Date : 2025-03-27

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 25C18-PTH03
Customer Identification : Clove Bud - Indonesia - CG0112R
Type : Essential Oil
Source : *Eugenia caryophyllus [syn. Syzygium aromaticum]*
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 : 2025-03-26

Physicochemical data

Refractive index : 1.5351 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2025-03-19

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
Furfural	0.08	Furan
5-Methylfurfural	0.01	Furan
2-Heptyl acetate	tr	Aliphatic ester
Linalool	0.01	Monoterpenic alcohol
(*E*)-4,8-Dimethylnona-1,3,7-triene	0.01	Terpene derivative
Menthol	0.01	Monoterpenic alcohol
Methyl salicylate	0.09	Phenolic ester
Chavicol	0.07	Phenylpropanoid
α-Cubebene	0.01	Sesquiterpene
Eugenol	81.15	Phenylpropanoid
α-Copaene	0.08	Sesquiterpene
Vanillin	0.01	Simple phenolic
Isocaryophyllene	0.02	Sesquiterpene
Methyleugenol	0.03	Phenylpropanoid
β-Caryophyllene	6.36	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.03	Sesquiterpene
9-epi-Isocaryophyllene	0.03	Sesquiterpene
α-Humulene	1.20	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.03	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
α-Selinene	0.03	Sesquiterpene
α-Muurolene	0.01	Sesquiterpene
(3*Z*,6*E*)-α-Farnesene	0.02	Sesquiterpene
γ-Cadinene	0.09	Sesquiterpene
trans-Calamenene	0.05	Sesquiterpene
δ-Cadinene	0.09	Sesquiterpene
Eugenyl acetate	9.38	Phenylpropanoid ester
Dihydroeugenyl acetate	0.04	Phenylpropanoid ester
Unknown	0.08	Unknown
Unknown	0.01	Phenylpropanoid
Caryophyllenyl alcohol	0.06	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.18	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Clovenol?	0.02	Sesquiterpenic alcohol
Unknown	0.02	Unknown
Humulene epoxide II	0.03	Sesquiterpenic ether
(*E*)-Isoeugenyl acetate	0.02	Phenylpropanoid ester

Caryophylladienol II	0.04	Sesquiterpenic alcohol
τ-Cadinol	0.01	Sesquiterpenic alcohol
14-Hydroxy-(*Z*)-caryophyllene	0.05	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.01	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.04	Sesquiterpenic alcohol
Unknown	0.02	Lignan
Unknown	0.01	Lignan
Consolidated total	**99.64**	

