Date : November 11, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22J28-NSO03
Customer identification : Organic EO: Eucalyptus radiata Lot# B406024 - Botanical Species: Eucalyptus radiata
Type : Essential oil
Source : *Eucalyptus radiata*
Customer : Natural Sourcing LLC

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 : Amélie Simard, Analyste
Analysis date : November 09, 2022

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

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Essential oil, *Eucalyptus radiata*
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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4636 ± 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
Ethanol	tr	Aliphatic alcohol
Isovaleral	tr	Aliphatic aldehyde
Hexanal	0.01	Aliphatic aldehyde
(2*E*)-Hexenal	0.04	Aliphatic aldehyde
(3*Z*)-Hexenol	0.04	Aliphatic alcohol
Isovaleric acid	0.03	Aliphatic acid
Hexanol	0.04	Aliphatic alcohol
α-Thujene	0.21	Monoterpene
α-Pinene	2.62	Monoterpene
α-Fenchene	0.02	Monoterpene
Camphene	0.03	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	2.10	Monoterpene
β-Pinene	0.79	Monoterpene
trans-para-Menthane	0.02	Monoterpene
Unknown	0.02	Unknown
trans-Dehydroxylinalool oxide	0.02	Monoterpenic ether
Myrcene	1.53	Monoterpene
Pseudolimonene	0.02	Monoterpene
α-Phellandrene	0.59	Monoterpene
Δ3-Carene	0.02	Monoterpene
α-Terpinene	0.24	Monoterpene
para-Cymene	0.15	Monoterpene
Limonene	6.43	Monoterpene
1,8-Cineole	66.41	Monoterpenic ether
(*Z*)-β-Ocimene	0.03	Monoterpene
(*E*)-β-Ocimene	0.23	Monoterpene
γ-Terpinene	0.38	Monoterpene
cis-Sabinene hydrate	0.03	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Terpinolene	0.14	Monoterpene
trans-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
trans-Sabinene hydrate	0.02	Monoterpenic alcohol
Linalool	0.46	Monoterpenic alcohol
Unknown	0.01	Unknown
cis-para-Menth-2-en-1-ol	0.19	Monoterpenic alcohol
trans-Pinocarveol	0.01	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.12	Monoterpenic alcohol
Isopulegol	0.03	Monoterpenic alcohol
Citronellal	0.05	Monoterpenic aldehyde
δ-Terpineol	0.19	Monoterpenic alcohol
Terpinen-4-ol	0.86	Monoterpenic alcohol
Cryptone	0.01	Normonoterpenic ketone
α-Terpineol	10.43	Monoterpenic alcohol
Myrtenol	0.01	Monoterpenic alcohol

