Date : 2024-08-05

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24G23-PTH02
Customer Identification : Organic Copaiba Oleoresin - Brazil - CB7107R
Type : Resin
Source : *Copaifera officinalis*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

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 : 2024-07-30

Physicochemical data

Refractive index : 1.5078 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-07-26

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
Myrcene	tr	Monoterpene
(2*E*,4*E*)-3,7-Dimethylocta-2,4-diene?	0.02	Monoterpene
(*Z*)-β-Ocimene	0.11	Monoterpene
(*E*)-β-Ocimene	0.01	Monoterpene
allo-Ocimene	0.02	Monoterpene
δ-Elemene isomer	0.01	Sesquiterpene
δ-Elemene	0.44	Sesquiterpene
α-Cubebene	0.54	Sesquiterpene
Cyclosativene I	0.02	Sesquiterpene
Cyclosativene II	0.01	Sesquiterpene
α-Ylangene	0.07	Sesquiterpene
α-Copaene	3.95	Sesquiterpene
cis-β-Elemene	0.03	Sesquiterpene
β-Cubebene	0.43	Sesquiterpene
β-Elemene	1.06	Sesquiterpene
Cyperene	0.31	Sesquiterpene
α-Gurjunene	0.05	Sesquiterpene
Sesquithujene	0.02	Sesquiterpene
β-Caryophyllene	39.60	Sesquiterpene
β-Ylangene	0.10	Sesquiterpene
β-Copaene	0.13	Sesquiterpene
γ-Elemene	0.37	Sesquiterpene
β-Humulene	0.07	Sesquiterpene
trans-α-Bergamotene	4.54	Sesquiterpene
Sesquisabinene A	0.25	Sesquiterpene
epi-β-Santalene	0.07	Sesquiterpene
α-Humulene	5.40	Sesquiterpene
allo-Aromadendrene	0.36	Sesquiterpene
cis-Muurola-4(15),5-diene	0.31	Sesquiterpene
(*E*)-β-Farnesene	0.03	Sesquiterpene
trans-Cadina-1(6),4-diene	0.21	Sesquiterpene
γ-Muurolene	1.53	Sesquiterpene
Germacrene D	5.85	Sesquiterpene
β-Selinene	0.78	Sesquiterpene
ar-Curcumene	0.13	Sesquiterpene
δ-Selinene	0.12	Sesquiterpene
epi-Cubebol	0.06	Sesquiterpenic alcohol
α-Selinene	0.48	Sesquiterpene
Bicyclogermacrene	0.69	Sesquiterpene
Viridiflorene	0.38	Sesquiterpene

α-Muurolene	0.34	Sesquiterpene
Caparratriene	0.06	Sesquiterpene
δ-Guaiene	0.33	Sesquiterpene
β-Bisabolene	2.84	Sesquiterpene
(3*E*,6*E*)-α-Farnesene	0.06	Sesquiterpene
Cubebol	0.02	Sesquiterpenic alcohol
β-Curcumene	0.03	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
β-Sesquiphellandrene	0.14	Sesquiterpene
δ-Cadinene	2.84	Sesquiterpene
trans-Calamenene	0.06	Sesquiterpene
trans-Cadina-1,4-diene	0.22	Sesquiterpene
(*E*)-γ-Bisabolene	0.13	Sesquiterpene
α-Cadinene	0.07	Sesquiterpene
α-Calacorene	0.05	Sesquiterpene
(*E*)-α-Bisabolene	0.28	Sesquiterpene
Isocaryophyllene epoxide B	0.02	Sesquiterpenic ether
Germacrene B	1.71	Sesquiterpene
Maaliol	0.07	Sesquiterpenic alcohol
β-Calacorene	0.27	Sesquiterpene
Caryophyllenyl alcohol	0.13	Sesquiterpenic alcohol
Spathulenol	0.05	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.16	Sesquiterpenic ether
Globulol	0.07	Sesquiterpenic alcohol
Viridiflorol	0.08	Sesquiterpenic alcohol
Humulene epoxide I	0.01	Sesquiterpenic ether
Ledol	0.12	Sesquiterpenic alcohol
Humulene epoxide II	0.03	Sesquiterpenic ether
Unknown	0.15	Oxygenated sesquiterpene
Junenol	0.96	Sesquiterpenic alcohol
Rosifoliol	0.03	Sesquiterpenic alcohol
1-epi-Cubenol	0.12	Sesquiterpenic alcohol
Caryophylladienol II	0.04	Sesquiterpenic alcohol
τ-Muurolol	0.31	Sesquiterpenic alcohol
τ-Cadinol	0.21	Sesquiterpenic alcohol
α-Muurolol	0.35	Sesquiterpenic alcohol
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.07	Sesquiterpenic alcohol
α-Cadinol	0.46	Sesquiterpenic alcohol
Selin-11-en-4α-ol	0.06	Sesquiterpenic alcohol
trans-Calamenen-10-ol	0.03	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	tr	Sesquiterpenic alcohol
Cadalene	0.06	Sesquiterpene
Germacra-4(15),5,10(14)-trien-1α-ol	0.04	Sesquiterpenic alcohol

