Date : December 13, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22L06-PTH01
Customer identification : Curry Leaf - India - CW9100R
Type : Essential oil
Source : *Murraya koenigii*
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 : Amélie Simard, Analyste
Analysis date : December 13, 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia
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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid
Refractive index: 1.4945 ± 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
Styrene	0.02	Simple phenolic
α-Thujene	0.05	Monoterpene
α-Pinene	2.40	Monoterpene
Camphene	0.04	Monoterpene
Sabinene	0.11	Monoterpene
β-Pinene	0.15	Monoterpene
Myrcene	1.63	Monoterpene
α-Phellandrene	4.17	Monoterpene
Pseudolimonene	0.33	Monoterpene
Δ3-Carene	0.03	Monoterpene
α-Terpinene	0.18	Monoterpene
para-Cymene	0.56	Monoterpene
Limonene	5.43	Monoterpene
β-Phellandrene	34.14	Monoterpene
(*Z*)-β-Ocimene	0.19	Monoterpene
(*E*)-β-Ocimene	0.56	Monoterpene
γ-Terpinene	0.17	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
para-Cymenene	tr	Monoterpene
Terpinolene	0.07	Monoterpene
trans-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	0.37	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
cis-para-Menth-2-en-1-ol	0.18	Monoterpenic alcohol
allo-Ocimene	0.01	Monoterpene
trans-para-Menth-2-en-1-ol	0.11	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Borneol	0.01	Monoterpenic alcohol
Unknown	0.01	Unknown
Lavandulol	0.10	Monoterpenic alcohol
Unknown	0.07	Oxygenated monoterpene
Terpinen-4-ol	0.22	Monoterpenic alcohol
Cryptone	0.36	Normonoterpenic ketone
α-Terpineol	0.48	Monoterpenic alcohol
Methyl salicylate	0.06	Phenolic ester
cis-Piperitol	0.06	Monoterpenic alcohol
cis-α-Phellandrene epoxide (iPr vs Me)	0.05	Monoterpenic ether
trans-Piperitol	0.06	Monoterpenic alcohol
Unknown	0.04	Oxygenated monoterpene
Cuminal	0.03	Monoterpenic aldehyde
Carvone	0.01	Monoterpenic ketone
Piperitone	0.05	Monoterpenic ketone
Phellandral	0.03	Monoterpenic aldehyde

