

Date : 2024-01-17

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 23L21-NPA01

Customer Identification : Copaifera officinalis - Brasil - NPS00117 - Lot#: NP0232

Type : Resin

Source : Copaifera officinalis

Customer : Nature Packaged

Checked an approved by:

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

Notes: 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.

This report is an update from the first version issued on 20214-01-16 to format it for online publication.

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

Date : 2024-01-16

PHYSICOCHEMICAL DATA

Refractive index : 1.5071 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2023-12-21

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY - CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Myrcene	tr	Monoterpene
(2E,4E)-3,7-Dimethylocta-2,4-diene?	0.02	Monoterpene
(Z)- β -Ocimene	0.10	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	0.56	Sesquiterpene
Cyclosativene I	0.02	Sesquiterpene
Cyclosativene II	0.02	Sesquiterpene
α -Ylangene	0.08	Sesquiterpene
α -Copaene	4.16	Sesquiterpene
<i>cis</i> - β -Elemene	0.03	Sesquiterpene
β -Cubebene	0.44	Sesquiterpene
Cyperene	0.32	Sesquiterpene
β -Elemene	0.68	Sesquiterpene
α -Gurjunene	0.04	Sesquiterpene
β -Caryophyllene	37.21	Sesquiterpene
β -Ylangene	0.10	Sesquiterpene
β -Copaene	0.14	Sesquiterpene
γ -Elemene	0.32	Sesquiterpene
<i>trans</i> - α -Bergamotene	5.06	Sesquiterpene
Sesquisabinene A	0.27	Sesquiterpene
α -Humulene	5.07	Sesquiterpene
allo-Aromadendrene	0.39	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.04	Sesquiterpene
(E)- β -Farnesene	0.25	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.22	Sesquiterpene
γ -Muurolole	1.52	Sesquiterpene
Germacrene D	6.41	Sesquiterpene
β -Selinene	0.57	Sesquiterpene
<i>trans</i> -Muurolo-4(15),5-diene	0.41	Sesquiterpene
δ -Selinene	0.12	Sesquiterpene
α -Selinene	0.54	Sesquiterpene
epi-Cubebol	0.06	Sesquiterpenic alcohol
Bicyclogermacrene	0.65	Sesquiterpene
Viridiflorene	0.41	Sesquiterpene
Caparratriene	0.12	Sesquiterpene
α -Muurolole	0.40	Sesquiterpene
δ -Guaiene	0.36	Sesquiterpene

β-Curcumene	0.02	Sesquiterpene
γ-Cadinene	0.16	Sesquiterpene
Cubebol	0.06	Sesquiterpenic alcohol
β-Bisabolene	2.86	Sesquiterpene
(3E,6E)-α-Farnesene	0.10	Sesquiterpene
trans-Calamenene	0.06	Sesquiterpene
δ-Cadinene	2.26	Sesquiterpene
β-Sesquiphellandrene	0.13	Sesquiterpene
Zonarene	0.57	Sesquiterpene
(E)-γ-Bisabolene	0.07	Sesquiterpene
trans-Cadina-1,4-diene	0.14	Sesquiterpene
α-Cadinene	0.13	Sesquiterpene
α-Calacorene	0.11	Sesquiterpene
(E)-α-Bisabolene	0.31	Sesquiterpene
Germacrene B	1.50	Sesquiterpene
β-Calacorene	0.04	Sesquiterpene
Caryophyllenyl alcohol	0.26	Sesquiterpenic alcohol
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.13	Sesquiterpenic ether
Globulol	0.07	Sesquiterpenic alcohol
Viridiflorol	0.08	Sesquiterpenic alcohol
Ledol	0.11	Sesquiterpenic alcohol
Junenol	0.74	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Rosifoliol	0.03	Sesquiterpenic alcohol
1-epi-Cubebol	0.11	Sesquiterpenic alcohol
Caryophylladienol II	0.03	Sesquiterpenic alcohol
τ-Cadinol	0.21	Sesquiterpenic alcohol
τ-Muurolol	0.32	Sesquiterpenic alcohol
α-Muurolol	0.35	Sesquiterpenic alcohol
Unknown	0.08	Oxygenated sesquiterpene
Unknown	0.07	Sesquiterpenic alcohol
α-Cadinol	0.42	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	0.08	Sesquiterpenic alcohol
Cadalene	0.06	Sesquiterpene
α-Bisabolol	0.05	Sesquiterpenic alcohol
Juniper camphor	0.18	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated diterpene
Unknown	0.12	Diterpene
Unknown	0.03	Oxygenated diterpene
Unknown	0.15	Oxygenated diterpene
Palmitic acid	0.11	Aliphatic acid
cis-3,14-Clerodadien-13-ol	0.09	Diterpenic alcohol
Unknown	0.04	Oxygenated diterpene
Manool	0.17	Diterpenic alcohol

