Date : 2024-07-19

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24G05-PTH05
Customer Identification : Palmarosa - India - P10113R
Type : Essential Oil
Source : *Cymbopogon martini var. motia [syn. Cymbopogon martini]*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 : Sylvain Mercier, M. Sc., Chimiste 2014-005
Date : 2024-07-17

Physicochemical data

Refractive index : 1.4736 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-07-08

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
Isobutyral	tr	Aliphatic aldehyde
2-Methyl-3-buten-2-ol	0.01	Aliphatic alcohol
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Isoamyl alcohol	0.01	Aliphatic alcohol
Hexanal	tr	Aliphatic aldehyde
Octane	tr	Alkane
Hexanol	0.01	Aliphatic alcohol
Isoamyl acetate	0.01	Aliphatic ester
Unknown	tr	Unknown
2-Heptanone	0.01	Aliphatic ketone
Hashishene	tr	Monoterpene
Tricyclene	tr	Monoterpene
α-Thujene	tr	Monoterpene
α-Pinene	tr	Monoterpene
6-Methyl-5-hepten-2-one	0.04	Aliphatic ketone
Myrcene	0.17	Monoterpene
trans-Dehydroxylinalool oxide	0.02	Monoterpenic ether
α-Phellandrene	0.01	Monoterpene
cis-Dehydroxylinalool oxide	0.02	Monoterpenic ether
para-Cymene	0.01	Monoterpene
Limonene	0.10	Monoterpene
1,8-Cineole	tr	Monoterpenic ether
(*Z*)-β-Ocimene	0.35	Monoterpene
(*E*)-β-Ocimene	1.44	Monoterpene
2,6-Dimethyl-5-heptenal (melonal)	0.02	Aliphatic aldehyde
γ-Terpinene	0.01	Monoterpene
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Octanol	0.02	Aliphatic alcohol
Terpinolene	0.02	Monoterpene
para-Cymenene	0.01	Monoterpene
trans-Linalool oxide (fur.)	tr	Monoterpenic alcohol
Rosefuran	0.01	Monoterpenic ether
Linalool	2.51	Monoterpenic alcohol
Unknown	0.01	Unknown
Camphor	0.01	Monoterpenic ketone
Citronellal	0.02	Monoterpenic aldehyde
Terpinen-4-ol	0.01	Monoterpenic alcohol
Menthol	0.01	Monoterpenic alcohol

Isogeranial	0.01	Monoterpenic aldehyde
α-Terpineol	0.02	Monoterpenic alcohol
cis-Piperitol	0.01	Monoterpenic alcohol
Decanal	0.01	Aliphatic aldehyde
Unknown	0.02	Unknown
cis-Isocarveol	tr	Monoterpenic alcohol
Nerol	0.21	Monoterpenic alcohol
Neral	0.23	Monoterpenic aldehyde
Isoamyl hexanoate	0.01	Aliphatic ester
Geraniol	79.24	Monoterpenic alcohol
Geranial	0.56	Monoterpenic aldehyde
Geranyl formate	0.14	Monoterpenic ester
2,3-Epoxygeraniol?	0.07	Oxygenated monoterpene
Citronellyl acetate	0.01	Monoterpenic ester
Neryl acetate	0.02	Monoterpenic ester
Geranic acid	0.01	Aliphatic acid
β-Elemene	0.06	Sesquiterpene
Geranyl acetate	8.50	Monoterpenic ester
α-Gurjunene	tr	Sesquiterpene
β-Caryophyllene	1.80	Sesquiterpene
α-Guaiene	0.01	Sesquiterpene
α-Humulene	0.12	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
Unknown	0.06	Sesquiterpene
β-Selinene	0.03	Sesquiterpene
Valencene	0.03	Sesquiterpene
α-Selinene	0.01	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.04	Sesquiterpene
δ-Cadinene	0.02	Sesquiterpene
α-Elemol	0.02	Sesquiterpenic alcohol
Unknown	0.01	Unknown
Geranyl butyrate	0.17	Monoterpenic ester
(*E*)-Nerolidol	0.15	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.22	Sesquiterpenic ether
Humulene epoxide II	0.01	Sesquiterpenic ether
Caryophylladienol II	0.01	Sesquiterpenic alcohol
Neointermedeol	0.02	Sesquiterpenic alcohol
Precocene II	0.01	Chromane
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.01	Sesquiterpenic alcohol
(2*E*,6*Z*)-Farnesal	tr	Sesquiterpenic aldehyde
(2*E*,6*E*)-Farnesol	0.90	Sesquiterpenic alcohol
(2*E*,6*E*)-Farnesal	0.01	Sesquiterpenic aldehyde
Geranyl caproate	0.69	Monoterpenic ester