α-Terpinen-7-al	0.05	Monoterpenic aldehyde
Cuminol	0.01	Monoterpenic alcohol
trans-Sabinyl acetate	0.06	Monoterpenic ester
Carvacrol	0.01	Monoterpenic alcohol
Unknown	0.01	Monoterpenic alcohol
para-Menth-5-en-1,2-diol isomer III	0.15	Monoterpenic alcohol
3-Oxo-para-menth-1-en-7-al	0.02	Monoterpenic ketone
Bicycloelemene	0.06	Sesquiterpene
α-Cubebene	0.09	Sesquiterpene
Unknown	0.01	Unknown
Isoledene	0.04	Sesquiterpene
α-Copaene	0.48	Sesquiterpene
7-Cubebene	0.05	Sesquiterpene
7-Cubebene epimer?	0.05	Aliphatic alcohol
cis-β-Elemene	0.06	Sesquiterpene
Sativene	0.01	Sesquiterpene
β-Elemene	0.28	Sesquiterpene
Unknown	0.07	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
α-Gurjunene	0.16	Sesquiterpene
β-Caryophyllene	26.12	Sesquiterpene
β-Copaene	0.12	Sesquiterpene
α-Maaliene	0.22	Sesquiterpene
trans-α-Bergamotene	0.64	Sesquiterpene
Aromadendrene	0.77	Sesquiterpene
Selina-5,11-diene	0.23	Sesquiterpene
Unknown	0.01	Unknown
α-Humulene	4.73	Sesquiterpene
allo-Aromadendrene	0.12	Sesquiterpene
(*E*)-β-Farnesene	0.22	Sesquiterpene
4,5-diepi-Aristolochene	0.07	Sesquiterpene
γ-Gurjunene	0.05	Sesquiterpene
Selina-4,11-diene	0.10	Sesquiterpene
γ-Muurolene	0.27	Sesquiterpene
Germacrene D	0.10	Sesquiterpene
β-Selinene	1.33	Sesquiterpene
Eremophilene	0.14	Sesquiterpene
δ-Selinene	0.35	Sesquiterpene
α-Selinene	2.49	Sesquiterpene
Bicyclogermacrene	0.73	Sesquiterpene
Viridiflorene	0.22	Sesquiterpene
α-Muurolene	0.12	Sesquiterpene
Unknown	0.21	Sesquiterpene
γ-Cadinene	0.13	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.09	Sesquiterpene
7-epi-α-Selinene	0.06	Sesquiterpene
trans-Calamenene	0.09	Sesquiterpene
δ-Cadinene	0.62	Sesquiterpene
Zonarene	0.07	Sesquiterpene
trans-Cadina-1,4-diene	0.08	Sesquiterpene
(*E*)-γ-Bisabolene	0.05	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene

α-Calacorene	0.02	Sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
7-Hydroxypiperitone?	0.01	Monoterpenic alcohol
Isocaryophyllene epoxide B	0.04	Sesquiterpenic ether
