Date : 2024-07-11

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24F26-PTH01
Customer Identification : Organic Clove Bud - Madagascar - CH0115R
Type : Essential Oil
Source : *Syzygium aromaticum*
Customer : Plant Therapy

Checked an 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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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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 : 2024-07-08

Physicochemical data

Refractive index : 1.5343 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-06-28

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	0.07	Furan
α-Pinene	0.01	Monoterpene
β-Pinene	0.01	Monoterpene
α-Phellandrene	0.01	Monoterpene
1,8-Cineole	0.04	Monoterpenic ether
2-Heptyl acetate	0.01	Aliphatic ester
2-Nonanone	0.01	Aliphatic ketone
Linalool	0.02	Monoterpenic alcohol
(*E*)-4,8-Dimethylnona-1,3,7-triene	0.02	Terpene derivative
Ethyl benzoate	0.01	Phenolic ester
Methyl salicylate	0.25	Phenolic ester
Chavicol	0.14	Phenylpropanoid
Chavicyl acetate	0.02	Phenylpropanoid ester
Eugenol	77.82	Phenylpropanoid
α-Copaene	0.06	Sesquiterpene
Vanillin	0.01	Simple phenolic
Isocaryophyllene	0.02	Sesquiterpene
Methyleugenol	0.06	Phenylpropanoid
β-Caryophyllene	4.40	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.02	Sesquiterpene
(*E*)-Isoeugenol	0.01	Phenylpropanoid
α-Humulene	0.55	Sesquiterpene
Unknown	0.01	Phenylpropanoid
γ-Muurolene	0.02	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
α-Muurolene	0.01	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
Cubebol	0.02	Sesquiterpenic alcohol
trans-Calamenene	0.03	Sesquiterpene
δ-Cadinene	0.04	Sesquiterpene
Eugenyl acetate	13.75	Phenylpropanoid ester
α-Calacorene	0.01	Sesquiterpene
Unknown	0.07	Unknown
Unknown	0.01	Phenylpropanoid
Caryophyllenyl alcohol	0.08	Sesquiterpenic alcohol
Unknown	0.04	Unknown
Caryophyllene oxide isomer	0.05	Sesquiterpenic ether
Caryophyllene oxide	0.65	Sesquiterpenic ether
Unknown	0.02	Unknown