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

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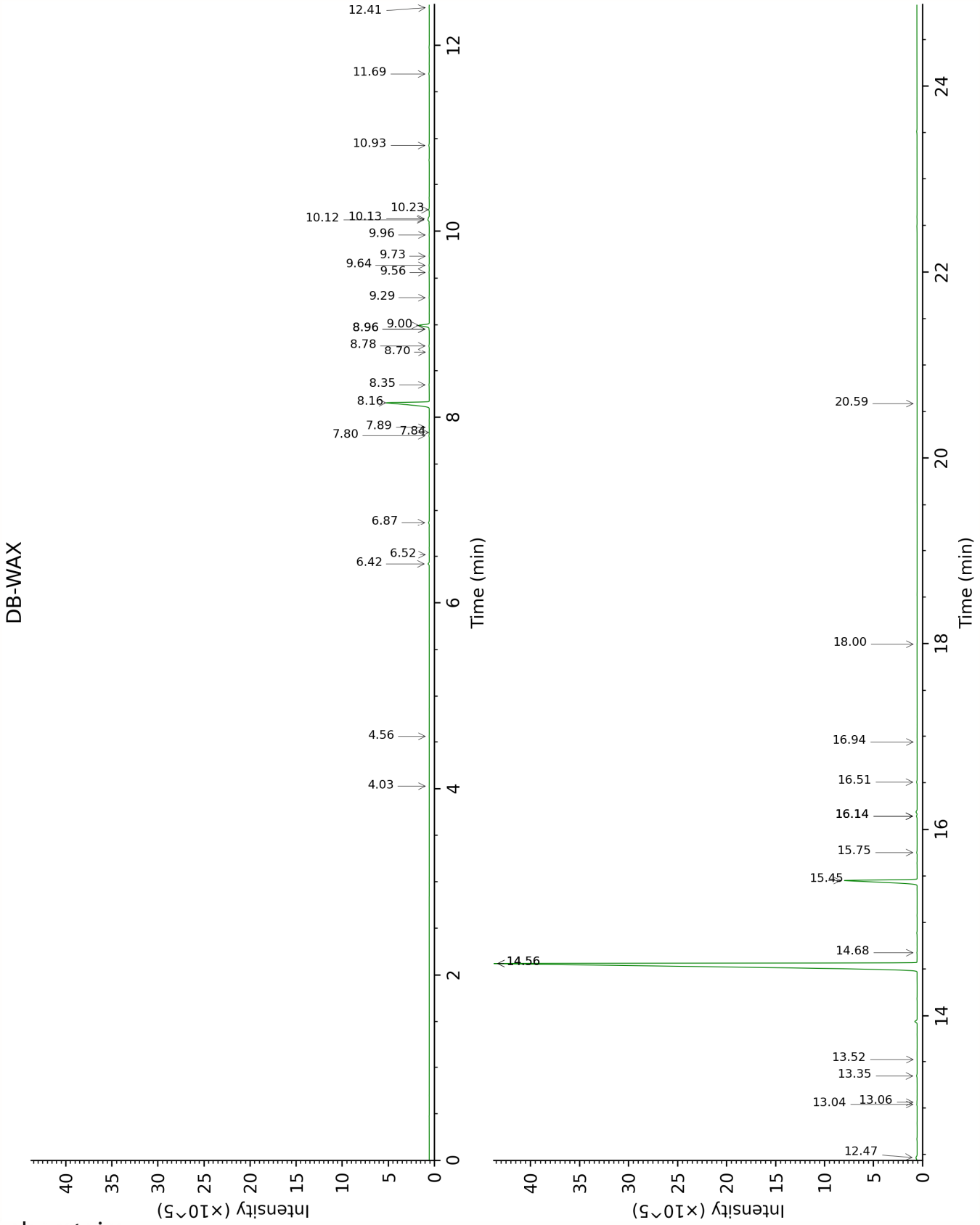
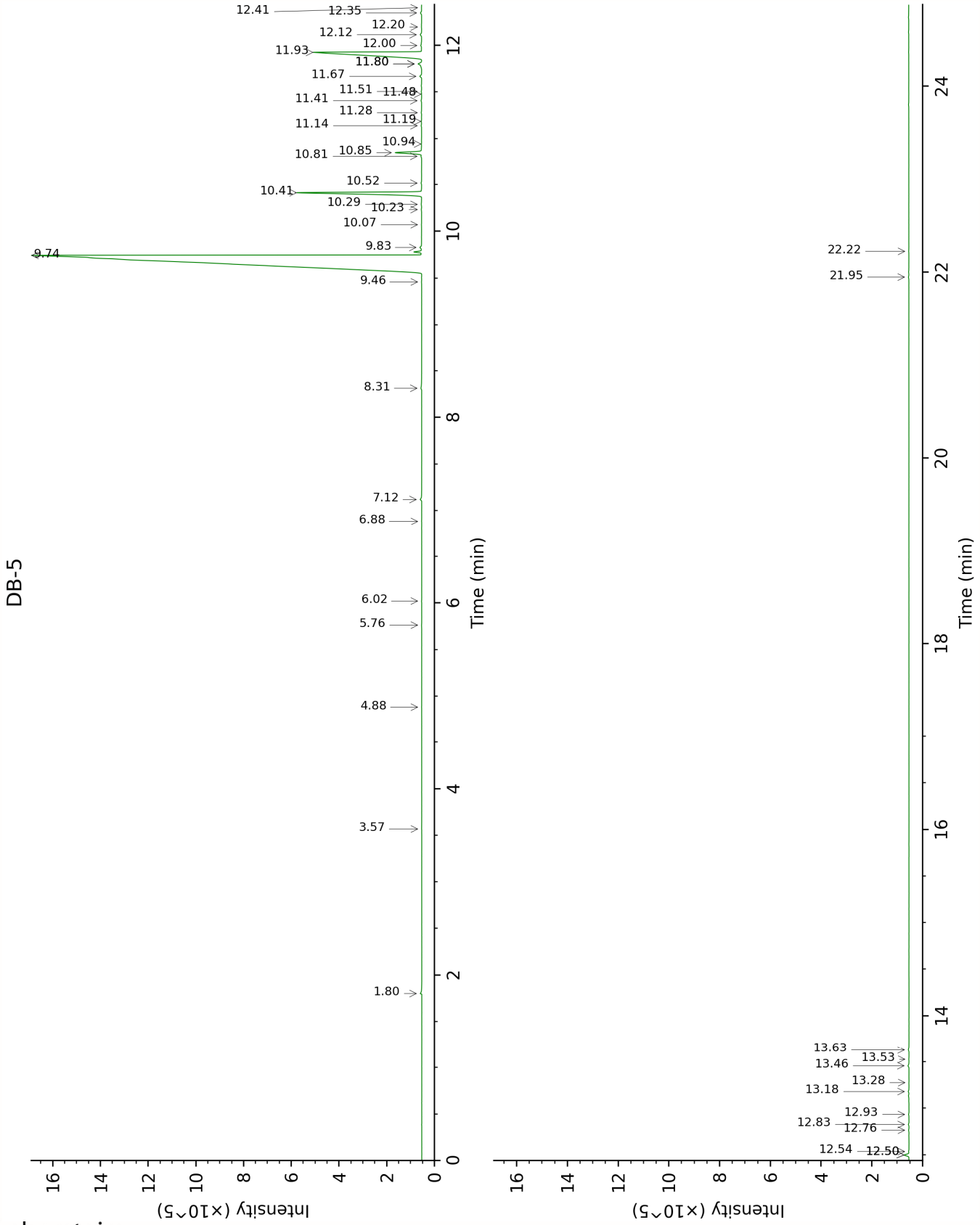