α-Bisabolol	0.03	Sesquiterpenic alcohol
Juniper camphor	0.20	Sesquiterpenic alcohol
Aromadendrane-4,10-diol	0.01	Sesquiterpenic alcohol
Methyl (*E*,*E*)-farnesate?	0.01	Sesquiterpenic ester
Unknown	0.02	Oxygenated diterpene
Unknown	0.11	Diterpene
Unknown	0.03	Oxygenated diterpene
Unknown	0.13	Oxygenated diterpene
Palmitic acid	0.05	Aliphatic acid
Unknown	0.01	Oxygenated diterpene
cis-3,14-Clerodadien-13-ol	0.07	Diterpenic alcohol
Unknown	0.03	Oxygenated diterpene
Manool	0.14	Diterpenic alcohol
Kolavelool	0.45	Diterpenic alcohol
Linoleic acid	0.05	Aliphatic acid
Oleic acid	0.03	Aliphatic acid
α-Eleostearic acid	0.03	Aliphatic acid
Stearic acid	0.02	Aliphatic acid
3α-Hydroxymanool	0.39	Diterpenic alcohol
Copalol	0.87	Diterpenic alcohol
Kolavenol	0.75	Diterpenic alcohol
Methyl copalate?	0.30	Diterpenic ester
Copaifera diterpenic acid I	4.44	Diterpenic acid
Methyl kolavenate	0.30	Diterpenic ester
Copaifera diterpenic acid II	1.23	Diterpenic acid
Kolavenyl acetate?	0.08	Diterpenic ester
Methyl hardwickiiate?	0.12	Diterpenic ester
Copaifera diterpenic acid III	0.17	Diterpenic acid
Copaifera diterpenic acid IV	2.11	Diterpenic acid
Copaifera diterpenic acid V	0.01	Diterpenic acid
Copaifera diterpenic acid IX	0.44	Diterpenic acid
Copaifera diterpenic acid VI	1.60	Diterpenic acid
Copaifera diterpenic acid VII	0.13	Diterpenic acid
Copaifera diterpenic acid VIII	0.33	Diterpenic acid
Consolidated total	**96.45**	