Humulene epoxide I	0.02	Sesquiterpenic ether
Widdrol	0.05	Sesquiterpenic alcohol
Humulene epoxide II	0.08	Sesquiterpenic ether
(*E*)-Isoeugenyl acetate	0.01	Phenylpropanoid ester
1,10-diepi-Cubenol	0.02	Sesquiterpenic alcohol
10-epi-Cubenol?	0.03	Sesquiterpenic alcohol
Caryophylladienol I	0.09	Sesquiterpenic alcohol
Caryophylladienol II	0.14	Sesquiterpenic alcohol
τ-Muurolol	0.03	Sesquiterpenic alcohol
Unknown	0.01	Sesquiterpenic alcohol
α-Cadinol	0.01	Sesquiterpenic alcohol
14-Hydroxy-(*Z*)-caryophyllene	0.07	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.01	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.11	Sesquiterpenic alcohol
Trimethoxypropylbenzene analog	0.01	Phenylpropanoid
Unknown	0.01	Unknown
(*E*)-Coniferyl alcohol	0.05	Phenylpropanoid
(*E*)-Coniferaldehyde	0.09	Phenylpropanoid
Benzyl benzoate	0.03	Phenolic ester
Caryolane-1,9β-diol	0.03	Sesquiterpenic alcohol
(*E*)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	0.01	Phenylpropanoid ester
Unknown	0.15	Lignan
Unknown	0.06	Lignan
Unknown	0.04	Unknown
Squalene	0.04	Triterpene
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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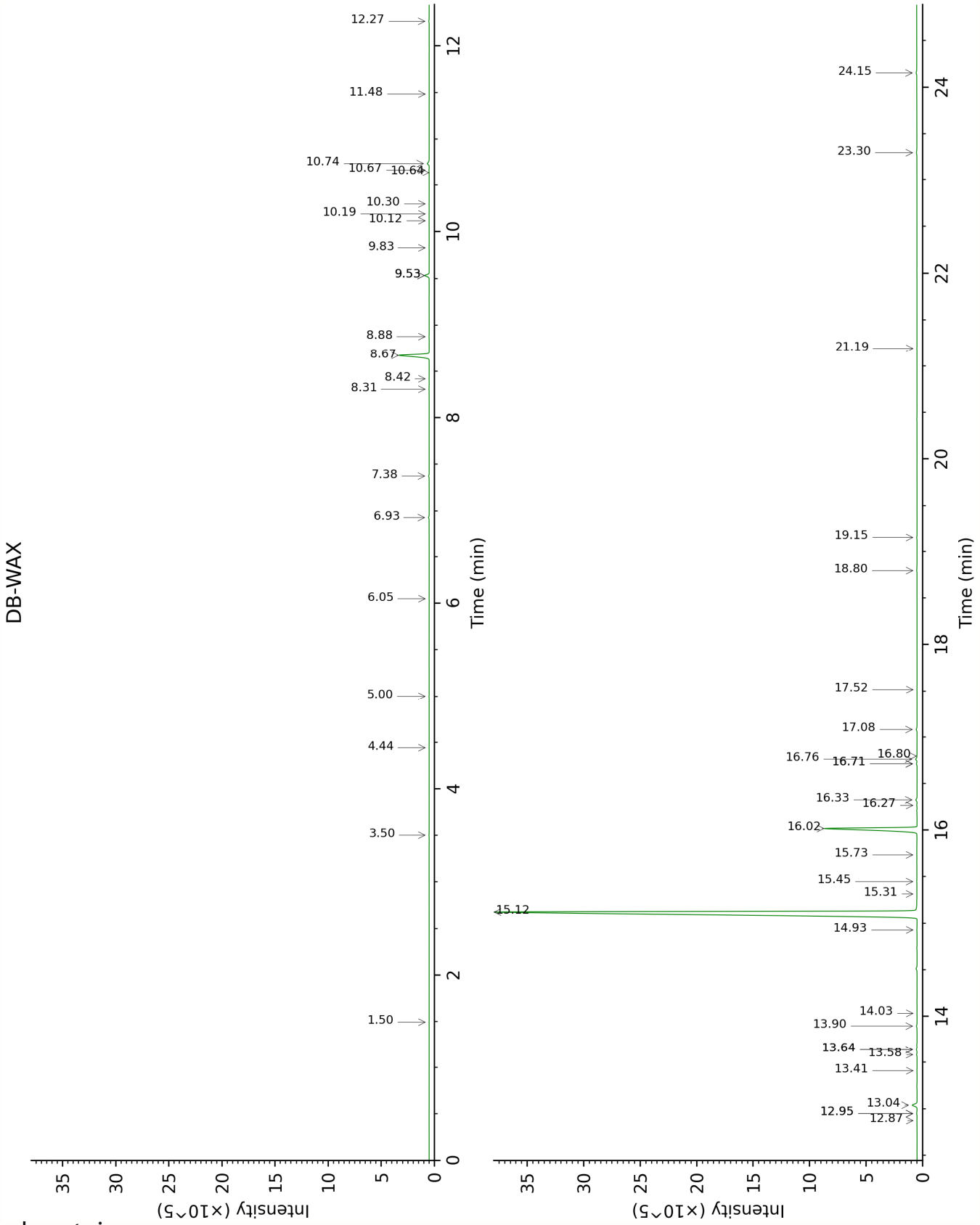
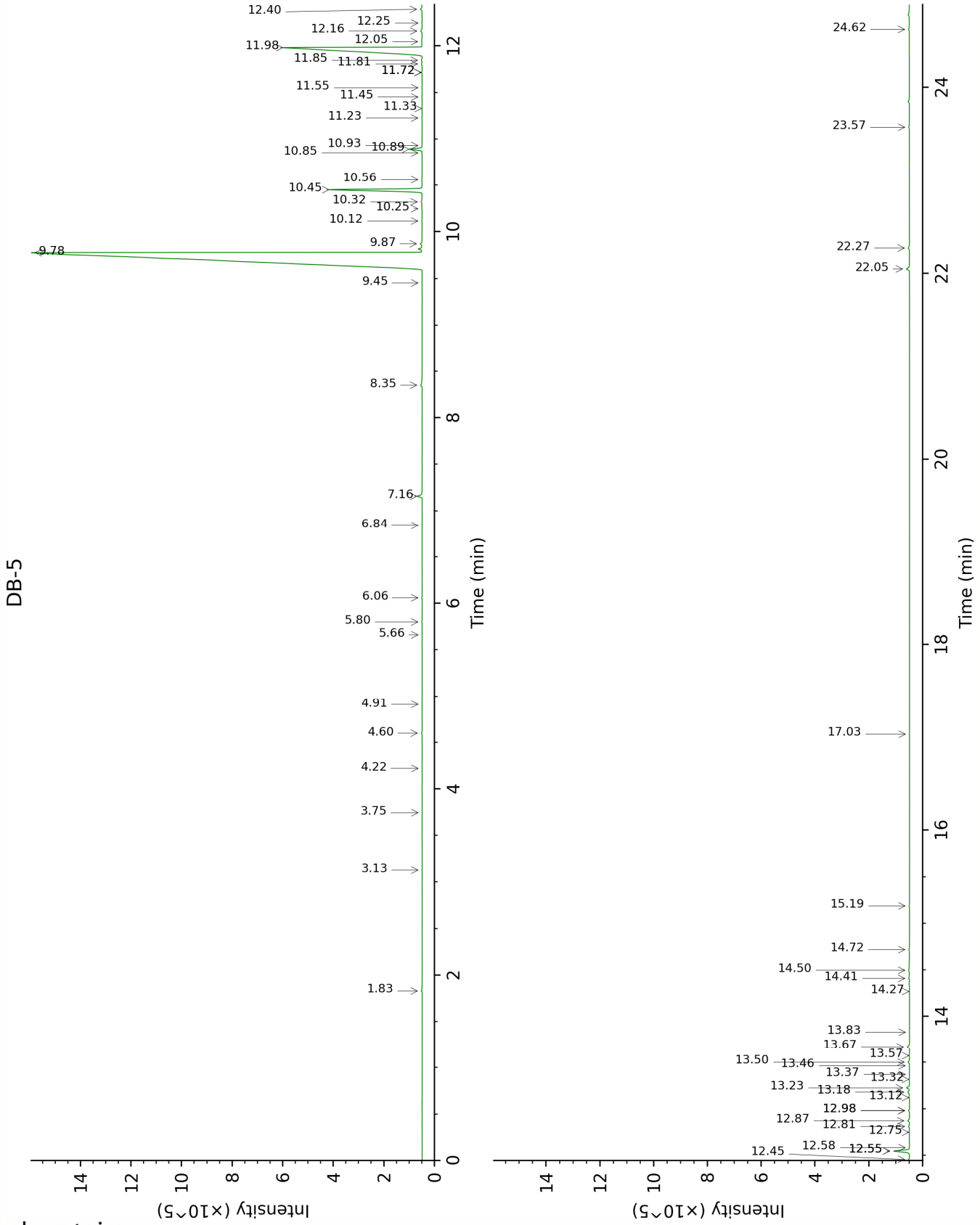

