

Date : 2024-03-28

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code** : 24C14-PTH01

**Customer Identification** : Myrrh - France - M40115R

**Type** : Essential Oil

**Source** : *Commiphora myrrha*

**Customer** : Plant Therapy

Checked and approved by:

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

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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 :** 2024-03-20

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.5258 \pm 0.0003$  (20 °C)

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

**Analyst :** Cindy Caron B. Sc.

**Date :** 2024-03-14

## 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
Ethanol	0.01	Aliphatic alcohol
<i>para</i> -Xylene	0.01	Simple phenolic
$\alpha$ -Thujene	tr	Monoterpene
$\alpha$ -Pinene	0.01	Monoterpene
Myrcene	0.01	Monoterpene
$\Delta^3$ -Carene	0.01	Monoterpene
<i>para</i> -Cymene	0.01	Monoterpene
Limonene	0.01	Monoterpene
( <i>E</i> )- $\beta$ -Ocimene	0.08	Monoterpene
Dimethylbenzofuran isomer I	0.01	Furan
Unknown	0.01	Unknown
$\delta$ -Elemene isomer	0.02	Sesquiterpene
$\delta$ -Elemene	0.75	Sesquiterpene
$\alpha$ -Cubebene	0.04	Sesquiterpene
Cyclosativene II	0.01	Sesquiterpene
$\alpha$ -Ylangene	0.01	Sesquiterpene
$\alpha$ -Copaene	0.11	Sesquiterpene
$\beta$ -Bourbonene	0.27	Sesquiterpene
1,5-diepi- $\beta$ -Bourbonene	0.03	Sesquiterpene
<i>cis</i> - $\beta$ -Elemene	0.12	Sesquiterpene
$\beta$ -Cubebene	0.02	Sesquiterpene
$\beta$ -Elemene	3.62	Sesquiterpene
Cyperene	0.05	Sesquiterpene
$\alpha$ -Gurjunene	0.02	Sesquiterpene
$\beta$ -Caryophyllene	0.38	Sesquiterpene
$\beta$ -Ylangene	0.11	Sesquiterpene
$\alpha$ -Santalene	0.15	Sesquiterpene
$\beta$ -Copaene	0.11	Sesquiterpene
$\gamma$ -Elemene	0.96	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	0.05	Sesquiterpene
Isogermacrene D	0.08	Sesquiterpene
6,9-Guaiadiene	0.01	Sesquiterpene
Unknown	0.07	Sesquiterpene
$\alpha$ -Humulene	0.21	Sesquiterpene
Rotundene	0.02	Sesquiterpene
allo-Aromadendrene	0.05	Sesquiterpene
Unknown	0.04	Sesquiterpene
4,5-diepi-Aristolochene	0.05	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.05	Sesquiterpene
Selina-4,11-diene	0.15	Sesquiterpene