Unknown	0.04	Oxygenated sesquiterpene
Germacrene B	0.09	Sesquiterpene
Maaliol	0.03	Sesquiterpenic alcohol
Palustrol	0.03	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.15	Sesquiterpenic alcohol
Spathulenol	0.30	Sesquiterpenic alcohol
Caryophyllene oxide	0.74	Sesquiterpenic ether
Caryophyllene oxide isomer	0.15	Sesquiterpenic ether
Globulol	0.25	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Viridiflorol	0.06	Sesquiterpenic alcohol
Cubeban-11-ol	0.07	Sesquiterpenic alcohol
Eudesm-5-en-11-ol analog	0.15	Sesquiterpenic alcohol
Humulene epoxide II	0.14	Sesquiterpenic ether
Unknown	0.11	Oxygenated sesquiterpene
Rosifoliol	0.09	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
1-epi-Cubenol	0.05	Sesquiterpenic alcohol
Caryophylladienol II	0.04	Sesquiterpenic alcohol
Isospathulenol	0.10	Sesquiterpenic alcohol
τ-Muurolol	0.03	Sesquiterpenic alcohol
τ-Cadinol	0.02	Sesquiterpenic alcohol
α-Muurolol	0.03	Sesquiterpenic alcohol
α-Cadinol	0.05	Sesquiterpenic alcohol
Neointermedeol	0.11	Sesquiterpenic alcohol
Unknown	0.02	Unknown
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.03	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
α-Phellandrene dimer III	0.01	Diterpene
meta-Camphorene	0.02	Diterpene
para-Camphorene	0.02	Diterpene
Consolidated total	**97.99%**	

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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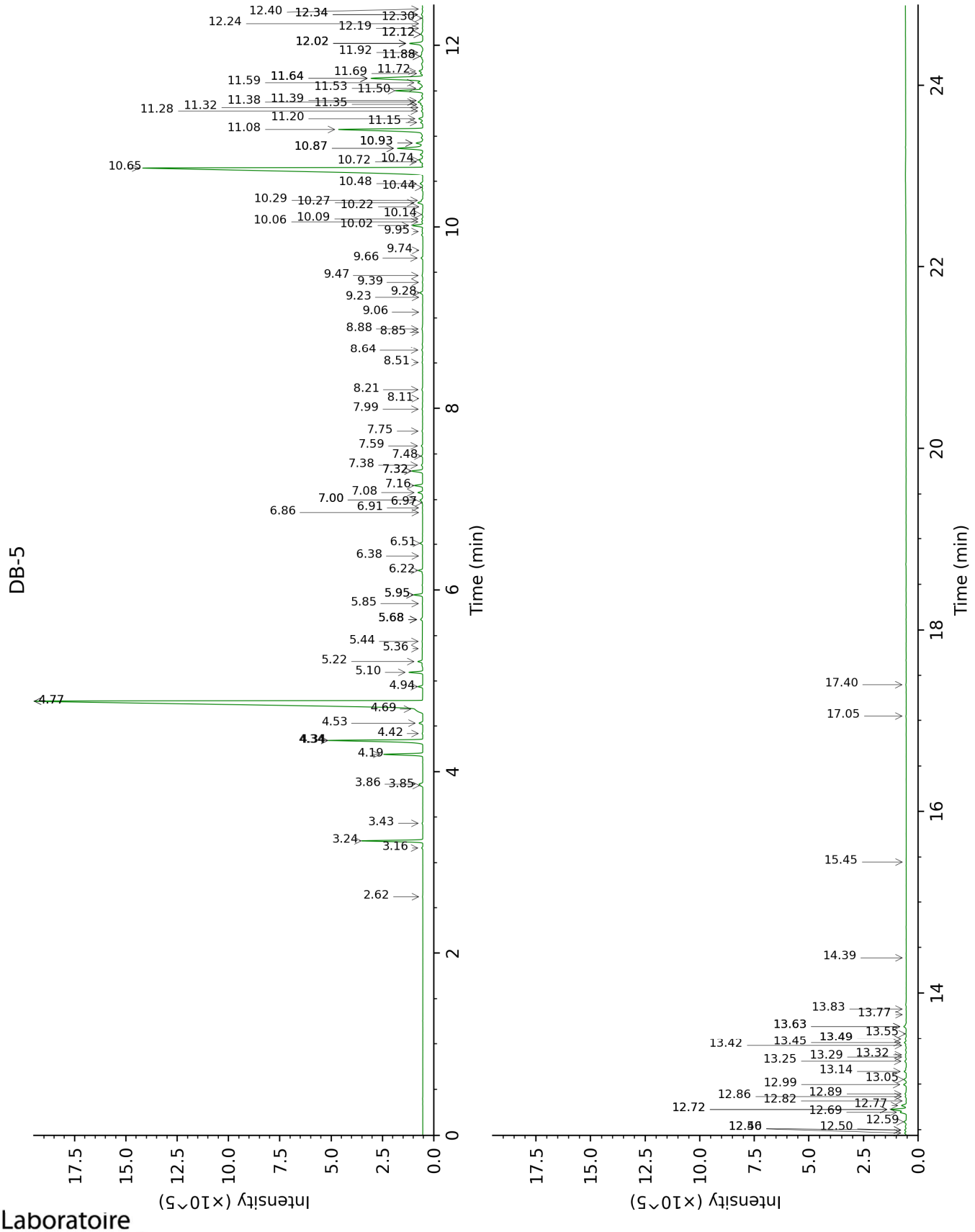
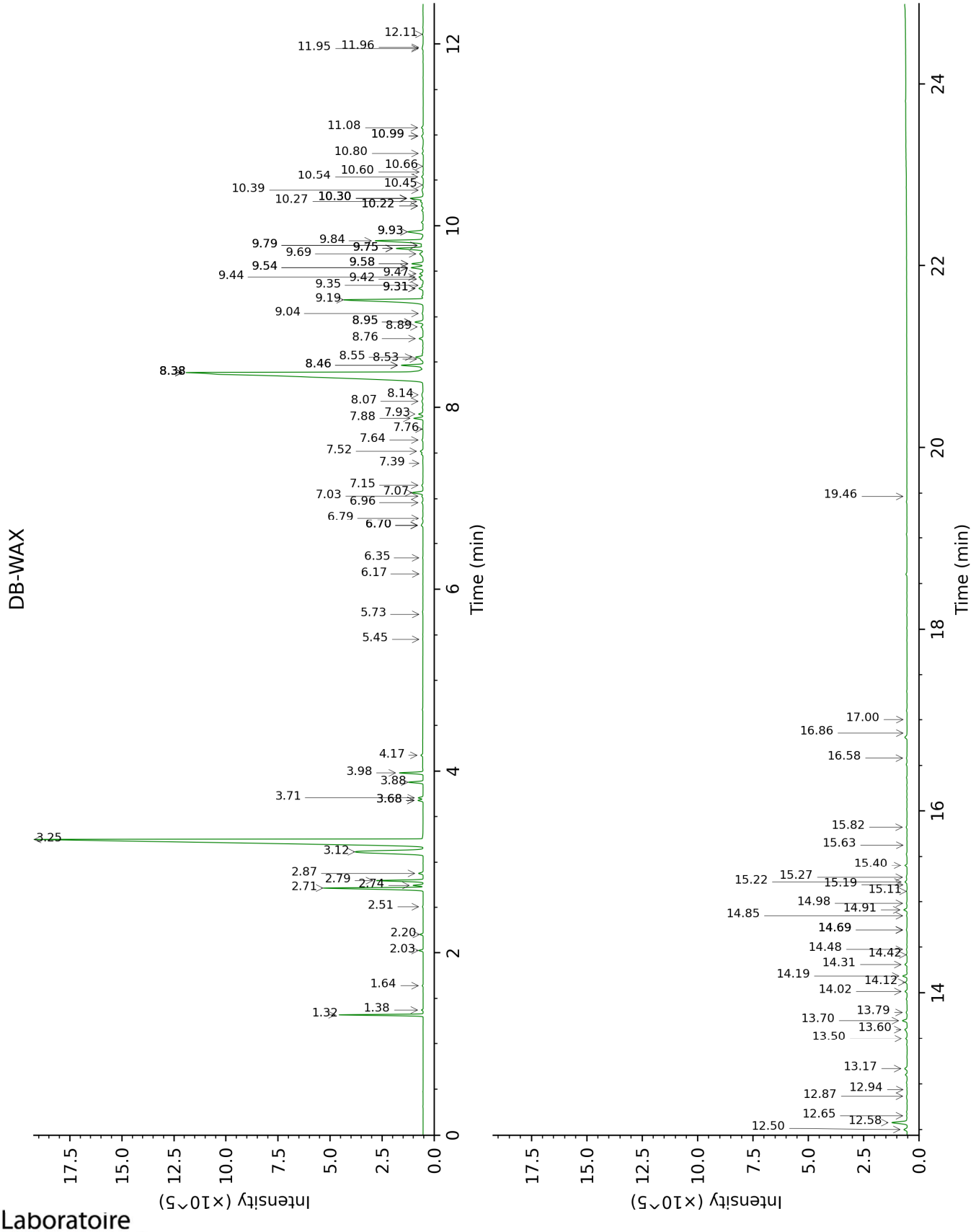

DB-5
Time (min)
Intensity (×10^5)
12.40
12.34
12.30
12.24
12.19
12.12
12.02
11.92
11.88
11.69
11.72
11.59
11.64
11.53
11.50
11.38
11.39
11.35
11.28
11.32
11.20
11.15
11.08
10.93
10.87
10.72
10.74
10.65
10.48
10.44
10.29
10.27
10.22
10.14
10.06
10.09
10.02
9.95
9.74
9.66
9.47
9.39
9.23
9.28
9.06
8.88
8.85
8.64
8.51
8.21
8.11
7.99
7.75
7.59
7.48
7.38
7.32
7.16
7.08
7.00
6.97
6.91
6.86
6.51
6.38
6.22
5.95
5.85
5.68
5.44
5.36
5.22
5.10
4.94
4.77
4.69
4.53
4.42
4.34
4.19
3.86
3.85
3.43
3.24
3.16
2.62
17.40
17.05
15.45
14.39
13.83
13.77