Kolavelool	0.53	Diterpenic alcohol
Linoleic acid	0.05	Aliphatic acid
Oleic acid	0.02	Aliphatic acid
Stearic acid	0.09	Aliphatic acid
3 α -Hydroxymanool	0.56	Diterpenic alcohol
Copalol	0.87	Diterpenic alcohol
Kolavenol	0.95	Diterpenic alcohol
Methyl copalate?	0.31	Diterpenic ester
Copaifera diterpenic acid I	4.58	Diterpenic acid
Methyl kolavenate	0.31	Diterpenic ester
Copaifera diterpenic acid II	1.40	Diterpenic acid
Kolavenyl acetate?	0.19	Diterpenic ester
Methyl hardwickiiate?	0.13	Diterpenic ester
Copaifera diterpenic acid III	0.19	Diterpenic acid
Copaifera diterpenic acid IV	2.36	Diterpenic acid
Copaifera diterpenic acid V	0.42	Diterpenic acid
Copaifera diterpenic acid VI	1.71	Diterpenic acid
Copaifera diterpenic acid VII	0.25	Diterpenic acid
Copaifera diterpenic acid VIII	0.35	Diterpenic acid
Consolidated total	95.61	

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

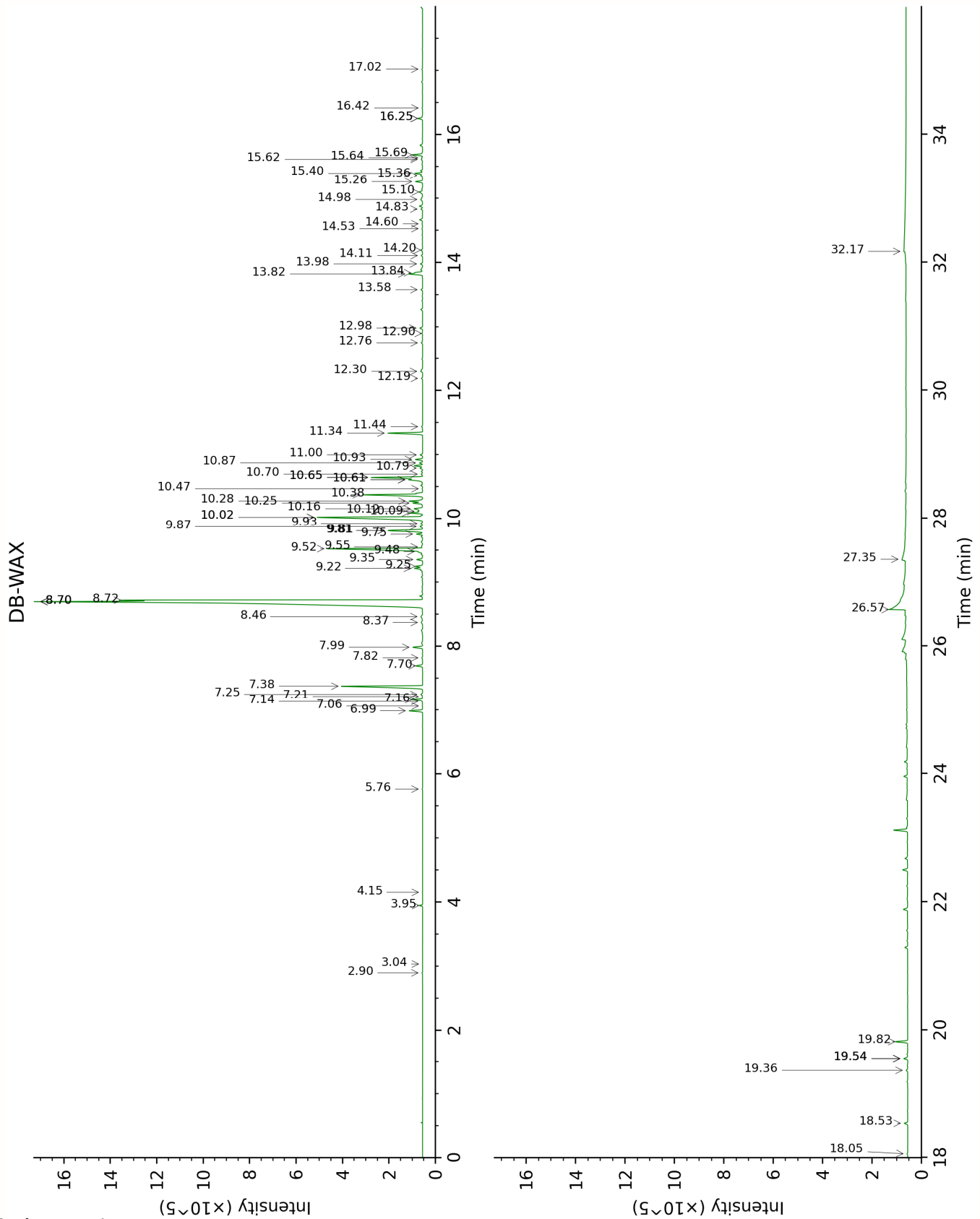
Note: no correction factor was applied

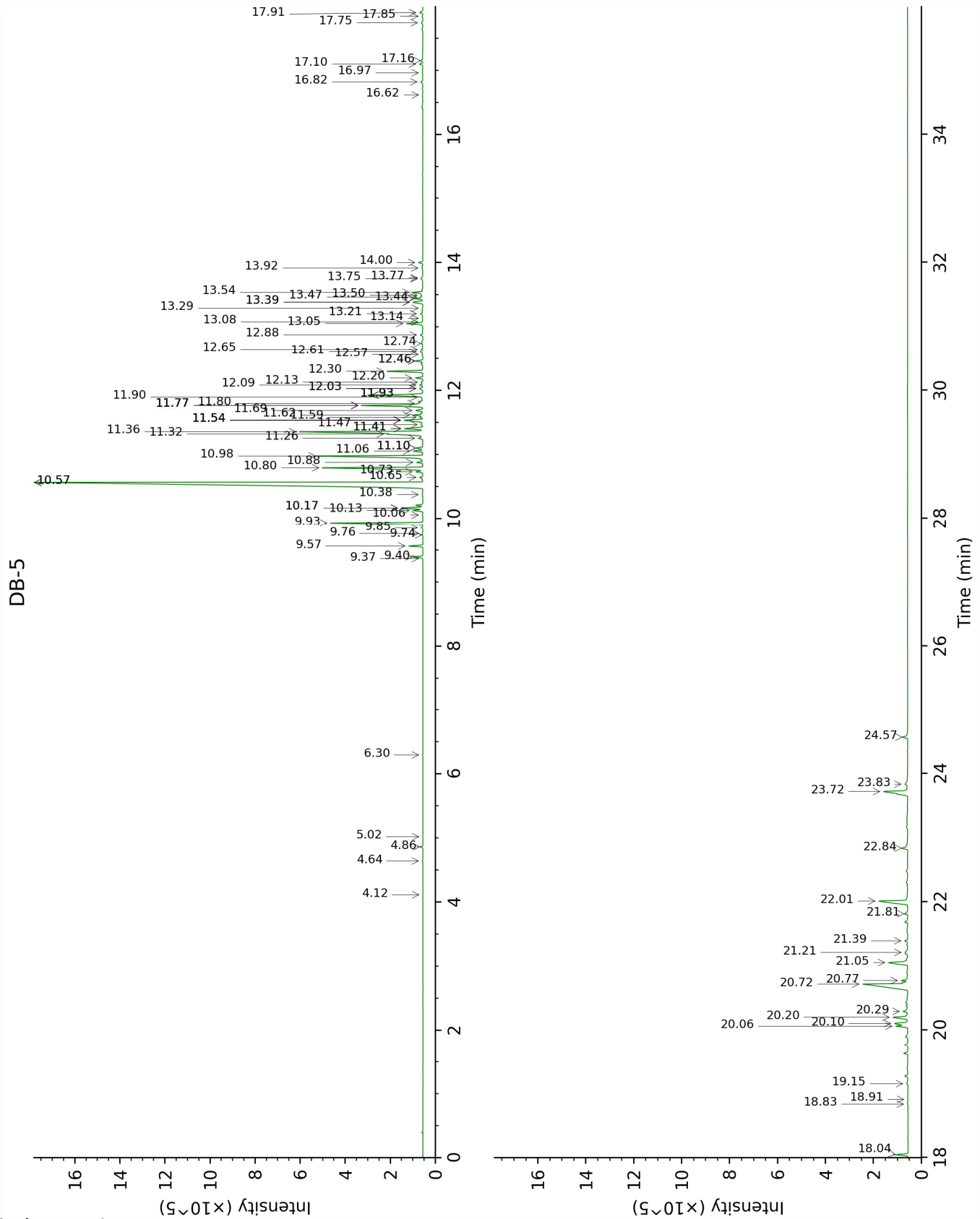
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.