$\gamma$ -Muurolene	0.10	Sesquiterpene
Germacrene D	0.83	Sesquiterpene
$\beta$ -Selinene	0.59	Sesquiterpene
$\delta$ -Selinene	0.06	Sesquiterpene
$\alpha$ -Selinene	0.66	Sesquiterpene
Bicyclogermacrene	0.05	Sesquiterpene
Curzerene	23.12	Sesquiterpenic ether
$\epsilon$ -Amorphene	0.04	Sesquiterpene
Germacrene A	0.06	Sesquiterpene
$\delta$ -Amorphene	0.11	Sesquiterpene
$\gamma$ -Cadinene	0.32	Sesquiterpene
<i>trans</i> -Calamenene	0.05	Sesquiterpene
$\delta$ -Cadinene	0.26	Sesquiterpene
Selina-4(15),7(11)-diene	0.11	Sesquiterpene
$\alpha$ -Calacorene	0.02	Sesquiterpene
Selina-4,7(11)-diene?	0.05	Sesquiterpene
Selina-3,7(11)-diene	0.08	Sesquiterpene
$\alpha$ -Elemol	0.15	Sesquiterpenic alcohol
Germacrene B	2.09	Sesquiterpene
1,5-Epoxysalvia-4(14)-ene	0.06	Sesquiterpenic ether
Furanoedesma-1,4-diene	0.58	Sesquiterpenic ether
Caryophyllene oxide	0.05	Sesquiterpenic ether
Viridiflorol	0.05	Sesquiterpenic alcohol
$\beta$ -Elemenone	0.23	Sesquiterpenic ketone
Curzerenone	0.29	Sesquiterpenic ketone
Unknown	0.02	Oxygenated sesquiterpene
Selin-6-en-4 $\alpha$ -ol isomer	0.20	Sesquiterpenic alcohol
Furanoedesma-1,3-diene	31.15	Sesquiterpenic ether
Alismol	0.02	Sesquiterpenic alcohol
Lindestrene	10.02	Sesquiterpenic ether
$\tau$ -Muurolol	0.14	Sesquiterpenic alcohol
$\tau$ -Cadinol	0.66	Sesquiterpenic alcohol
$\alpha$ -Muurolol	0.05	Sesquiterpenic alcohol
$\alpha$ -Eudesmol	0.11	Sesquiterpenic alcohol
Furanodiene	0.67	Sesquiterpenic ether
Atractylone?	0.68	Sesquiterpenic ether
$\alpha$ -Elemyl acetate	1.43	Sesquiterpenic ester
Germacrone	0.38	Sesquiterpenic ketone
Juniper camphor	0.09	Sesquiterpenic alcohol
Unknown	2.18	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Aromadendrane-4,10-diol	0.17	Sesquiterpenic alcohol
2-Methoxyfuranodiene	4.54	Sesquiterpenic ether
Oplopanone	0.06	Sesquiterpenic alcohol
Benzyl benzoate	0.05	Phenolic ester

Unknown	0.08	Unknown
Unknown	0.15	Sesquiterpenic ester
Unknown	0.17	Sesquiterpenic ester
Isofuranodienone	0.10	Sesquiterpenic ketone
Unknown	0.55	Oxygenated sesquiterpene
2-Acetoxyfuranodiene?	0.78	Sesquiterpenic ester
Myrrhanolide C?	0.11	Sesquiterpenic alcohol
Unknown	0.16	Unknown
Cembrenol	0.01	Diterpenic alcohol
<b>Consolidated total</b>	<b>92.45</b>	