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(2*E*,6*E*)-Farnesyl acetate	0.10	Sesquiterpenic ester
Phytone	0.03	Terpenic ketone
Geranyl caprylate	0.17	Monoterpenic ester
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Unknown	0.03	Unknown
Unknown	0.01	Unknown
Consolidated total	**98.83**	

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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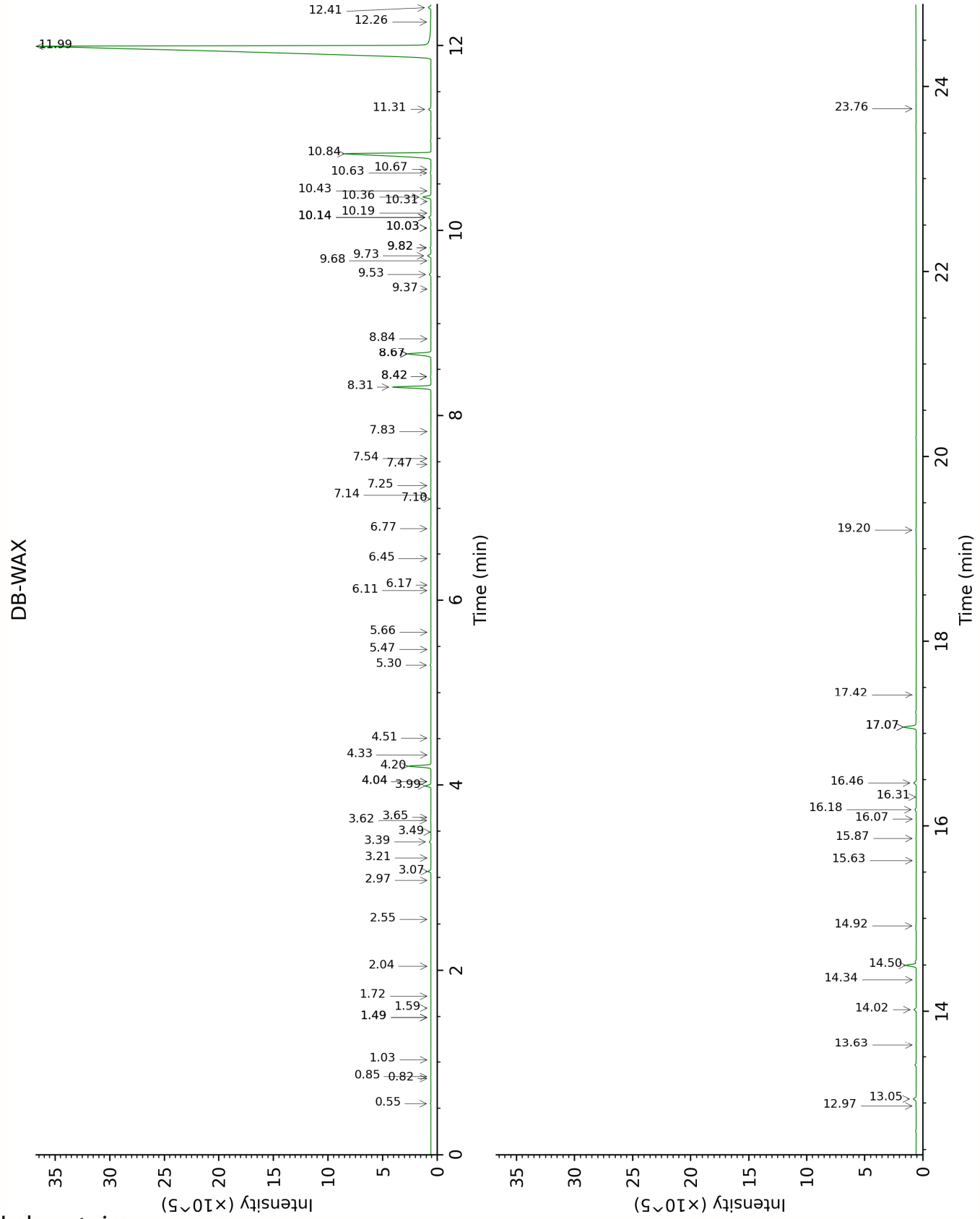
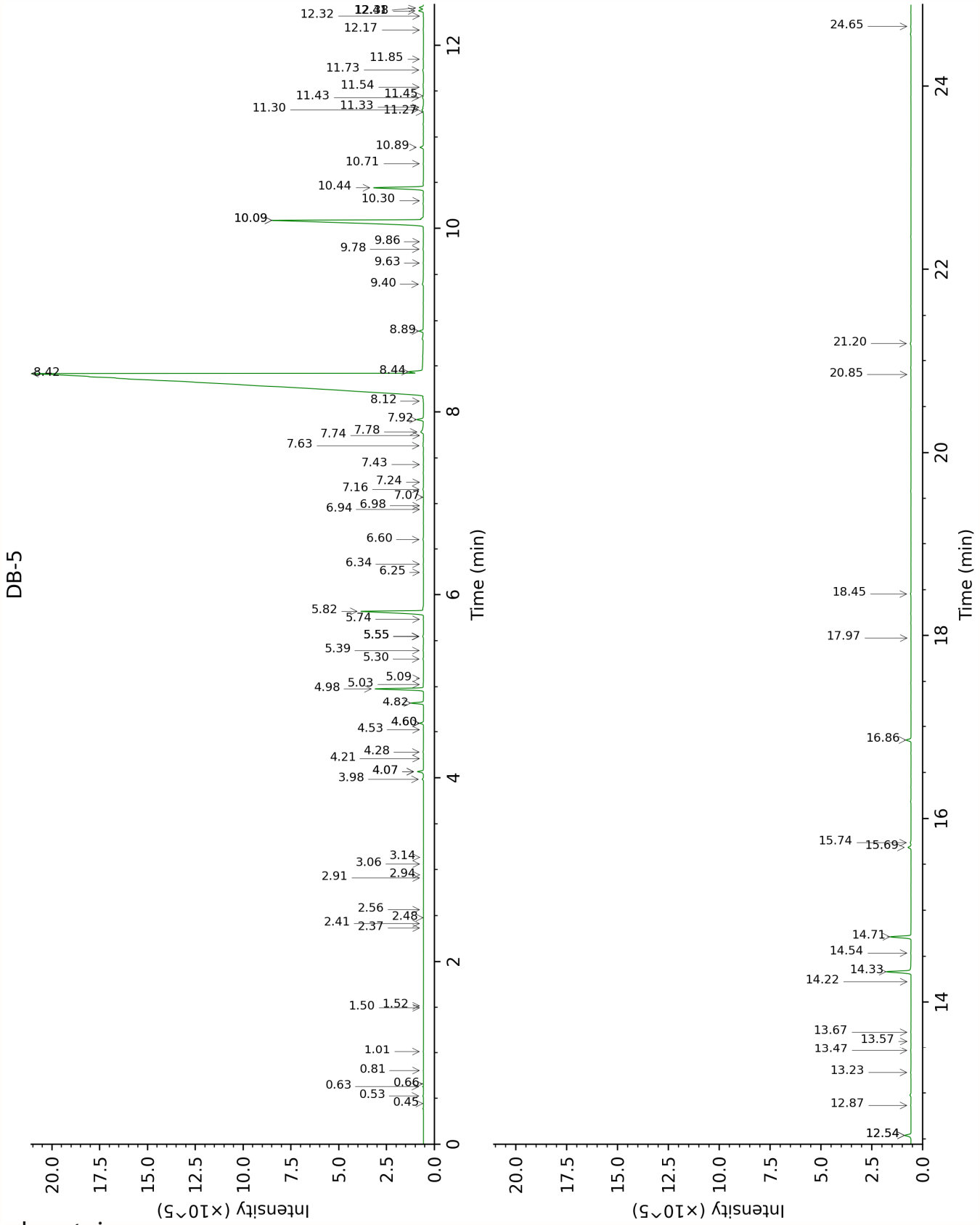