DB-WAX
12.41
11.69
10.93
10.12
10.13
10.23
9.96
9.64
9.73
9.56
9.29
8.96
9.00
8.78
8.70
8.35
8.16
7.80
7.89
7.84
6.87
6.42
6.52
4.56
4.03
Time (min)
Intensity (×10^5)
20.59
18.00
16.94
16.51
16.14
15.75
15.45
14.68
14.56
13.52
13.35
13.04
13.06
12.47
Time (min)
Intensity (×10^5)


DB-5
12.41
12.35
12.20
12.12
12.00
11.93
11.80
11.67
11.51
11.48
11.41
11.28
11.19
11.14
10.94
10.85
10.81
10.52
10.41
10.29
10.23
10.07
9.83
9.74
9.46
8.31
7.12
6.88
6.02
5.76
4.88
3.57
1.80
Time (min)
Intensity (×10^5)
22.22
21.95
13.63
13.53
13.46
13.28
13.18
12.93
12.83
12.76
12.54
12.50
Time (min)
Intensity (×10^5)

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Furfural	6.42	1411.0	0.11	1.80	829.7	0.08
5-Methylfurfural	7.84	1517.8	0.01	3.57	962.5	0.01
2-Heptyl acetate	4.03	1237.6	0.01	4.88	1046.9	tr
Linalool	7.80	1515.1	0.03	5.76	1102.7	0.01
(*E*)-4,8-Dimethylnona-1,3,7-triene	4.56	1277.9	0.01	6.02	1119.2	0.01
Menthol	8.96*	1605.2	[0.03]	6.88	1174.3	0.01
Methyl salicylate	10.23	1709.8	0.05	7.12	1189.3	0.09
Chavicol	16.14*	2266.6	[0.07]	8.31	1268.6	0.07
α-Cubebene	6.52	1418.4	0.01	9.46	1347.6	0.01
Eugenol	14.56*†	2104.8	[80.71]	9.74†	1367.6	80.90
α-Copaene	6.87	1444.7	0.07	9.83	1373.6	0.08
Vanillin	18.00	2469.6	0.01	10.07	1390.7	0.01
Isocaryophyllene	7.89	1522.1	0.02	10.23	1402.1	0.02
Methyleugenol	13.04	1959.0	0.03	10.29	1406.1	0.03
β-Caryophyllene	8.16	1542.7	6.37	10.41	1415.4	6.36
Caryophylla-4(12),8(13)-diene	8.35	1557.8	0.03	10.52	1423.1	0.03
9-epi-Isocaryophyllene	8.78	1591.1	0.04	10.81	1445.0	0.03
α-Humulene	9.00	1608.5	1.18	10.85	1448.0	1.20
allo-Aromadendrene	8.70	1585.2	0.02	10.94	1454.9	0.02
trans-Cadina-1(6),4-diene	8.96*	1605.2	[0.03]	11.14	1469.5	0.03
γ-Muurolene	9.29	1632.6	0.02	11.19	1473.0	0.02
β-Selinene	9.56	1654.7	0.02	11.28	1480.0	0.02
α-Selinene	9.64	1660.9	0.03	11.41	1489.5	0.03
α-Muurolene	9.73	1668.9	0.02	11.48	1494.8	0.01
(3*Z*,6*E*)-α-Farnesene	9.96	1687.5	0.02	11.51	1496.9	0.02
γ-Cadinene	10.12	1700.7	0.16	11.67	1509.2	0.09
trans-Calamenene	10.93	1769.2	0.05	11.80*	1519.7	[0.23]
δ-Cadinene	10.14	1701.7	0.09	11.80*	1519.7	[0.23]
Eugenyl acetate	15.45	2194.6	9.33	11.93	1529.5	9.38
Dihydroeugenyl acetate				12.00	1535.2	0.04
Unknown SYAR II [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	11.69	1836.3	0.05	12.12	1544.3	0.08
Unknown SYAR III	20.59	2778.6	0.01	12.20	1550.9	0.01

[m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]						
Caryophyllenyl alcohol	13.35	1987.4	0.06	12.35	1562.7	0.06
(*E*)-Nerolidol	13.52	2004.0	0.01	12.41	1567.2	0.01
Caryophyllene oxide	12.47	1905.5	0.18	12.50*	1574.2	[0.21]
Caryophyllene oxide isomer	12.41	1900.2	0.02	12.50*	1574.2	[0.21]
Clovenol?	14.68	2116.4	0.02	12.54	1577.3	0.02
Unknown SYAR XII [m/z 164, 93 (48), 43 (44), 91 (27), 55 (27)...]				12.76	1595.3	0.02
Humulene epoxide II	13.06	1961.2	0.02	12.83	1600.1	0.03
(*E*)-Isoeugenyl acetate	16.94	2352.0	0.01	12.93	1608.7	0.02
Caryophylladienol II	15.75	2225.7	0.04	13.18	1629.1	0.04
τ-Cadinol	14.56*†	2104.8	[80.71]	13.28	1637.0	0.01
14-Hydroxy-(*Z*)-caryophyllene	16.14*	2266.6	[0.07]	13.46	1652.0	0.05
14-Hydroxy-9-epi-(*E*)-caryophyllene	16.14*	2266.6	[0.07]	13.53	1657.8	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	16.51	2305.1	0.05	13.63	1666.2	0.04
Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117 (30), 91 (22)...]				21.95	2494.2	0.02
Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)]				22.22	2527.1	0.01
Total reported		99.25%			99.73%	

*: 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