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





FULL ANALYSIS DATA

Myrcene	Column DB-WAX			Column DB-5		
	3.04	1133.0	tr	4.12	993.0	tr
(2E,4E)-3,7-Dimethylocta-2,4-diene?	2.90	1122.5	0.02	4.64	1026.5	0.02
(Z)- β -Ocimene	3.95	1202.0	0.11	4.86	1040.3	0.10
(E)- β -Ocimene	4.15	1216.6	0.01	5.02	1050.1	0.01
allo-Ocimene	5.76	1332.8	0.02	6.30	1130.3	0.02
δ -Elemene isomer	7.06	1426.4	0.02	9.37	1333.7	0.01
δ -Elemene	7.16	1433.8	0.44	9.40	1335.5	0.44
α -Cubebene	6.99	1420.8	0.59	9.57	1347.5	0.56
Cyclosativene I	7.14	1432.0	0.02	9.74	1359.7	0.02
Cyclosativene II	7.22	1437.8	0.02	9.76	1361.3	0.02
α -Ylangene	7.25	1440.3	0.09	9.85	1367.7	0.08
α -Copaene	7.38	1449.8	4.39	9.93	1373.3	4.16
cis- β -Elemene	8.46	1531.5	0.15	10.06	1382.2	0.03
β -Cubebene	7.99	1494.8	0.48	10.13	1387.2	0.44
Cyperene	7.70	1473.4	0.32	10.17*	1389.9	[1.00]
β -Elemene	8.70*†	1549.5	[36.39]	10.17*	1389.9	[1.00]
α -Gurjunene	7.82	1482.6	0.04	10.38	1404.7	0.04
β -Caryophyllene	8.70*†	1549.5	[36.39]	10.57*	1418.8	[37.31]
β -Ylangene	8.37	1524.4	0.10	10.57*	1418.8	[37.31]
β -Copaene	8.70*†	1549.5	[36.39]	10.65	1424.6	0.14
γ -Elemene	9.25	1591.9	0.32	10.74	1431.2	0.32
trans- α -Bergamotene	8.72*†	1551.3	[8.96]	10.80	1435.8	5.06
Sesquisabinene A	9.35	1600.2	0.28	10.88	1442.1	0.27
α -Humulene	9.52	1613.9	5.33	10.98	1449.4	5.07
allo-Aromadendrene	9.22	1589.5	0.36	11.06	1455.2	0.39
cis-Muurolo-4(15),5-diene	9.55	1616.1	0.04	11.10*	1458.7	[0.32]
(E)- β -Farnesene	9.75	1632.3	0.25	11.10*	1458.7	[0.32]
trans-Cadina-1(6),4-diene	9.48	1610.3	0.17	11.26	1470.1	0.22
γ -Muurolole	9.81*	1636.8	[1.93]	11.32	1475.0	1.52
Germacrene D	10.02*	1654.1	[6.81]	11.36	1477.6	6.41
β -Selinene	10.09	1659.8	0.57	11.41*	1481.2	[0.98]
trans-Muurolo-4(15),5-diene	10.02*	1654.1	[6.81]	11.41*	1481.2	[0.98]
δ -Selinene	9.87	1641.9	0.13	11.47	1485.9	0.12
α -Selinene	10.16	1665.0	0.54	11.54*	1491.0	[1.15]
epi-Cubebol	12.19	1836.9	0.06	11.54*	1491.0	[1.15]
Bicyclogermacrene	10.25*†	1672.1	[0.41]	11.54*	1491.0	[1.15]