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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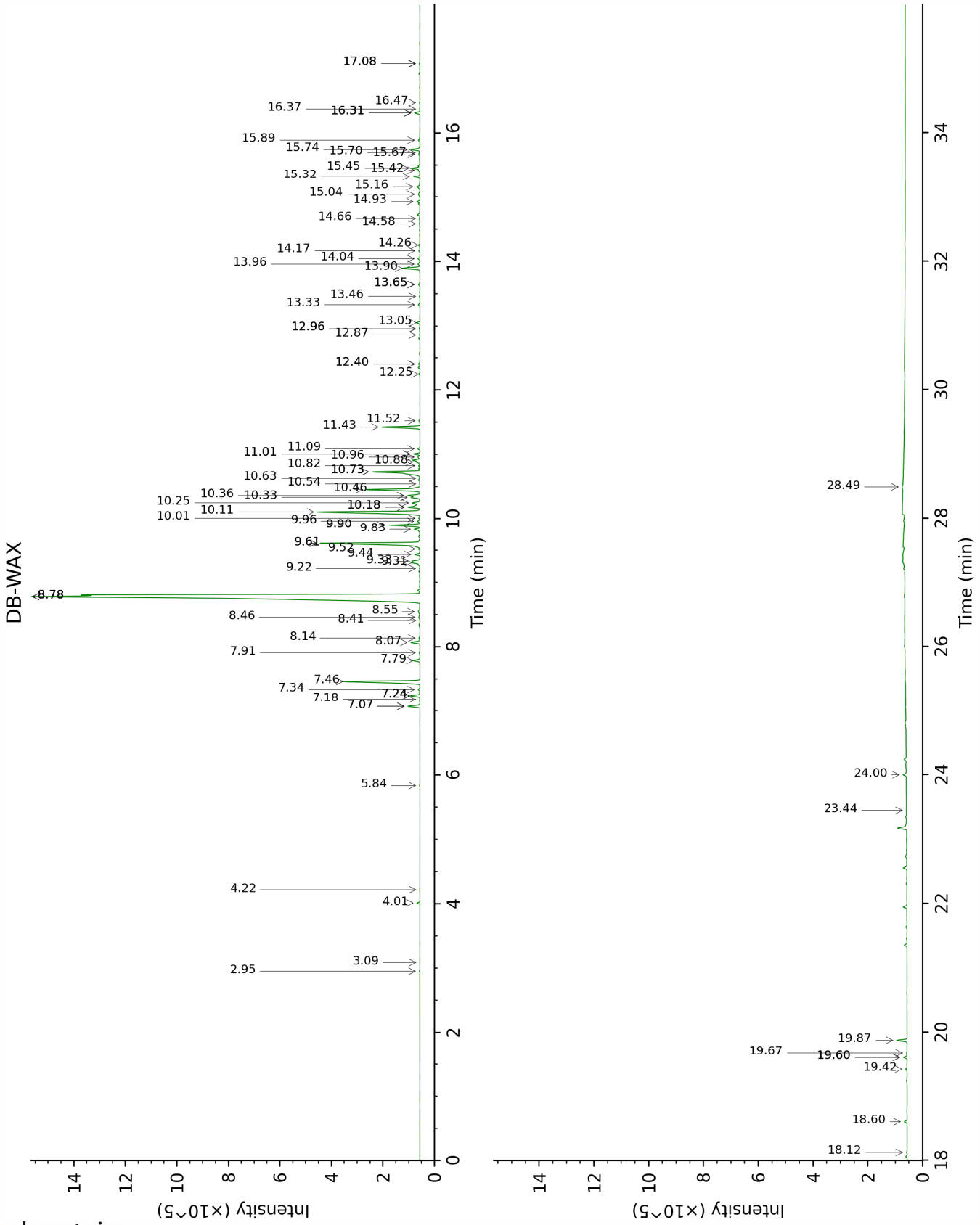
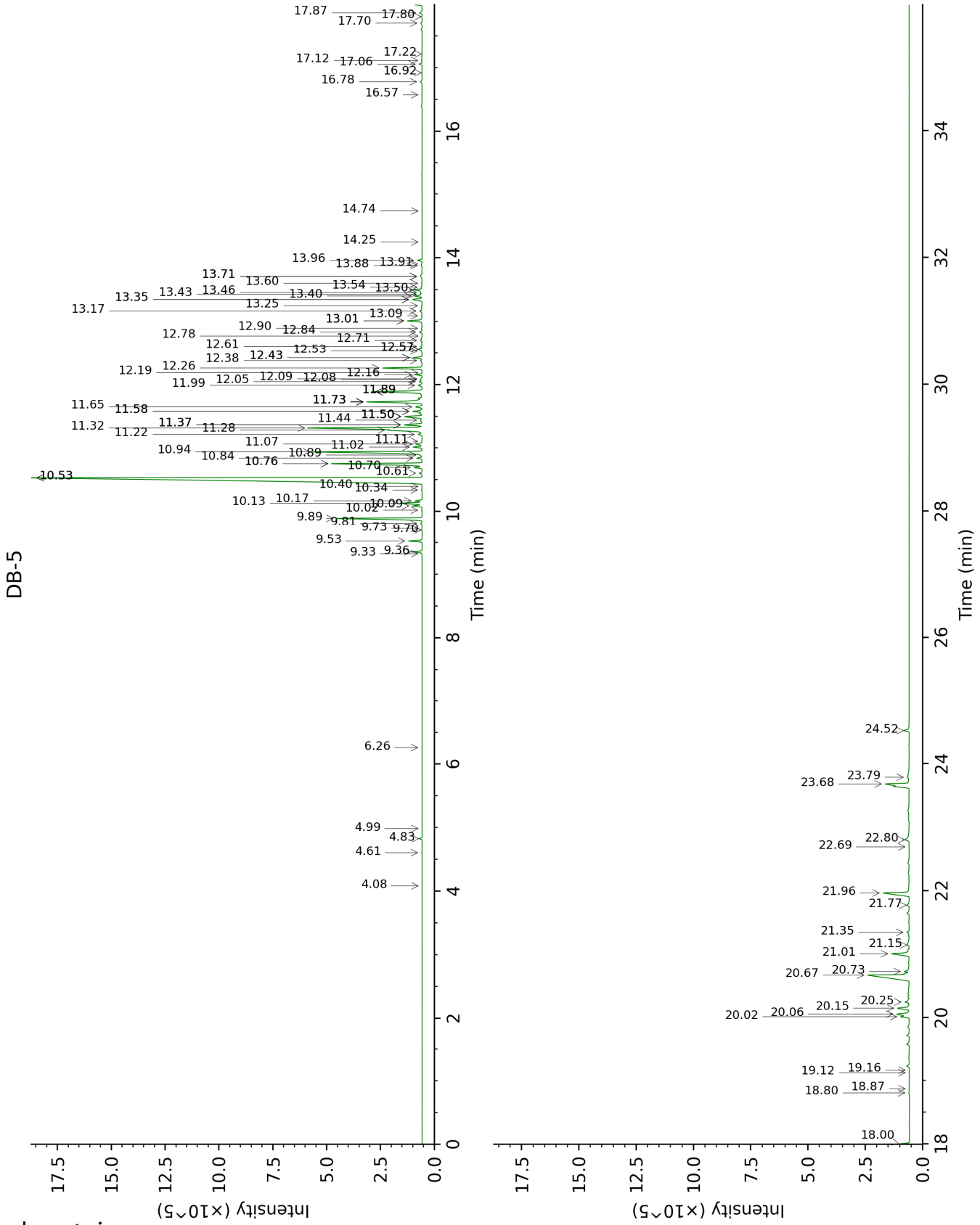