DB-WAX
Intensity (×10^5)
Time (min)
12.41
12.26
11.99
11.31
10.84
10.63
10.67
10.43
10.36
10.31
10.14
10.19
10.03
9.82
9.68
9.73
9.53
9.37
8.84
8.67
8.42
8.31
7.83
7.54
7.47
7.25
7.14
7.10
6.77
6.45
6.11
6.17
5.66
5.47
5.30
4.51
4.33
4.20
4.04
3.99
3.62
3.65
3.49
3.39
3.21
3.07
2.97
2.55
2.04
1.72
1.59
1.49
1.03
0.85
0.82
0.55
23.76
19.20
17.42
17.07
16.46
16.31
16.18
16.07
15.87
15.63
14.92
14.50
14.34
14.02
13.63
13.05
12.97


DB-5
Time (min)
Intensity (×10^5)
12.32
12.17
11.85
11.73
11.54
11.43
11.45
11.30
11.33
11.27
10.89
10.71
10.44
10.30
10.09
9.86
9.78
9.63
9.40
8.89
8.42
8.44
8.12
7.92
7.74
7.78
7.63
7.43
7.16
7.24
7.07
6.94
6.98
6.60
6.34
6.25
5.82
5.74
5.55
5.39
5.30
4.98
5.03
5.09
4.82
4.53
4.60
4.21
4.28
4.07
3.98
3.06
3.14
2.91
2.94
2.56
2.48
2.41
2.37
1.50
1.52
1.01
0.81
0.63
0.66
0.53
0.45
24.65
21.20
20.85
18.45
17.97
16.86
15.74
15.69
14.71
14.54
14.33
14.22
13.67
13.57
13.47
13.23
12.87
12.54