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

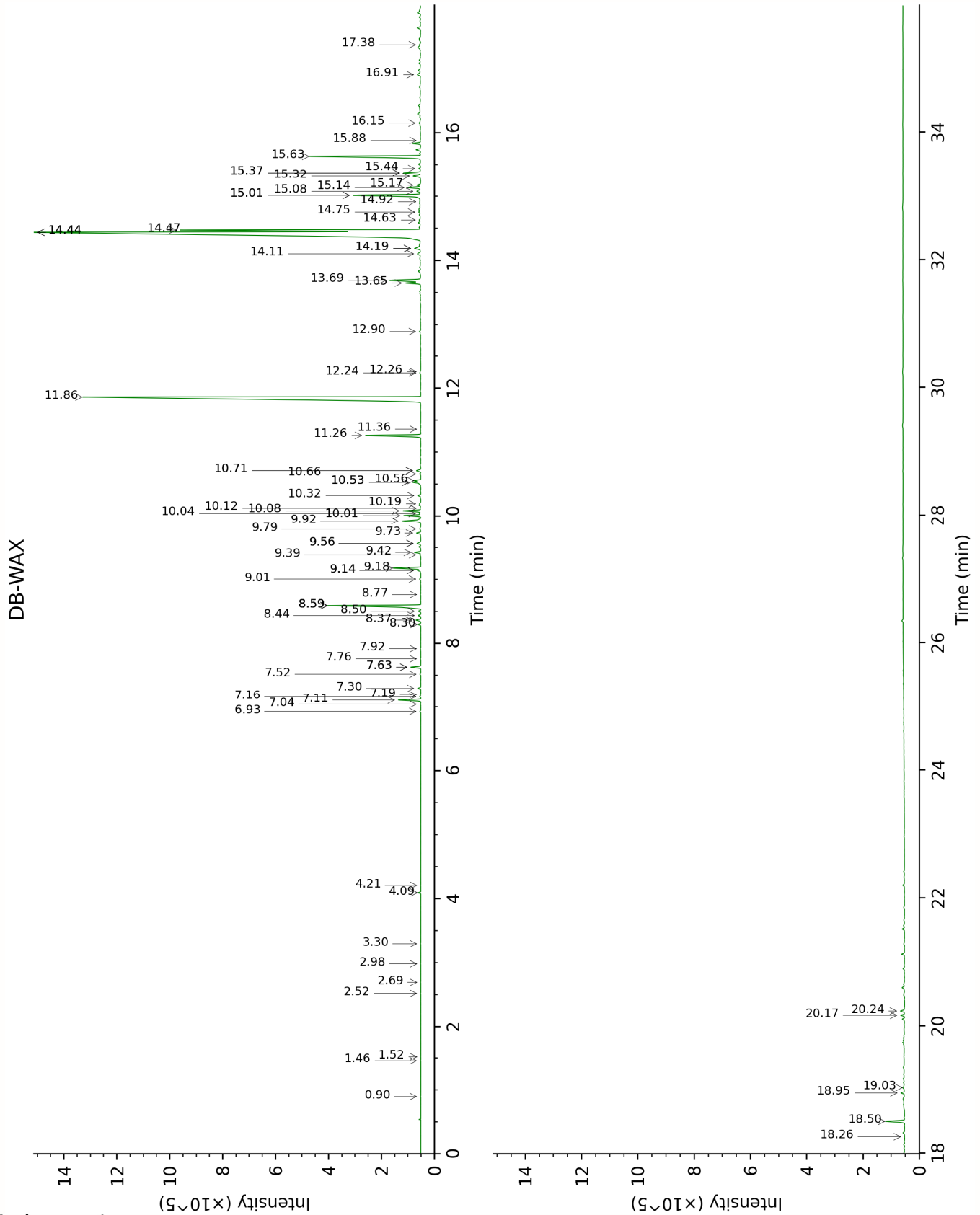
Note: no correction factor was applied

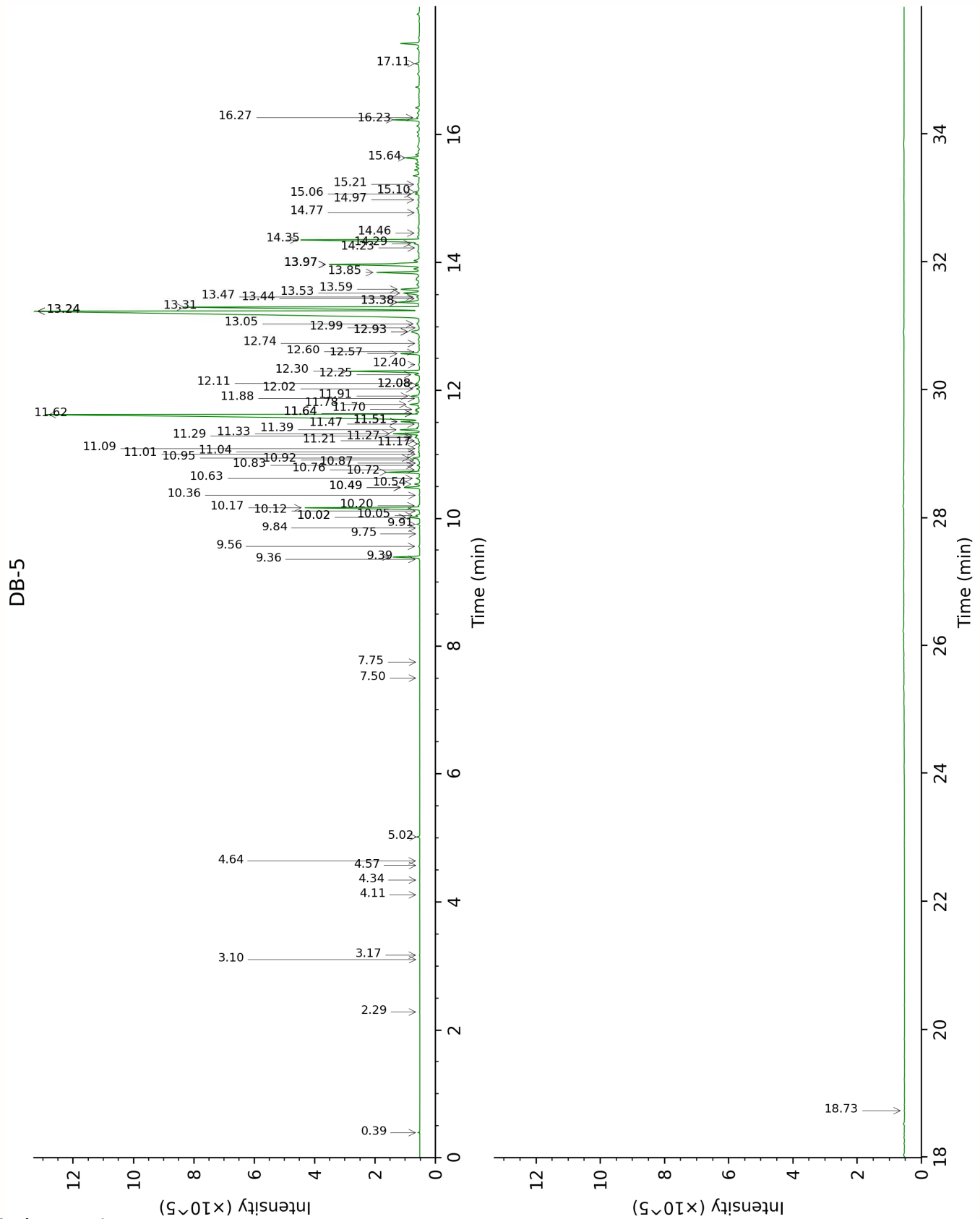
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Ethanol	Column DB-WAX			Column DB-5		
	0.90	907.5	0.01	0.39	500.7	0.01
<i>para</i> -Xylene	2.52	1096.1	0.01	2.29	865.2	0.01
$\alpha$ -Thujene	1.52	1000.7	tr	3.10	927.0	tr
$\alpha$ -Pinene	1.46	991.3	0.01	3.17	931.5	0.01
Myrcene	2.98	1132.6	tr	4.11	993.4	0.01
$\Delta$ 3-Carene	2.69	1110.6	tr	4.34	1008.4	0.01
<i>para</i> -Cymene	4.21	1224.7	tr	4.57	1022.6	0.01
Limonene	3.30	1156.5	0.01	4.64	1027.0	0.01
( <i>E</i> )- $\beta$ -Ocimene	4.10	1216.5	0.08	5.02	1050.4	0.08
Dimethylbenzofuran isomer I				7.50	1208.1	0.01
Unknown COMY III [m/z 148, 105 (70), 133 (36), 119 (35), 91 (22), 77 (16)]				7.75	1224.7	0.01
$\delta$ -Elemene isomer	7.04	1428.0	0.02	9.36	1333.3	0.02
$\delta$ -Elemene	7.11	1433.0	0.73	9.39	1335.8	0.75
$\alpha$ -Cubebene	6.93	1419.6	0.04	9.56	1347.6	0.04
Cyclosativene II	7.16	1437.2	0.04	9.75	1361.3	0.01
$\alpha$ -Ylangene	7.19	1439.5	0.02	9.84	1367.7	0.01