DB-WAX
12.27
11.48
10.74
10.67
10.64
10.30
10.19
10.12
9.83
9.53
8.88
8.67
8.42
8.31
7.38
6.93
6.05
5.00
4.44
3.50
1.50
24.15
23.30
21.19
19.15
18.80
17.52
17.08
16.76
16.80
16.71
16.33
16.27
16.02
15.73
15.45
15.31
15.12
14.93
14.03
13.90
13.64
13.58
13.41
13.04
12.95
12.87
Time (min)
Intensity (×10^5)


DB-5
Time (min)
Intensity (×10^5)
12.40
12.25
12.16
12.05
11.98
11.85
11.81
11.72
11.55
11.45
11.33
11.23
10.93
10.89
10.85
10.56
10.45
10.32
10.25
10.12
9.87
9.78
9.45
8.35
7.16
6.84
6.06
5.80
5.66
4.91
4.60
4.22
3.75
3.13
1.83
24.62
23.57
22.27
22.05
17.03
15.19
14.72
14.50
14.41
14.27
13.83
13.67
13.57
13.50
13.46
13.37
13.32
13.23
13.18
13.12
12.98
12.87
12.81
12.75
12.58
12.55
12.45

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Furfural	6.93	1415.3	0.08	1.83	830.0	0.07
α-Pinene	1.50	991.1	0.01	3.13	931.1	0.01
β-Pinene				3.74	971.8	0.01
α-Phellandrene				4.22	1003.3	0.01
1,8-Cineole	3.50	1166.1	0.03	4.60	1027.2	0.04
2-Heptyl acetate	4.44	1234.1	0.01	4.91	1046.7	0.01
2-Nonanone	6.05	1352.7	0.01	5.66	1093.8	0.01
Linalool	8.31	1516.8	0.02	5.80	1102.5	0.02
(*E*)-4,8-Dimethylnona-1,3,7-triene	5.00	1273.1	0.02	6.06	1119.0	0.02
Ethyl benzoate	9.53*	1611.2	[0.58]	6.84	1169.0	0.01
Methyl salicylate	10.74	1708.3	0.28	7.16	1189.3	0.25
Chavicol	16.76	2270.4	0.16	8.35	1268.4	0.14
Chavicyl acetate	12.95*	1898.8	[0.06]	9.45	1344.3	0.02
Eugenol	15.12†	2103.5	78.32	9.78†	1367.1	77.72
α-Copaene	7.38	1447.8	0.07	9.87	1373.9	0.06
Vanillin	18.80	2493.4	0.06	10.12	1391.1	0.01
Isocaryophyllene	8.42	1525.4	0.02	10.25	1400.4	0.02
Methyleugenol	13.58	1957.0	0.05	10.32	1405.6	0.06
β-Caryophyllene	8.67	1544.7	4.43	10.45	1415.3	4.40
Caryophylla-4(12),8(13)-diene	8.88	1560.4	0.02	10.56	1423.4	0.02
(*E*)-Isoeugenol	16.80	2273.8	0.02	10.85	1445.2	0.01
α-Humulene	9.53*	1611.2	[0.58]	10.89	1448.2	0.55
Unknown FRAG CCLIII [m/z 137, 166 (25), 122 (21), 77 (10), 105 (17), 94 (12)...]				10.93	1451.1	0.01
γ-Muurolene	9.83	1634.8	0.02	11.23	1473.2	0.02
β-Selinene	10.12	1658.0	0.01	11.33	1480.8	0.02
α-Selinene	10.19	1663.8	0.01	11.45	1489.9	0.02
α-Muurolene	10.30	1672.4	0.02	11.55	1497.3	0.01
γ-Cadinene	10.64	1700.1	0.01	11.72*	1509.8	[0.02]
Cubebol	12.87	1892.0	0.02	11.72*	1509.8	[0.02]
trans-Calamenene	11.48	1770.8	0.01	11.81	1517.1	0.03
δ-Cadinene	10.67	1702.4	0.04	11.85	1520.2	0.04
Eugenyl acetate	16.02	2193.2	13.30	11.98	1530.8	13.75
α-Calacorene				12.05	1535.9	0.01
Unknown SYAR II [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.27	1838.5	0.06	12.16	1544.8	0.07
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77	21.19	2782.1	0.02	12.25	1551.5	0.01

(55), 164 (55), 103 (50)]						
Caryophyllenyl alcohol	13.90	1985.6	0.08	12.40	1563.2	0.08
Unknown ERPU VII [m/z 134, 69 (71), 91 (64), 135 (59), 41 (55)...]				12.45	1567.8	0.04
Caryophyllene oxide isomer	12.95*	1898.8	[0.06]	12.55*	1575.1	[0.70]
Caryophyllene oxide	13.04	1907.2	0.65	12.55*	1575.1	[0.70]
Unknown SYAR V [m/z 151, 178 (54), 123 (20), 55 (13), 161 (11), 77 (10)...]				12.58	1577.9	0.02
Humulene epoxide I	13.41	1941.1	0.02	12.75	1590.9	0.02
Widdrol	14.93	2084.5	0.03	12.81	1595.8	0.05
Humulene epoxide II	13.64*	1962.0	[0.08]	12.87	1600.7	0.08
(*E*)-Isoeugenyl acetate	17.52	2351.1	0.01	12.98*	1609.5	[0.04]
1,10-diepi-Cubenol	14.03	1998.7	0.02	12.98*	1609.5	[0.04]
10-epi-Cubenol?	13.64*	1962.0	[0.08]	13.12	1621.0	0.03
Caryophylladienol I	16.27	2218.9	0.04	13.18	1625.9	0.09
Caryophylladienol II	16.33	2225.1	0.14	13.23	1629.7	0.14
τ-Muurolol	15.32	2122.8	0.01	13.32	1637.2	0.03
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	15.45	2136.1	0.02	13.37	1641.6	0.01
α-Cadinol	15.74	2164.6	0.02	13.46	1649.4	0.01
14-Hydroxy-(*Z*)-caryophyllene	16.71*	2265.2	[0.08]	13.50	1652.6	0.07
14-Hydroxy-9-epi-(*E*)-caryophyllene	16.71*	2265.2	[0.08]	13.57	1658.4	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	17.08	2304.3	0.11	13.67	1666.6	0.11
Trimethoxypropylbenzene analog				13.83	1679.7	0.01
Unknown SYAR VI [m/z 180, 125 (44), 55 (32), 93 (25), 43 (24), 149 (23)...]				14.27	1716.5	0.01
(*E*)-Coniferyl alcohol	23.30	3060.3	0.08	14.41	1728.7	0.05
(*E*)-Coniferaldehyde	24.15	3180.8	0.11	14.50	1736.3	0.09
Benzyl benzoate	19.15	2534.7	0.04	14.72	1755.5	0.03
Caryolane-1,9β-diol				15.19	1796.2	0.03
(*E*)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate				17.03	1966.3	0.01
Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117				22.05	2500.7	0.15

(30), 91 (22)...]						
Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)]				22.27	2527.6	0.06
Unknown SYAR VIII [m/z 164, 165 (12), 55 (11), 81 (10), 69 (10), 95 (10)...]				23.57	2687.9	0.04
Squalene				24.62	2824.2	0.04
Total reported	99.43%				99.65%	

*: 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

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