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Isobutyral	0.55	776.2	0.01	0.45	538.0	tr
2-Methyl-3-buten-2-ol	1.72	1014.3	0.01	0.53	606.1	0.01
Isovaleral	0.85	886.6	0.01	0.63	641.7	0.01
2-Methylbutyral	0.82	879.1	tr	0.66	651.8	0.01
2-Ethylfuran	1.03	918.6	tr	0.81	702.3	tr
Isoamyl alcohol	3.65	1177.2	0.01	1.01	732.7	0.01
Hexanal	2.04	1045.2	0.01	1.50	800.7	tr
Octane				1.52	803.8	tr
Hexanol	5.66	1324.9	0.01	2.37	874.5	0.01
Isoamyl acetate	2.55	1093.4	0.01	2.41	878.5	0.01
Unknown ZIOF II [m/z 59, 85 (88), 41 (57), 43 (43)...]	6.11	1356.6	0.02	2.48	883.8	tr
2-Heptanone	3.21	1144.1	0.01	2.56	891.0	0.01
Hashishene	1.49*	990.6	[tr]	2.91	916.6	tr
Tricyclene				2.94	918.9	tr
α-Thujene	1.59	1002.1	tr	3.06	926.7	tr
α-Pinene	1.49*	990.6	[tr]	3.14	931.5	tr
6-Methyl-5-hepten-2-one	5.30	1299.9	0.05	3.98	987.7	0.04
Myrcene	3.07	1133.1	0.17	4.07*	993.2	[0.19]
trans-Dehydroxylinalool oxide	3.62	1174.7	0.02	4.07*	993.2	[0.19]
α-Phellandrene	2.97	1125.8	0.01	4.21	1002.7	0.01
cis-Dehydroxylinalool oxide	4.04*	1205.5	[0.02]	4.28	1007.2	0.02
para-Cymene	4.32	1225.8	0.01	4.52	1022.5	0.01
Limonene	3.39	1157.3	0.10	4.60*	1026.9	[0.11]
1,8-Cineole	3.49	1165.3	tr	4.60*	1026.9	[0.11]
(*Z*)-β-Ocimene	3.99	1202.3	0.35	4.82	1040.7	0.35
(*E*)-β-Ocimene	4.20	1217.3	1.45	4.98	1050.9	1.44
2,6-Dimethyl-5-heptenal (melonal)	5.47	1311.8	0.01	5.02	1053.8	0.02
γ-Terpinene	4.04*	1205.5	[0.02]	5.09	1058.1	0.01
cis-Linalool oxide (fur.)	6.77	1404.0	0.02	5.30	1071.3	0.02
Octanol	8.42*	1525.6	[0.04]	5.40	1077.1	0.02
Terpinolene	4.51	1238.5	0.02	5.55*	1086.7	[0.03]
para-Cymenene	6.45	1380.9	0.01	5.55*	1086.7	[0.03]

trans-Linalool oxide (fur.)	7.10	1427.9	tr	5.55*	1086.7	[0.03]
Rosefuran	6.16	1360.8	0.01	5.74	1098.4	0.01
Linalool	8.31	1517.0	2.52	5.82	1103.8	2.51
Unknown COGU I [m/z 95, 123 (73), 67 (64), 82 (54), 41 (47), 55 (27)...]				6.25	1130.9	0.01
Camphor	7.48	1455.1	0.01	6.34	1136.7	0.01
Citronellal	7.25	1438.4	0.02	6.60	1153.8	0.02
Terpinen-4-ol	8.84	1557.3	0.01	6.94	1175.3	0.01
Menthol	9.37	1598.4	tr	6.98	1177.9	0.01
Isogeranial	8.42*	1525.6	[0.04]	7.07	1183.8	0.01
α-Terpineol	10.03*	1650.7	[0.04]	7.16	1189.2	0.02
cis-Piperitol	9.82*	1633.8	[0.06]	7.24	1194.2	0.01
Decanal	7.54	1459.7	0.01	7.43	1206.6	0.01
Unknown ARAB I [m/z 69, 41 (55), 111 (25), 93 (14), 109 (14)...]				7.63	1220.4	0.02
cis-Isocarveol	12.26	1837.6	0.10	7.74	1227.8	tr
Nerol	11.31	1756.5	0.17	7.78	1230.4	0.21
Neral	9.73	1626.9	0.25	7.92	1239.4	0.23
Isoamyl hexanoate	7.14	1430.8	0.02	8.12	1252.8	0.01
Geraniol	11.99	1814.6	79.24	8.42*†	1272.9	[79.28]
Geranial	10.36	1677.3	0.56	8.44*†	1274.3	[0.84]
Geranyl formate	10.14*	1659.8	[0.18]	8.89	1304.4	0.14
2,3-Epoxygeraniol?				9.40	1340.2	0.07
Citronellyl acetate	9.68	1622.6	0.01	9.63	1356.5	0.01
Neryl acetate	10.43	1682.6	0.01	9.78	1367.1	0.02
Geranic acid				9.86	1372.8	0.01
β-Elemene	8.67*	1544.3	[1.88]	10.09*	1389.2	[8.56]
Geranyl acetate	10.84	1716.4	8.50	10.09*	1389.2	[8.56]
α-Gurjunene	7.83	1480.9	0.01	10.30	1404.1	tr
β-Caryophyllene	8.67*	1544.3	[1.88]	10.44	1414.7	1.80
α-Guaiene	8.67*	1544.3	[1.88]	10.71	1434.7	0.01
α-Humulene	9.53	1610.8	0.11	10.89	1448.0	0.12
Germacrene D	10.03*	1650.7	[0.04]	11.27	1476.6	0.01
Unknown CASA VII [m/z 189, 133 (75), 91 (71), 105 (69), 93 (44)... 204 (33)]	9.82*	1633.8	[0.06]	11.30	1478.3	0.06