$\alpha$ -Copaene	7.30	1447.1	0.10	9.91	1372.3	0.11
$\beta$ -Bourbonene	7.63*	1471.9	[0.34]	10.02*	1380.2	[0.30]
1,5-diepi- $\beta$ - Bourbonene	7.52	1463.6	0.03	10.02*	1380.2	[0.30]
<i>cis</i> - $\beta$ -Elemene	8.44	1533.5	0.09	10.05	1382.3	0.12
$\beta$ -Cubebene	7.92	1493.5	0.02	10.12	1387.2	0.02
$\beta$ -Elemene	8.59*	1545.4	[4.04]	10.17	1390.8	3.62
Cyperene	7.63*	1471.9	[0.34]	10.20	1393.0	0.05
$\alpha$ -Gurjunene	7.76	1481.7	0.02	10.36	1404.4	0.02
$\beta$ -Caryophyllene	8.59*	1545.4	[4.04]	10.49*	1413.5	[0.48]
$\beta$ -Ylangene	8.30	1522.6	0.11	10.49*	1413.5	[0.48]
$\alpha$ -Santalene	8.37	1527.9	0.19	10.54	1417.4	0.15
$\beta$ -Copaene	8.50	1538.6	0.09	10.63	1424.0	0.11
$\gamma$ -Elemene	9.18	1591.0	0.97	10.72	1431.2	0.96
<i>trans</i> - $\alpha$ - Bergamotene	8.59*	1545.4	[4.04]	10.76	1434.0	0.05
Isogermacrene D	9.14*	1588.2	[0.11]	10.83	1439.2	0.08
6,9-Guaiadiene	8.76	1558.9	0.01	10.87	1441.7	0.01
Unknown EUMA XII [m/z 93, 107 (85), 105 (82), 189 (79), 91 (69), 81 (68), 79 (60), 161 (55)... 204 (31)]	10.32	1683.5	0.11	10.92	1445.4	0.07