DB-WAX
Time (min)
Intensity (×10^5)
17.08
16.47
16.37
16.31
15.89
15.74
15.70
15.67
15.45
15.42
15.32
15.16
15.04
14.93
14.66
14.58
14.26
14.17
14.04
13.96
13.90
13.65
13.46
13.33
13.05
12.96
12.87
12.40
12.25
11.52
11.43
11.09
11.01
10.96
10.88
10.82
10.73
10.63
10.54
10.46
10.36
10.33
10.25
10.18
10.11
10.01
9.96
9.90
9.83
9.61
9.52
9.44
9.31
9.22
8.78
8.55
8.46
8.41
8.14
8.07
7.91
7.79
7.46
7.34
7.24
7.18
7.07
5.84
4.22
4.01
3.09
2.95
28.49
24.00
23.44
19.87
19.67
19.60
19.42
18.60
18.12


DB-5
Time (min)
Intensity (×10^5)
17.87
17.80
17.70
17.22
17.12
17.06
16.92
16.78
16.57
14.74
14.25
13.96
13.88
13.91
13.71
13.60
13.54
13.50
13.35
13.43
13.46
13.40
13.25
13.17
13.01
13.09
12.90
12.84
12.78
12.71
12.61
12.53
12.57
12.38
12.43
12.19
12.26
12.16
11.99
12.05
12.09
12.08
11.89
11.73
11.65
11.58
11.44
11.50
11.32
11.37
11.28
11.22
11.07
11.02
11.11
10.94
10.84
10.89
10.76
10.70
10.61
10.53
10.40
10.34
10.13
10.17
10.09
10.02
9.89
9.81
9.73
9.70
9.53
9.33
9.36
6.26
4.99
4.83
4.61
4.08
24.52
23.68
23.79
22.69
22.80
21.96
21.77
21.35
21.15
21.01
20.67
20.73
20.02
20.06
20.15
20.25
19.12
19.16
18.80
18.87
18.00

FULL ANALYSIS DATA

Myrcene	**Column DB-WAX**			**Column DB-5**		
	3.09	1134.4	tr	4.08	993.0	tr
(2*E*,4*E*)-3,7-Dimethylocta-2,4-diene?	2.95	1124.1	0.02	4.61	1026.2	0.02
(*Z*)-β-Ocimene	4.01	1204.4	0.12	4.83	1040.1	0.11
(*E*)-β-Ocimene	4.22	1219.1	0.01	4.99	1050.0	0.01
allo-Ocimene	5.84	1334.6	0.02	6.26	1130.2	0.02
δ-Elemene isomer	7.07*	1423.3	[0.61]	9.33	1333.0	0.01
δ-Elemene	7.24*	1436.0	[0.48]	9.36	1335.1	0.44
α-Cubebene	7.07*	1423.3	[0.61]	9.53	1347.1	0.54
Cyclosativene I	7.18	1431.4	0.02	9.70	1359.3	0.02
Cyclosativene II	7.24*	1436.0	[0.48]	9.73	1361.1	0.01
α-Ylangene	7.34	1443.0	0.10	9.81	1367.3	0.07
α-Copaene	7.46	1452.4	4.33	9.89	1372.9	3.95
cis-β-Elemene	8.55	1534.0	0.16	10.02	1382.0	0.03
β-Cubebene	8.07	1497.3	0.49	10.09	1386.8	0.43
β-Elemene	8.78*	1552.0	[49.31]	10.13	1389.6	1.06
Cyperene	7.79	1476.3	0.33	10.17	1392.4	0.31
α-Gurjunene	7.91	1485.3	0.04	10.34	1404.5	0.05
Sesquithujene	8.41	1523.4	0.01	10.40	1408.8	0.02
β-Caryophyllene	8.78*	1552.0	[49.31]	10.53*	1418.8	[39.70]
β-Ylangene	8.46	1527.2	0.10	10.53*	1418.8	[39.70]
β-Copaene	8.78*	1552.0	[49.31]	10.61	1424.3	0.13
γ-Elemene	9.31	1592.6	0.37	10.70	1431.0	0.37
β-Humulene	8.14	1502.4	0.07	10.76*	1435.4	[4.62]
trans-α-Bergamotene	8.78*	1552.0	[49.31]	10.76*	1435.4	[4.62]
Sesquisabinene A	9.44	1602.8	0.25	10.84	1441.8	0.25
epi-β-Santalene	9.22	1585.5	0.03	10.89	1445.5	0.07
α-Humulene	9.61*	1616.8	[6.13]	10.94	1449.2	5.40
allo-Aromadendrene	9.33	1594.4	0.39	11.02	1454.7	0.36
cis-Muurola-4(15),5-diene	9.61*	1616.8	[6.13]	11.07	1458.4	0.31
(*E*)-β-Farnesene	9.83	1634.3	0.31	11.11	1461.4	0.03
trans-Cadina-1(6),4-diene	9.52	1609.7	0.06	11.22	1469.6	0.21
γ-Muurolene	9.90*	1639.8	[1.92]	11.28	1474.6	1.53
Germacrene D	10.11	1656.7	6.52	11.32	1477.1	5.85
β-Selinene	10.18*	1662.7	[0.76]	11.37*	1480.8	[0.91]
ar-Curcumene	10.96	1726.8	0.13	11.37*	1480.8	[0.91]
δ-Selinene	9.96	1645.1	0.13	11.44	1486.2	0.12
epi-Cubebol	12.25	1837.4	0.06	11.50*	1490.5	[1.07]