13.63
13.55
13.42
13.49
13.45
13.25
13.29
13.32
13.14
13.05
12.99
12.89
12.86
12.82
12.77
12.72
12.69
12.59
12.50


DB-WAX
Time (min)
Intensity (×10^5)
12.11
11.95
11.96
11.08
10.99
10.80
10.54
10.60
10.66
10.39
10.45
10.27
10.30
10.22
9.93
9.79
9.84
9.75
9.69
9.58
9.54
9.47
9.44
9.42
9.35
9.31
9.19
9.04
8.95
8.89
8.76
8.55
8.53
8.46
8.38
8.14
8.07
7.93
7.88
7.76
7.64
7.52
7.39
7.15
7.07
7.03
6.96
6.79
6.70
6.35
6.17
5.73
5.45
4.17
3.98
3.88
3.71
3.68
3.25
3.12
2.87
2.79
2.74
2.71
2.51
2.20
2.03
1.64
1.38
1.32
19.46
17.00
16.86
16.58
15.82
15.63
15.40
15.22
15.27
15.19
15.11
14.98
14.91
14.85
14.69
14.48
14.42
14.31
14.19
14.12
14.02
13.79
13.70
13.60
13.50
13.17
12.94
12.87
12.65
12.58
12.50

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Styrene	2.62	888	0.02	3.68*	1208	0.20
α-Thujene	3.16	926	0.05	1.38	1004	0.05
α-Pinene	3.24	931	2.40	1.32	997	2.41
Camphene	3.43	944	0.04	1.64	1030	0.03
Sabinene	3.85†	971	0.25	2.20	1087	0.11
β-Pinene	3.86†	972	[0.25]	2.03	1069	0.15
Myrcene	4.19	993	1.63	2.79	1137	1.65
α-Phellandrene	4.34*	1003	4.47	2.71	1130	4.17
Pseudolimonene	4.34*	1003	[4.47]	2.74	1133	0.33
Δ3-Carene	4.42	1008	0.03	2.51	1114	0.03
α-Terpinene	4.53	1015	0.18	2.87	1143	0.19
para-Cymene	4.69	1024	0.56	3.98	1231	0.91
Limonene	4.77*	1030	39.61	3.12	1163	5.43
β-Phellandrene	4.77*	1030	[39.61]	3.25	1174	34.14
(*Z*)-β-Ocimene	4.94	1040	0.19	3.68*	1208	[0.20]
(*E*)-β-Ocimene	5.10	1050	0.56	3.88	1223	0.57
γ-Terpinene	5.22	1058	0.17	3.71	1210	0.20
cis-Sabinene hydrate	5.36	1066	0.01	6.70*	1426	0.11
cis-Linalool oxide (fur.)	5.44	1071	0.01	6.35	1400	0.01
para-Cymenene	5.68*	1086	0.10	6.17	1387	tr
Terpinolene	5.68*	1086	[0.10]	4.17	1246	0.07
trans-Linalool oxide (fur.)	5.68*	1086	[0.10]	6.70*	1426	[0.11]
trans-Sabinene hydrate	5.85	1097	0.01	7.76	1506	0.01
Linalool	5.95*	1103	0.37	7.88	1516	0.37
Nonanal	5.95*	1103	[0.37]	5.73	1354	0.01
cis-para-Menth-2-en-1-ol	6.22	1120	0.18	7.93	1519	0.20
allo-Ocimene	6.38	1130	0.01	5.45	1334	0.01
trans-para-Menth-2-en-1-ol	6.52	1139	0.11	8.76	1585	0.19