$\alpha$ -Humulene	9.42	1610.5	0.23	10.95	1447.6	0.21
Rotundene	9.01	1577.7	0.05	11.01	1452.2	0.02
allo-Aromadendrene	9.14*	1588.2	[0.11]	11.04	1454.7	0.05
Unknown AMBA XXIX [m/z 161, 105 (68), 119 (54), 91 (52), 93 (41), 79 (39)... 204 (6)]				11.09	1458.6	0.04
4,5-diepi- Aristolochene	9.56*	1621.8	[0.18]	11.17	1464.1	0.05
<i>trans</i> -Cadina-1(6),4- diene	9.39	1607.5	0.05	11.22	1467.6	0.05
Selina-4,11-diene	9.56*	1621.8	[0.18]	11.27	1471.4	0.15
$\gamma$ -Murolene	9.73	1635.1	0.17	11.29	1473.2	0.10
Germacrene D	9.92	1651.1	0.91	11.33	1475.9	0.83
$\beta$ -Selinene	10.01	1658.1	0.59	11.39	1480.4	0.59
$\delta$ -Selinene	9.79	1640.4	0.07	11.48	1487.0	0.06
$\alpha$ -Selinene	10.08	1664.1	0.66	11.51*	1489.8	[0.63]
Bicyclogermacrene	10.19	1673.1	0.05	11.51*	1489.8	[0.63]
Curzerene	11.86	1813.9	23.27	11.62	1498.0	23.12
$\epsilon$ -Amorphene	10.12	1667.4	0.04	11.64*	1499.3	[0.10]
Germacrene A	10.53*	1700.5	[0.37]	11.64*	1499.3	[0.10]
$\delta$ -Amorphene	10.04	1660.7	0.05	11.70	1504.0	0.11
$\gamma$ -Cadinene	10.53*	1700.5	[0.37]	11.78	1510.1	0.32
<i>trans</i> -Calamenene	11.36	1770.9	0.02	11.88	1517.4	0.05
$\delta$ -Cadinene	10.56	1702.6	0.22	11.91	1520.2	0.26
Selina-4(15),7(11)- diene	10.71*	1715.8	[0.19]	12.02	1529.1	0.11
$\alpha$ -Calacorene	12.26	1849.3	0.02	12.08*†	1533.4	[0.07]
Selina-4,7(11)-diene?	10.66	1711.4	0.05	12.08*†	1533.4	[0.07]
Selina-3,7(11)-diene	10.71*	1715.8	[0.19]	12.11*†	1535.6	[0.12]
$\alpha$ -Elemol	14.19*	2026.4	[0.38]	12.25	1546.5	0.15
Germacrene B	11.26	1762.6	2.10	12.30	1550.6	2.09
1,5-Epoxyvalial- 4(14)-ene	12.24	1847.4	0.04	12.40	1558.7	0.06
Furanoedesma-1,4- diene	13.65	1975.7	0.57	12.57	1572.2	0.58
Caryophyllene oxide	12.90	1905.8	0.05	12.60	1574.5	0.05
Viridiflorol	14.10	2018.4	0.20	12.74	1585.4	0.05
$\beta$ -Elemenone	14.19*	2026.4	[0.38]	12.92*	1599.7	[0.52]
Curzerenone	15.37*	2141.8	[0.66]	12.92*	1599.7	[0.52]
Unknown MIAL II [m/z 43, 81 (97), 135 (71), 95 (62), 204 (61), 71 (59), 207 (56)...	14.63	2068.9	0.07	12.99	1604.5	0.02