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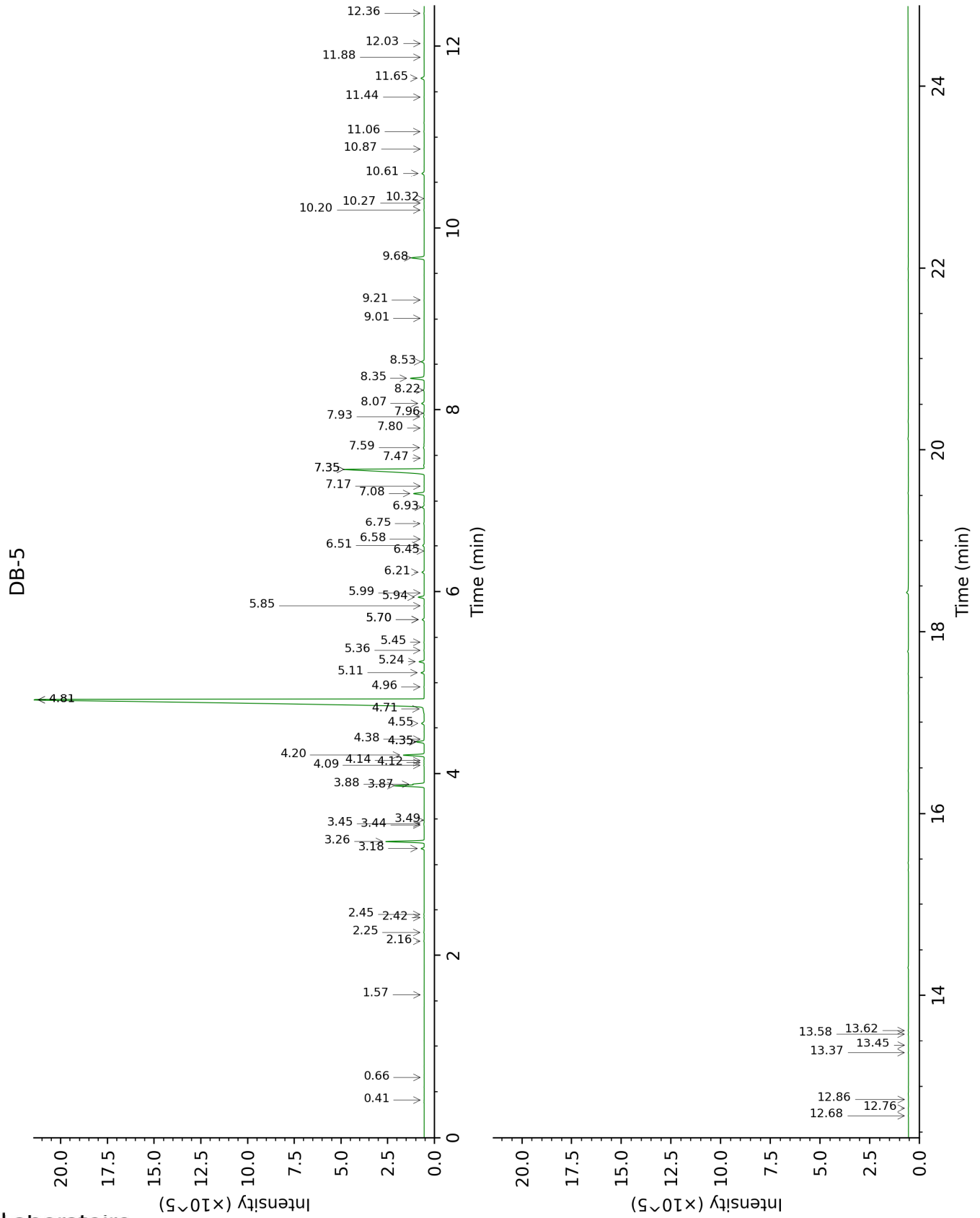|		
cis-α-Phellandrene epoxide (iPr vs Me)	0.01	Monoterpenic ether
trans-Piperitol	0.07	Monoterpenic alcohol
exo-2-Hydroxycineole	0.02	Monoterpenic alcohol
Nerol	0.05	Monoterpenic alcohol
Citronellol	0.05	Monoterpenic alcohol
Neral	0.21	Monoterpenic aldehyde
Piperitone	0.06	Monoterpenic ketone
Geraniol	1.17	Monoterpenic alcohol
Geranial	0.24	Monoterpenic aldehyde
Unknown	0.02	Oxygenated monoterpene
Unknown	0.02	Monoterpenic alcohol
α-Terpinyl acetate	1.06	Monoterpenic ester
Geranyl acetate	0.03	Monoterpenic ester
Unknown	0.02	Sesquiterpene
Unknown	0.02	Unknown
β-Caryophyllene	0.20	Sesquiterpene
Aromadendrene	0.02	Sesquiterpene
α-Humulene	0.03	Sesquiterpene
(1S,2S,4S)-para-Menthane-1,2,4-triol	0.01	Monoterpenic alcohol
Bicyclogermacrene	0.29	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.01	Sesquiterpene
α-Elemol	0.03	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Globulol	0.02	Sesquiterpenic alcohol
Viridiflorol	0.01	Sesquiterpenic alcohol
γ-Eudesmol	0.03	Sesquiterpenic alcohol
Isospathulenol	0.02	Sesquiterpenic alcohol
β-Eudesmol	0.03	Sesquiterpenic alcohol
α-Eudesmol	0.03	Sesquiterpenic alcohol
Consolidated total	**98.47%**	