α-Selinene	10.25	1668.1	0.48	11.50*	1490.5	[1.07]
Bicyclogermacrene	10.36*†	1677.2	[0.61]	11.50*	1490.5	[1.07]
Viridiflorene	9.90*	1639.8	[1.92]	11.50*	1490.5	[1.07]
α-Muurolene	10.33*†	1675.0	[0.42]	11.58*	1496.6	[0.40]
Caparratriene	10.01	1648.8	0.06	11.58*	1496.6	[0.40]
δ-Guaiene	10.18*	1662.7	[0.76]	11.65	1501.8	0.33
β-Bisabolene	10.46	1684.7	2.84	11.73*	1508.0	[2.92]
(3*E*,6*E*)-α-Farnesene	10.82	1715.6	0.06	11.73*	1508.0	[2.92]
Cubebol	12.86	1891.9	0.02	11.73*	1508.0	[2.92]
β-Curcumene	10.54	1691.9	0.03	11.73*	1508.0	[2.92]
γ-Cadinene	10.63	1699.1	0.01	11.73*	1508.0	[2.92]
β-Sesquiphellandrene	10.88	1720.5	0.14	11.89*	1520.5	[2.62]
δ-Cadinene	10.73*	1707.6	[2.97]	11.89*	1520.5	[2.62]
trans-Calamenene	11.52	1774.4	0.06	11.89*	1520.5	[2.62]
trans-Cadina-1,4-diene	11.01*	1731.0	[0.28]	11.99	1528.4	0.22
(*E*)-γ-Bisabolene	10.73*	1707.6	[2.97]	12.05	1533.0	0.13
α-Cadinene	11.09	1737.7	0.10	12.08	1535.3	0.07
α-Calacorene	12.40*	1851.2	[0.08]	12.09	1536.5	0.05
(*E*)-α-Bisabolene	11.01*	1731.0	[0.28]	12.16	1541.6	0.28
Isocaryophyllene epoxide B	12.40*	1851.2	[0.08]	12.19	1544.0	0.02
Germacrene B	11.42	1766.1	1.87	12.26	1549.8	1.71
Maaliol	13.33	1934.9	0.08	12.38	1558.9	0.07
β-Calacorene	12.96*	1900.6	[0.05]	12.42*	1562.5	[0.40]
Caryophyllenyl alcohol	13.96	1992.7	0.13	12.42*	1562.5	[0.40]
Spathulenol	14.66	2060.1	0.05	12.53	1570.9	0.05
Caryophyllene oxide isomer	12.96*	1900.6	[0.05]	12.57*	1573.7	[0.17]
Caryophyllene oxide	13.06	1909.3	0.16	12.57*	1573.7	[0.17]
Globulol	14.17	2012.5	0.06	12.61	1577.1	0.07
Viridiflorol	14.26	2020.9	0.08	12.71	1584.6	0.08
Humulene epoxide I	13.46	1946.7	0.03	12.78	1589.9	0.01
Ledol	13.65*	1963.5	[0.08]	12.84	1594.8	0.12
Humulene epoxide II	13.65*	1963.5	[0.08]	12.90	1599.5	0.03
Unknown MECA V [m/z 179, 161 (66), 119 (44), 95 (38), 105 (35)... 204 (24), 222 (1)]	14.93	2085.1	0.15	13.01*	1609.0	[0.69]