Viridiflorene	9.81*	1636.8	[1.93]	11.54*	1491.0	[1.15]
Caparratriene	9.92	1646.2	0.09	11.59	1494.5	0.12
α -Muurolene	10.28*†	1674.6	[0.64]	11.62	1496.9	0.40
δ -Guaiene	10.12	1661.7	0.19	11.69	1502.2	0.36
β -Curcumene	10.47	1690.2	0.02	11.77*	1508.3	[3.10]
γ -Cadinene	10.61*	1701.8	[0.73]	11.77*	1508.3	[3.10]
Cubebol	12.76	1886.6	0.06	11.77*	1508.3	[3.10]
β -Bisabolene	10.38	1682.6	2.86	11.77*	1508.3	[3.10]
(3E,6E)- α -Farnesene	10.70	1709.1	0.07	11.80	1510.7	0.10
<i>trans</i> -Calamenene	11.44	1771.6	0.05	11.90	1518.3	0.06
δ -Cadinene	10.65*	1704.8	[2.33]	11.93*	1520.9	[2.71]
β - Sesquiphellandrene	10.79	1717.1	0.13	11.93*	1520.9	[2.71]
Zonarene	10.61*	1701.8	[0.73]	11.93*	1520.9	[2.71]
(E)- γ -Bisabolene	10.65*	1704.8	[2.33]	12.03*	1529.0	[0.21]
<i>trans</i> -Cadina-1,4- diene	10.87	1723.8	0.14	12.03*	1529.0	[0.21]
α -Cadinene	11.00	1734.4	0.11	12.09	1533.2	0.13
α -Calacorene	12.30	1846.5	0.08	12.13	1536.7	0.11
(E)- α -Bisabolene	10.93	1728.5	0.31	12.20	1541.9	0.31
Germacrene B	11.34	1763.1	1.57	12.30	1550.1	1.50
β -Calacorene	12.90	1899.7	0.04	12.46*	1562.7	[0.33]
Caryophyllenyl alcohol	13.84	1986.4	0.26	12.46*	1562.7	[0.33]
Spathulenol	14.60	2059.0	0.03	12.57	1570.8	0.04
Caryophyllene oxide	12.98	1907.4	0.13	12.61	1574.2	0.13
Globulol	14.11	2011.7	0.06	12.65	1577.4	0.07
Viridiflorol	14.20	2019.9	0.07	12.74	1584.7	0.08
Ledol	13.58	1962.3	0.07	12.88	1595.2	0.11
Junenol	13.82	1984.7	0.69	13.06	1609.3	0.74
Unknown MECA V [m/z 179, 161 (66), 119 (44), 95 (38), 105 (35)... 204 (24), 222 (1)]	14.83	2080.9	0.08	13.08	1611.3	0.03
Rosifoliol	14.53	2051.8	0.03	13.14	1616.0	0.03
1-epi-Cubenol	13.98	1999.3	0.10	13.21	1621.9	0.11
Caryophylladienol II	16.26*	2223.5	[0.24]	13.29	1628.9	0.03
τ -Cadinol	15.10	2106.9	0.21	13.39*	1636.7	[0.59]
τ -Muurolol	15.26	2123.2	0.32	13.39*	1636.7	[0.59]
α -Muurolol	15.40	2136.6	0.35	13.44	1641.3	0.35
Unknown COOF I [m/z 121, 95 (50), 59 (46), 93 (41), 81	14.98	2095.3	0.13	13.47	1643.3	0.08