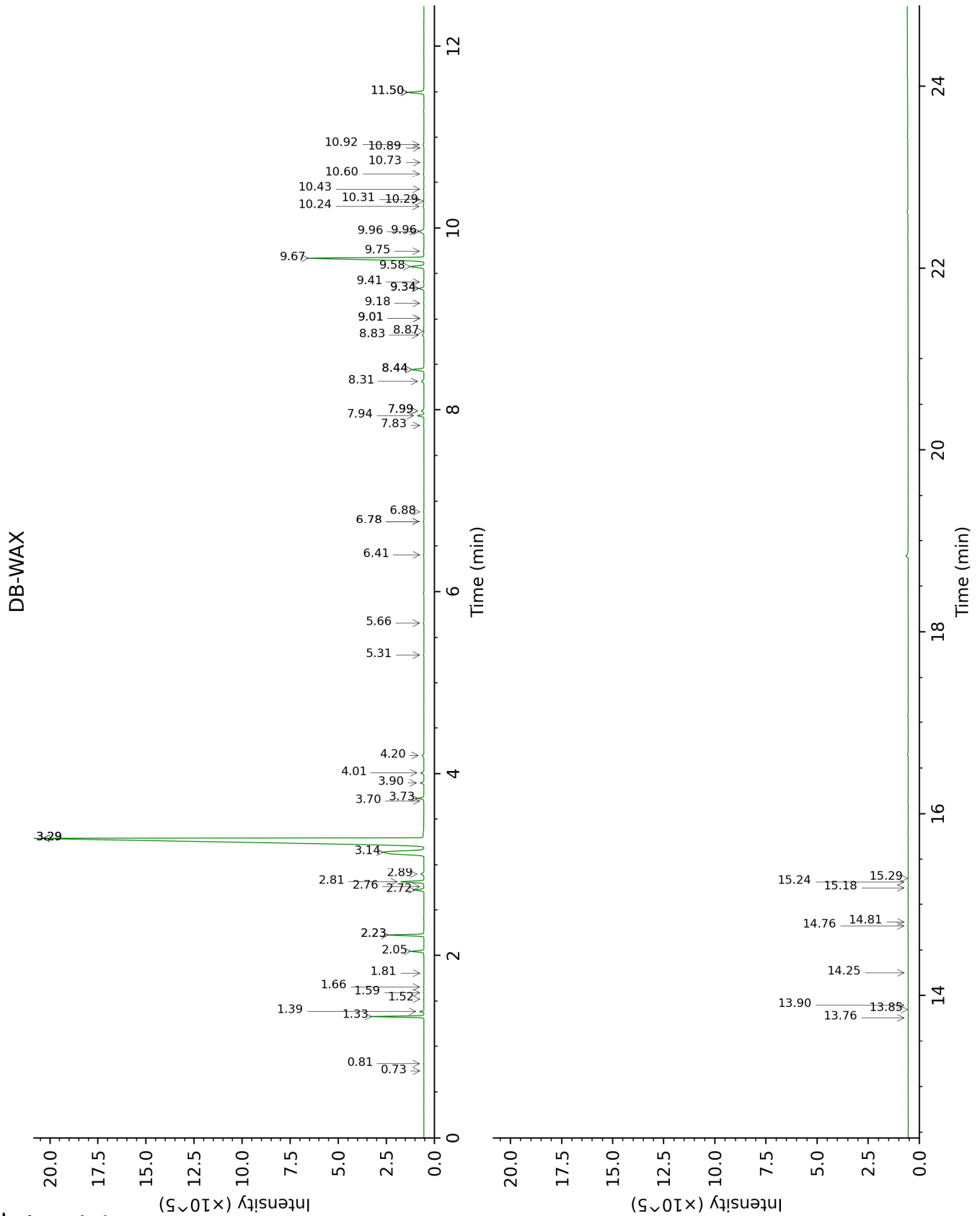tr: The compound has been detected below 0.005% of total signal.

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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Essential oil, *Eucalyptus radiata*
Internal code: 22J28-NSO03   Organic EO: Eucalyptus radiata Lot# B406024 - Botanical Species: Eucalyptus radiata   Natural Sourcing LLC

Report prepared for

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

Essential oil, *Eucalyptus radiata*
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DB-5

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DB-WAX

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.41	508	tr	0.81	906	0.01
Isovaleral	0.66	643	tr	0.73	887	tr
Hexanal	1.57	800	0.01	1.81	1043	0.01
(2*E*)-Hexenal	2.16	849	0.04	3.29*	1174	66.47
(3*Z*)-Hexenol	2.25	857	0.04	5.66	1346	0.04
Isovaleric acid	2.42	870	0.03	9.41	1632	0.04
Hexanol	2.45	873	0.04	5.31	1321	0.03
α-Thujene	3.18	927	0.21	1.39	1001	0.21
α-Pinene	3.26	932	2.62	1.33	994	2.62
α-Fenchene	3.44†	943	0.04	1.59	1021	0.02
Camphene	3.45†	944	[0.04]	1.66	1028	0.03
Thuja-2,4(10)-diene	3.49	947	0.01	2.23*	1086	2.13
Sabinene	3.87†	972	2.88	2.23*	1086	[2.13]
β-Pinene	3.88†	973	[2.88]	2.05	1067	0.79
trans-para-Menthane	4.09	986	0.02	1.52	1014	0.01
Unknown [m/z 67, 68 (95), 43 (73), 94 (65), 79 (54), 41 (50)...]	4.12	988	0.02			
trans-Dehydroxylinalool oxide	4.14	990	0.02	3.29*	1174	[66.47]
Myrcene	4.20	994	1.53	2.81	1135	1.55
Pseudolimonene	4.35*	1003	0.60	2.76	1130	0.02
α-Phellandrene	4.35*	1003	[0.60]	2.72	1128	0.59
Δ3-Carene	4.38	1005	0.02			
α-Terpinene	4.55	1016	0.24	2.89	1142	0.25
para-Cymene	4.71	1026	0.15	4.01	1230	0.22
Limonene	4.81*†	1032	73.34	3.14	1162	6.43
1,8-Cineole	4.81*†	1032	[73.34]	3.29*	1174	[66.47]
(*Z*)-β-Ocimene	4.96	1041	0.03	3.70	1207	0.03
(*E*)-β-Ocimene	5.11	1051	0.23	3.90	1222	0.24
γ-Terpinene	5.24	1058	0.38	3.73	1209	0.40
cis-Sabinene hydrate	5.36	1066	0.03	6.78*	1428	0.06
cis-Linalool oxide (fur.)	5.45	1072	0.03	6.41	1401	0.02
Terpinolene	5.70*	1087	0.16	4.20	1245	0.14
trans-Linalool oxide (fur.)	5.70*	1087	[0.16]	6.78*	1428	[0.06]
trans-Sabinene hydrate	5.85	1097	0.02	7.83	1508	0.02
Linalool	5.94	1103	0.46	7.94	1516	0.46
Unknown [m/z 43, 59 (37), 79 (33), 91 (32), 119 (31)...]	5.99	1106	0.01	8.87	1588	0.01