Unknown [m/z 81, 41 (99), 69 (93), 68 (93), 71 (91), 67 (85)...152 (2)]	6.86	1161	0.01			
Borneol	6.91	1164	0.01	9.58*	1651	0.50
Unknown [m/z 109, 95 (29), 110 (22), 81 (21), 79 (18), 91 (13)...]	6.97	1168	0.01			
Lavandulol	7.00*	1170	0.15	9.42	1637	0.10
Unknown [m/z 95, 110 (43), 81 (28), 41 (15)... 152 (8)]	7.00*	1170	[0.15]	7.64	1497	0.07
Terpinen-4-ol	7.08	1175	0.22	8.46*	1561	0.99

Cryptone	7.16	1180	0.36	8.94*	1599	0.38
α-Terpineol	7.32*	1190	0.54	9.58*	1651	[0.50]
Methyl salicylate	7.32*	1190	[0.54]	10.30*	1710	0.63
cis-Piperitol	7.38	1194	0.06	9.35	1632	0.05
cis-α-Phellandrene epoxide (iPr vs Me)	7.48	1200	0.05	10.80	1753	0.05
trans-Piperitol	7.59	1208	0.06	10.22*	1703	0.13
Unknown [m/z 43, 111 (88), 126 (74), 125 (61)... 168? (2)]	7.75	1218	0.04	10.99*	1769	0.11
Cuminal	7.99	1234	0.03	10.45	1723	0.02
Carvone	8.11	1242	0.01	9.78*	1667	0.09
Piperitone	8.21	1249	0.05	9.75*	1665	1.31
Phellandral	8.51	1268	0.03	9.78*	1667	[0.09]
α-Terpinen-7-al	8.64	1278	0.05	10.60	1736	0.02
Cuminol	8.84	1291	0.01			
trans-Sabinyl acetate	8.88	1293	0.06	9.04	1606	0.05
Carvacrol	9.06	1306	0.01	15.11	2155	0.02
Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	9.23	1317	0.01	14.69*	2112	0.05
para-Menth-5-en-1,2-diol isomer III	9.28	1321	0.15	14.91	2134	0.15
3-Oxo-para-menth-1-en-7-al	9.39	1329	0.02	12.65	1917	0.03
Bicycloelemene	9.47	1334	0.06	6.96	1446	0.06
α-Cubebene	9.66	1348	0.09	6.70*	1426	[0.11]
Unknown [m/z 139, 93 (64), 69 (62), 83 (57), 55 (55), 109 (53)...]	9.74	1354	0.01			
Isoledene	9.95	1368	0.04	6.79	1433	0.04
α-Copaene	10.02	1373	0.48	7.07	1454	0.48
7-Cubebene	10.06	1375	0.05	7.03	1451	0.05
7-Cubebene epimer?	10.09	1378	0.05	7.15	1460	0.06
cis-β-Elemene	10.14	1381	0.06	8.14	1536	0.11
Sativene	10.22	1387	0.01	7.39	1478	0.01
β-Elemene	10.27	1390	0.28	8.38*	1555	27.28
Unknown [m/z 93, 122 (98), 161 (98), 107 (86), 95 (46), 105 (72)... 204 (34)]	10.29	1392	0.07			
Isocaryophyllene	10.44	1402	0.03	8.07	1530	0.08
α-Gurjunene	10.48	1405	0.16	7.52	1488	0.14