β-Selinene	10.14*	1659.8	[0.18]	11.33	1480.5	0.03
Valencene	10.14*	1659.8	[0.18]	11.43	1488.3	0.03
α-Selinene	10.19	1663.6	0.01	11.45	1489.8	0.01
α-Muurolene	10.31	1673.5	0.01	11.54	1496.8	0.02
γ-Cadinene	10.63	1699.0	0.05	11.73	1511.1	0.04
δ-Cadinene	10.67	1702.4	0.01	11.85	1520.3	0.02
α-Elemol	14.34	2028.2	0.01	12.17	1545.2	0.02
Unknown CYMA I [m/z 59, 68 (63), 43 (31), 67 (27), 81 (27), 94 (25), 69 (23), 41 (22), 84 (20)...]				12.32	1557.2	0.01
Geranyl butyrate	12.41	1851.4	0.20	12.38	1561.8	0.17
(*E*)-Nerolidol	14.02	1997.3	0.14	12.41	1564.5	0.15
Caryophyllene oxide isomer	12.97	1900.9	0.02	12.54*	1574.7	[0.23]
Caryophyllene oxide	13.05	1907.8	0.22	12.54*	1574.7	[0.23]
Humulene epoxide II	13.63	1961.3	0.01	12.87	1600.3	0.01
Caryophylladienol II	16.31	2223.7	0.02	13.23	1629.8	0.01
Neointermedeol	15.87	2177.7	0.02	13.47	1649.7	0.02
Precocene II	17.42	2340.8	0.02	13.57	1658.4	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	17.07*	2302.7	[0.91]	13.67	1666.7	0.01
(2*E*,6*Z*)-Farnesal	15.63	2153.8	0.01	14.22	1712.6	tr
(2*E*,6*E*)-Farnesol	17.07*	2302.7	[0.91]	14.33	1722.0	0.90
(2*E*,6*E*)-Farnesal	16.08	2199.1	0.01	14.54	1739.7	0.01
Geranyl caproate	14.50	2043.1	0.70	14.71	1755.0	0.69
(2*E*,6*E*)-Farnesyl acetate	16.18	2209.6	0.09	15.69	1841.2	0.10
Phytone	14.92	2083.8	0.03	15.74	1845.9	0.03
Geranyl caprylate	16.46	2239.4	0.18	16.86	1949.5	0.17
Unknown DRMO VII [m/z 69, 41 (49), 81 (47), 93 (21), 95 (30), 43 (26)...]				17.97	2058.2	0.01
Unknown DRMO VI [m/z 69, 41 (37), 81 (23), 95 (19), 109 (18)...]	19.20	2540.4	0.04	18.45	2106.0	0.02
Unknown CYMA				20.85	2362.9	0.01

III [m/z 69, 81 (70), 93 (37), 95 (31), 41 (24)...]						
Unknown MOFI VII [m/z 69, 81 (54), 95 (26), 41 (20), 82 (16), 123 (16)...]				21.20	2401.6	0.03
Unknown CYWI IV [m/z 69, 81 (64), 95 (29), 137 (19), 41 (19)...]	23.76	3125.4	0.01	24.65	2827.8	0.01
Total reported		98.81%			99.12%	

*: 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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