(36), 67 (36)... 206 (18), 220? (1)]						
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	15.36	2133.4	0.09	13.50	1645.8	0.07
α -Cadinol	15.69	2165.8	0.47	13.54	1649.4	0.42
(3Z)-Caryophylla- 3,8(13)-dien-5 β -ol	17.02	2303.6	0.04	13.75	1666.7	0.08
Cadalene	15.62	2158.6	0.07	13.76	1667.9	0.06
α -Bisabolol	15.64	2161.0	0.04	13.92	1680.5	0.05
Juniper camphor	16.26*	2223.5	[0.24]	14.00	1687.6	0.18
Unknown COOF II [m/z 43, 95 (66), 81 (63), 137 (61), 41 (53), 107 (47)... 262 (6)...]	18.06	2415.6	0.04	16.62	1919.6	0.02
Unknown COOF III [m/z 95, 105 (79), 107 (75), 189 (68), 41 (64), 81 (61)... 257 (12), 272 (2)]	16.42	2240.3	0.02	16.82	1938.9	0.12
Unknown COOF IV [m/z 43, 95 (98), 107 (84), 93 (55), 121 (53)... 262 (7)...]	18.53	2469.0	0.16	16.97	1952.3	0.03
Unknown COOF V [m/z 95, 107 (61), 191 (46), 121 (45)...]	19.54*	2584.9	[0.20]	17.10	1965.3	0.15
Palmitic acid				17.16	1970.3	0.11
<i>cis</i> -3,14- Clerodadien-13-ol	19.36	2563.9	0.08	17.75	2027.5	0.09
Unknown COOF VII [m/z 95, 191 (43), 71 (27), 55 (27)...]	19.54*	2584.9	[0.20]	17.85	2037.5	0.04
Manool	19.54*	2584.9	[0.20]	17.91	2043.3	0.17
Kolavelool	19.82	2617.8	0.56	18.04	2056.8	0.53
Linoleic acid				18.83	2136.4	0.05
Oleic acid				18.91	2144.1	0.02
Stearic acid				19.15	2169.4	0.09
3 α -Hydroxymanool				20.06	2265.9	0.56
Copalol				20.10	2270.5	0.87
Kolavenol				20.20	2281.0	0.95

Methyl copalate?				20.29	2290.8	0.31
Copaifera diterpenic acid I	26.57	3528.5	3.98	20.72	2337.8	4.58
Methyl kolavenate				20.77	2344.2	0.31
Copaifera diterpenic acid II	27.35	3623.0	1.14	21.05	2375.6	1.40
Kolavenyl acetate?				21.21	2393.2	0.19
Methyl hardwickiiate?				21.39	2414.0	0.13
Copaifera diterpenic acid III				21.81	2463.1	0.19
Copaifera diterpenic acid IV	32.17	3976.5	2.63	22.01	2486.2	2.36
Copaifera diterpenic acid V				22.84	2585.2	0.42
Copaifera diterpenic acid VI				23.72	2694.9	1.71
Copaifera diterpenic acid VII				23.83	2709.4	0.25
Copaifera diterpenic acid VIII				24.57	2804.4	0.35
Total reported		91.06%			94.96%	

*: 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