β-Caryophyllene	10.65	1418	26.12	8.38*	1555	[27.28]
β-Copaene	10.72	1423	0.12	8.38*	1555	[27.28]
α-Maaliene	10.74	1425	0.22	8.53†	1566	0.45
trans-α-Bergamotene	10.87*	1434	1.41	8.38*	1555	[27.28]

Aromadendrene	10.87*	1434	[1.41]	8.46*	1561	[0.99]
Selina-5,11-diene	10.93*	1439	0.37	8.55†	1568	[0.45]
Unknown [m/z 41, 97 (78), 69 (77), 43 (71), 125 (67), 55 (56)... 168 (39)]	10.93*	1439	[0.37]	16.86	2337	0.01
α-Humulene	11.08	1450	4.73	9.19	1619	4.78
allo-Aromadendrene	11.15	1455	0.12	8.89	1595	0.10
(*E*)-β-Farnesene	11.20	1458	0.22	9.44	1639	0.19
4,5-diepi-Aristolochene	11.28	1465	0.07	9.31*	1629	0.22
γ-Gurjunene	11.32	1468	0.05	8.94*	1599	[0.38]
Selina-4,11-diene	11.35	1470	0.10	9.31*	1629	[0.22]
γ-Muurolene	11.38	1472	0.27	9.48	1642	0.17
Germacrene D	11.39	1473	0.10	9.69	1660	0.27
β-Selinene	11.50	1481	1.33	9.75*	1665	[1.31]
Eremophilene	11.53	1483	0.14	9.75*	1665	[1.31]
δ-Selinene	11.59	1488	0.35	9.54*	1648	0.58
α-Selinene	11.64*	1491	3.54	9.84	1672	2.49
Bicyclogermacrene	11.64*	1491	[3.54]	9.93*	1680	0.85
Viridiflorene	11.64*	1491	[3.54]	9.54*	1648	[0.58]
α-Muurolene	11.69	1495	0.12	9.93*	1680	[0.85]
Unknown [m/z 93, 105 (63), 119 (60), 91 (58), 107 (55), 41 (51), 69 (44), 79 (44), 202 (43)]	11.72	1497	0.21			
γ-Cadinene	11.88*	1510	0.20	10.27	1707	0.13
(3*E*,6*E*)-α-Farnesene	11.88*	1510	[0.20]	10.39	1718	0.09
7-epi-α-Selinene	11.92	1513	0.06	10.30*	1710	[0.63]
trans-Calamenene	12.02*	1521	0.78	11.08	1777	0.09
δ-Cadinene	12.02*	1521	[0.78]	10.30*	1710	[0.63]
Zonarene	12.02*	1521	[0.78]	10.22*	1703	[0.13]
trans-Cadina-1,4-diene	12.12*	1528	0.14	10.54	1730	0.08
(*E*)-γ-Bisabolene	12.12*	1528	[0.14]	10.30*	1710	[0.63]
α-Cadinene	12.19	1534	0.03	10.66	1741	0.02
α-Calacorene	12.24	1538	0.02	11.95	1854	0.05
Unknown [m/z 121, 149 (93), 43 (71), 93 (67), 91 (65), 107 (58), 119 (56)...220 (18)]	12.30	1542	0.03			
7-Hydroxypiperitone?	12.34*	1545	0.09	19.46	2635	0.01
Isocaryophyllene epoxide B	12.34*	1545	[0.09]	11.96	1855	0.04
Unknown [m/z 98, 97 (95), 126 (91), 95 (69), 41 (67), 55	12.40	1550	0.04	14.42	2085	0.03

