenol	7.41	1196	0.01	10.72	1741	0.01
trans-Piperitol	7.58	1207	0.03	10.23*	1700	0.03
endo-Fenchyl acetate	7.76	1219	0.02	6.71*	1423	[0.05]
Citronellol	7.96	1232	0.01	10.60*	1731	0.02
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	8.01	1235	0.02	11.18	1781	0.01
Unknown [m/z 43, 109 (63), 71 (50), 81 (31), 55 (29), 85 (26)...]	8.20	1249	0.04	9.54	1643	0.03
Geraniol	8.34	1258	0.03	11.49*	1808	0.94
trans-Ascaridole glycol	8.49	1268	0.02	14.02	2040	0.01
Phellandral	8.52	1270	0.02	9.85	1668	0.02
Bornyl acetate	8.74*	1285	0.95	8.12*	1530	0.07
Safrole	8.74*	1285	[0.95]	11.49*	1808	[0.94]
cis-Ascaridole glycol	8.79	1288	0.03	14.63*	2099	0.19
Cuminol	8.85	1292	0.02	14.07	2045	0.01
Terpinen-4-yl acetate	8.96	1299	0.02	8.61	1568	0.02
Unknown [m/z 81, 55 (82), 41 (58), 69 (51), 67 (49)...]	8.99	1301	0.03	10.90	1757	0.03
Thymol	9.05	1303	0.01	14.93	2129	0.06
Unknown [m/z 121, 178 (20), 77 (13), 122 (10)]	9.09	1306	0.13	8.45*	1556	[4.33]
Carvacrol	9.15	1310	0.01	15.26	2162	0.01
Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	9.26	1318	0.02	14.80	2116	0.01
1,4-para-Menthadien-7-ol	9.39	1327	0.01	13.62	2002	0.01
Unknown [m/z 149, 178 (41), 121 (36), 91 (30), 55 (21)]	9.45	1331	0.03	8.72	1577	0.02

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Compound	R.T.	R.I.	%	R.T.	R.I.	%
α-Terpinyl acetate	9.67*	1347	0.12	9.57	1646	0.08
α-Cubebene	9.67*	1347	[0.12]	6.71*	1423	[0.05]
Eugenol	9.77*	1354	0.23	14.63*	2099	[0.19]
Citronellyl acetate	9.77*	1354	[0.23]	9.32*	1625	[0.07]
Neryl acetate	9.92	1364	0.02	10.05*	1685	0.05
α-Copaene	10.03	1372	0.29	7.07	1451	0.29
Geranyl acetate	10.19	1384	0.12	10.42	1716	0.13
β-Cubebene	10.24	1387	0.01	7.68	1496	0.01
β-Elemene	10.27	1389	0.02	8.31*†	1545	0.29
Methyleugenol	10.46	1402	0.36	13.17	1959	0.36
cis-α-Bergamotene	10.60*	1413	0.20	8.12*	1530	[0.07]
β-Caryophyllene	10.60*	1413	[0.20]	8.31*†	1545	[0.29]
trans-α-Bergamotene	10.88	1434	0.08	8.34†	1548	[0.29]
(*E*)-Isoeugenol	11.04	1446	0.46	16.33	2272	0.43
(*E*)-β-Farnesene	11.20	1458	0.03	9.41	1632	0.02
trans-Cadina-1(6),4-diene	11.36	1469	0.01	9.14	1611	0.01
γ-Muurolene	11.40	1473	0.02	9.49	1639	0.03
Germacrene D	11.44	1476	0.04	9.65*	1652	[0.66]
Bicyclogermacrene	11.64	1491	0.02	9.94	1675	0.02
Methyl (*E*)-isoeugenol	11.72	1496	0.46	14.86	2122	0.45
(*Z*)-α-Bisabolene	11.81	1503	0.01	10.05*	1685	[0.05]
β-Bisabolene	11.86	1507	0.03	10.05*	1685	[0.05]
(3*E*,6*E*)-α-Farnesene	11.89*	1509	0.03	10.40	1714	0.01
γ-Cadinene	11.89*	1509	[0.03]	10.23*	1700	[0.03]
trans-Calamenene	12.02*†	1520	6.14	11.11	1774	0.01
Myristicin	12.02*†	1520	[6.14]	15.54	2190	6.06
δ-Cadinene	12.02*†	1520	[6.14]	10.28	1704	0.01
trans-Cadina-1,4-diene	12.14	1529	0.02	10.55	1727	0.01
α-Calacorene	12.21	1534	0.01	11.97	1850	0.01
(*E*)-α-Bisabolene	12.31	1542	0.01	10.60*	1731	[0.02]
Elemicin	12.49	1556	0.93	15.35	2171	0.95
Spathulenol	12.68	1571	0.01	14.24	2062	0.01
Caryophyllene oxide	12.73	1575	0.01	12.62	1908	0.01
Methoxyeugenol	13.05	1600	0.17	18.13	2468	0.16
Unknown [m/z 165, 121 (81), 181 (25), 238 (25)]	13.16	1609	0.02	13.82	2020	0.01
(*E*)-Isoelemicin	13.66	1650	0.03	16.92	2336	0.02
Myristic acid	15.10	1771	0.08			
Total identified		**99.23%**			**99.24%**	
Total reported		**99.60%**			**99.35%**	

*: 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

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