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cis-para-Menth-2-en-1-ol	6.22	1120	0.19	7.99*	1520	0.20
trans-Pinocarveol	6.45	1135	0.01	9.01*	1600	0.03
trans-para-Menth-2-en-1-ol	6.51	1139	0.12	8.83	1585	0.14
Isopulegol	6.58	1143	0.03	7.99*	1520	[0.20]
Citronellal	6.75	1154	0.05	6.88	1437	0.03
δ-Terpineol	6.93	1166	0.19	9.34*	1626	0.37
Terpinen-4-ol	7.08	1176	0.86	8.44*	1555	0.86
Cryptone	7.17	1181	0.01	9.01*	1600	[0.03]
α-Terpineol	7.35*	1192	10.35	9.67	1653	10.43
Myrtenol	7.35*	1192	[10.35]	10.73	1741	0.01
cis-α-Phellandrene epoxide (iPr vs Me)	7.47	1200	0.01	10.89	1755	0.01
trans-Piperitol	7.59	1208	0.07	10.24	1700	0.08
exo-2-Hydroxycineole	7.80	1222	0.02	11.50*	1807	1.25
Nerol	7.93	1230	0.05	10.92	1758	0.07
Citronellol	7.96	1233	0.05	10.60	1730	0.05
Neral	8.07	1240	0.21	9.34*	1626	[0.37]
Piperitone	8.22	1250	0.06	9.75	1660	0.06
Geraniol	8.35	1258	1.17	11.50*	1807	[1.25]
Geranial	8.53	1270	0.24	9.96†	1677	[0.50]
Unknown [m/z 59, 94 (99), 79 (68), 43 (32), 97 (17)... 137 (8)...]	9.01	1303	0.02			
Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	9.21	1317	0.02	14.81	2115	0.01
α-Terpinyl acetate	9.68	1349	1.06	9.58	1646	1.07
Geranyl acetate	10.20	1386	0.03	10.43	1716	0.04
Unknown [m/z 93, 122 (98), 161 (98), 107 (86), 95 (46), 105 (72)... 204 (34)]	10.27	1391	0.02			
Unknown [m/z 79, 59 (80), 94 (49), 43 (41), 109 (30), 93 (25)...]	10.32	1395	0.02			
β-Caryophyllene	10.61	1415	0.20	8.31	1545	0.21
Aromadendrene	10.87	1435	0.02	8.44*	1555	[0.86]
α-Humulene	11.06	1449	0.03	9.18	1613	0.03
(1S,2S,4S)-para-Menthane-1,2,4-triol	11.44	1478	0.01			
Bicyclogermacrene	11.65	1493	0.29	9.96†	1677	0.50
γ-Cadinene	11.88	1510	0.02	10.30	1704	0.03
δ-Cadinene	12.03	1522	0.01	10.31	1706	0.02
α-Elemol	12.36	1548	0.03	13.90	2026	0.03
Spathulenol	12.68	1573	0.02	14.25	2061	0.02

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Globulol	12.76	1579	0.02	13.76	2013	0.02
Viridiflorol	12.86	1587	0.01	13.85	2022	0.02
γ-Eudesmol	13.37	1628	0.03	14.76	2111	0.04
Isospathulenol	13.45	1634	0.02	15.29	2163	0.02
β-Eudesmol	13.58	1645	0.03	15.24	2159	0.03
α-Eudesmol	13.62	1648	0.03	15.18	2153	0.03
Total identified	**98.74%**			**98.55%**		
Total reported	**98.85%**			**98.58%**		

*: 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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