222 (3)]						
Selin-6-en-4 $\alpha$ -ol isomer	14.92	2096.4	0.04	13.05	1609.5	0.20
Furanoeudesma-1,3-diene	14.44*†	2050.6	[33.38]	13.24*	1625.7	[31.17]
Alismol	15.88	2193.0	0.02	13.24*	1625.7	[31.17]
Lindestrene	14.47*†	2053.9	[8.64]	13.31	1630.9	10.02
$\tau$ -Muurolol	15.17	2122.0	0.14	13.38*	1637.2	[0.80]
$\tau$ -Cadinol	15.01*	2106.1	[2.84]	13.38*	1637.2	[0.80]
$\alpha$ -Muurolol	15.32	2136.3	0.34	13.44	1641.9	0.05
$\alpha$ -Eudesmol	15.44	2148.9	0.07	13.47	1644.0	0.11
Furanodiene	14.44*†	2050.6	[33.38]	13.53	1649.0	0.67
Atractylone?				13.58	1653.8	0.68
$\alpha$ -Elemyl acetate	13.69	1979.5	1.30	13.85	1675.4	1.43
Germacrone	15.37*	2141.8	[0.66]	13.97*	1685.6	[3.73]
Juniper camphor	16.15	2221.0	0.09	13.97*	1685.6	[3.73]
Unknown COMY IV [m/z 108, 216 (29), 93 (26), 109 (21), 91 (21)]	15.01*	2106.1	[2.84]	13.97*	1685.6	[3.73]
Unknown AGAR XXIV [m/z 93, 81 (90), 95 (86), 91 (83), 41 (83), 107 (81)... 220 (29), 238? (4)]	17.38	2349.9	0.05	14.23	1706.9	0.04
Aromadendrane-4,10-diol	16.91	2299.6	0.20	14.29	1712.6	0.17
2-Methoxyfuranodiene	15.63	2168.1	4.51	14.35	1717.6	4.54
Oplopanone	18.26	2447.0	0.01	14.46	1726.8	0.06
Benzyl benzoate	19.03	2533.9	0.14	14.77	1754.3	0.05
Unknown COPE IV [m/z 161, 189 (92), 204 (80), 43 (35), 133 (31), 105 (29)...]	14.75	2080.9	0.08	14.97	1771.6	0.08
Unknown FECA VI [m/z 161, 189 (59), 204 (54), 43 (50), 107 (28), 149 (24), 122 (24)...]	15.14	2118.3	0.47	15.06	1779.4	0.15
Unknown ALAL I [m/z 161, 43 (96), 204 (71), 189 (53), 105 (34), 133 (32), 91 (29)...]	15.08	2112.5	0.19	15.10	1782.2	0.17
Isofuranodienone				15.21	1792.4	0.10

Unknown COMY II [m/z 108, 109 (74), 106 (58), 148 (48), 43 (42), 91 (40), 105 (29), 230 (26)... 274 (13)]				15.64	1830.4	0.55
2- Acetoxymuranodiene?	18.50	2473.9	0.71	16.23	1884.3	0.78
Myrrhanolide C?	18.94	2524.4	0.15	16.27	1887.4	0.11
Unknown COMY I [m/z 197, 108 (83), 212 (50), 43 (42), 169 (38), 183 (31), 155 (30), 79 (26), 105 (26)]	20.17	2668.3	0.14	17.11	1966.6	0.16
Cembrenol	20.24	2676.2	0.17	18.73	2126.3	0.01
Total reported		92.13%			93.50%	

\*: 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

‡: 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