Junenol	13.90	1986.6	0.96	13.01*	1609.0	[0.69]
Rosifoliol	14.58	2052.3	0.04	13.09	1615.6	0.03
1-epi-Cubenol	14.04	2000.6	0.10	13.17	1621.7	0.12
Caryophylladienol II	16.31*	2224.5	[0.26]	13.25	1628.5	0.04
τ-Muurolol	15.32	2124.2	0.31	13.35*	1636.6	[0.56]
τ-Cadinol	15.16	2108.1	0.21	13.35*	1636.6	[0.56]
α-Muurolol	15.45	2137.4	0.38	13.40	1641.2	0.35
Unknown COOF I [m/z 121, 95 (50), 59 (46), 93 (41), 81 (36), 67 (36)... 206 (18), 220? (1)]	15.04	2096.4	0.12	13.43	1643.2	0.07
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	15.42	2134.3	0.08	13.46	1645.6	0.07
α-Cadinol	15.74	2166.4	0.46	13.50	1649.2	0.46
Selin-11-en-4α-ol	15.89	2180.9	0.08	13.54	1652.4	0.06
trans-Calamenen-10-ol	17.08*	2304.4	[0.04]	13.60	1657.6	0.03
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	17.08*	2304.4	[0.04]	13.71*	1666.5	[0.06]
Cadalene	15.67	2159.0	0.06	13.71*	1666.5	[0.06]
Germacra-4(15),5,10(14)-trien-1α-ol	16.31*	2224.5	[0.26]	13.88	1680.4	0.04
α-Bisabolol	15.70	2161.7	0.04	13.91	1682.5	0.03
Juniper camphor	16.31*	2224.5	[0.26]	13.96	1687.3	0.20
Aromadendrane-4,10-diol	17.08*	2304.4	[0.04]	14.25	1711.4	0.01
Methyl (*E*,*E*)-farnesate?				14.74	1753.5	0.01
Unknown COOF II [m/z 43, 95 (66), 81 (63), 137 (61), 41 (53), 107 (47)... 262 (6)...]	18.12	2417.4	0.03	16.58	1918.8	0.02
Unknown COOF III [m/z 95, 105 (79), 107 (75), 189 (68), 41 (64), 81 (61)... 257 (12), 272 (2)]	16.47	2241.0	0.03	16.78	1938.4	0.11
Unknown COOF IV	18.60	2470.6	0.15	16.92	1951.7	0.03

[m/z 43, 95 (98), 107 (84), 93 (55), 121 (53)... 262 (7)...]						
Unknown COOF V [m/z 95, 107 (61), 191 (46), 121 (45)...]	19.67	2593.6	0.04	17.06	1964.7	0.13
Palmitic acid				17.12	1970.0	0.05
Unknown COOF VI [m/z 95, 107 (27), 81 (19), 191 (17), 55 (16)... 275 (1)...]	16.37	2230.7	0.03	17.22	1979.7	0.01
cis-3,14-Clerodadien-13-ol	19.42	2564.4	0.09	17.70	2027.1	0.07
Unknown COOF VII [m/z 95, 191 (43), 71 (27), 55 (27)...]	19.60*	2585.6	[0.18]	17.80	2037.0	0.03
Manool	19.60*	2585.6	[0.18]	17.87	2043.0	0.14
Kolavelool	19.87	2618.3	0.50	18.00	2056.3	0.45
Linoleic acid				18.80	2137.7	0.05
Oleic acid	24.00	3150.5	0.17	18.87	2144.5	0.03
α-Eleostearic acid	23.44	3073.6	0.02	19.12	2170.6	0.03
Stearic acid				19.16	2174.8	0.02
3α-Hydroxymanool				20.02	2265.5	0.39
Copalol				20.06	2270.1	0.87
Kolavenol				20.15	2280.1	0.75
Methyl copalate?				20.25	2290.5	0.30
Copaifera diterpenic acid I	28.49	3726.0	4.03	20.67	2337.6	4.44
Methyl kolavenate				20.73	2343.9	0.30
Copaifera diterpenic acid II				21.01	2375.2	1.23
Kolavenyl acetate?				21.15	2390.5	0.08
Methyl hardwickiiate?				21.35	2413.5	0.12
Copaifera diterpenic acid III				21.77	2463.2	0.17
Copaifera diterpenic acid IV				21.96	2485.4	2.11
Copaifera diterpenic acid V				22.69	2572.6	0.01
Copaifera diterpenic acid IX				22.80	2586.1	0.44
Copaifera diterpenic acid VI				23.68	2695.3	1.60
Copaifera				23.79	2709.1	0.13

diterpenic acid VII						
Copaifera diterpenic acid VIII				24.52	2804.1	0.33
Total reported		92.57%			95.06%	

*: 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