(55), 123 (53)... 220 (3)]						
Germacrene B	12.46	1555	0.09	10.99*	1769	[0.11]
Maaliol	12.50*	1558	0.09	12.87	1937	0.03
Palustrol	12.50*	1558	[0.09]	12.11	1868	0.03
(*E*)-Nerolidol	12.59	1565	0.15	13.60	2005	0.13
Spathulenol	12.69	1573	0.30	14.19	2062	0.19
Caryophyllene oxide	12.72*	1575	0.75	12.58	1910	0.74
Caryophyllene oxide isomer	12.72*	1575	[0.75]	12.50	1903	0.15
Globulol	12.77	1579	0.25	13.70	2015	0.23
Unknown [m/z 161, 159 (69), 91 (41), 187 (38), 105 (37), 146 (35), 131 (34)...]	12.82	1583	0.02	14.69*	2112	[0.05]
Viridiflorol	12.86	1586	0.06	13.79	2024	0.04
Cubeban-11-ol	12.89	1589	0.07	13.50	1996	0.08
Eudesm-5-en-11-ol analog	12.99	1597	0.15	14.02	2046	0.09
Humulene epoxide II	13.05	1601	0.14	13.17	1965	0.12
Unknown [m/z 43, 81 (97), 135 (71), 95 (62), 204 (61), 71 (59), 207 (56)... 222 (3)]	13.14	1608	0.11	14.31	2075	0.10
Rosifoliol	13.25	1617	0.09	14.12	2056	0.07
Unknown [m/z 161, 43 (74), 105 (57), 121 (45), 81 (43)... 204 (31)...]	13.29	1621	0.04	14.48	2091	0.03
1-epi-Cubenol	13.32	1623	0.05			
Caryophylladienol II	13.42	1631	0.04	15.82	2228	0.04
Isospathulenol	13.45	1634	0.10	15.22	2165	0.11
τ-Muurolol	13.49*	1638	0.08	14.85	2128	0.03
τ-Cadinol	13.49*	1638	[0.08]	14.69*	2112	[0.05]
α-Muurolol	13.56	1642	0.03	14.98	2141	0.03
α-Cadinol	13.63*	1649	0.18	15.27	2170	0.05
Neointermedeol	13.63*	1649	[0.18]	15.40	2184	0.11
Unknown [m/z 91, 93 (81), 79 (81), 41 (79), 69 (76), 105 (66)...]	13.77	1660	0.02			
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	13.83	1665	0.03	16.58	2307	0.03
Unknown [m/z 159, 93 (87), 105 (84), 91 (81), 107 (71), 131 (69), 79 (65), 119	14.39	1712	0.01	17.00	2353	0.01

(63), 145 (62), 41 (61), 220 (61)]						
α-Phellandrene dimer III	15.45	1803	0.01	12.94	1944	0.02
meta-Camphorene	17.05	1950	0.02	15.18	2162	0.01
para-Camphorene	17.40	1984	0.02	15.63	2207	0.01
Total identified		**97.58%**			**97.50%**	
Total reported		**98.20%**			**97.75%**	

*: 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