CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24J04-PTH04
Customer Identification : Clove Bud - Indonesia - CG0111R
Type : Essential Oil
Source : *Syzygium aromaticum*
Customer : Plant Therapy

Checked an approved by:

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

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MÉTHODE CERTIFIÉE
✷ISO 17025:2017
CERTIFIED METHOD

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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 : 2024-10-16

PHYSICOCHEMICAL DATA

Refractive index : 1.5351 ± 0.0003 (20 ℃)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-10-08

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
Furfural	0.07	Furan
5-Methylfurfural	0.02	Furan
2-Heptyl acetate	0.01	Aliphatic ester
2-Nonanone	0.01	Aliphatic ketone
Linalool	0.01	Monoterpenic alcohol
(*E*)-4,8-Dimethylnona-1,3,7-triene	0.01	Terpene derivative
Methyl salicylate	0.10	Phenolic ester
Chavicol	0.08	Phenylpropanoid
α-Cubebene	0.01	Sesquiterpene
Eugenol	81.06	Phenylpropanoid
α-Copaene	0.08	Sesquiterpene
β-Elemene	tr	Sesquiterpene
Isocaryophyllene	0.02	Sesquiterpene
Methyleugenol	0.03	Phenylpropanoid
β-Caryophyllene	6.37	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.03	Sesquiterpene
9-epi-Isocaryophyllene	0.02	Sesquiterpene
(*E*)-Isoeugenol	0.01	Phenylpropanoid
α-Humulene	1.17	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.02	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
α-Selinene	0.03	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.08	Sesquiterpene
Cubebol	0.01	Sesquiterpenic alcohol
trans-Calamenene	0.06	Sesquiterpene
δ-Cadinene	0.17	Sesquiterpene
trans-Cadina-1,4-diene	0.03	Sesquiterpene
Eugenyl acetate	9.07	Phenylpropanoid ester
α-Calacorene	0.03	Sesquiterpene
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
Humulene epoxide I	0.01	Sesquiterpenic ether

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Unknown	0.03	Unknown
Humulene epoxide II	0.04	Sesquiterpenic ether
(*E*)-Isoeugenyl acetate	0.02	Phenylpropanoid ester
Caryophylladienol II	0.04	Sesquiterpenic alcohol
14-Hydroxy-(*Z*)-caryophyllene	0.06	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.01	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.05	Sesquiterpenic alcohol
Unknown	0.02	Lignan
Unknown	0.01	Lignan
Consolidated total	**99.39**	

tr: The compound has been detected below 0.005% of the total signal
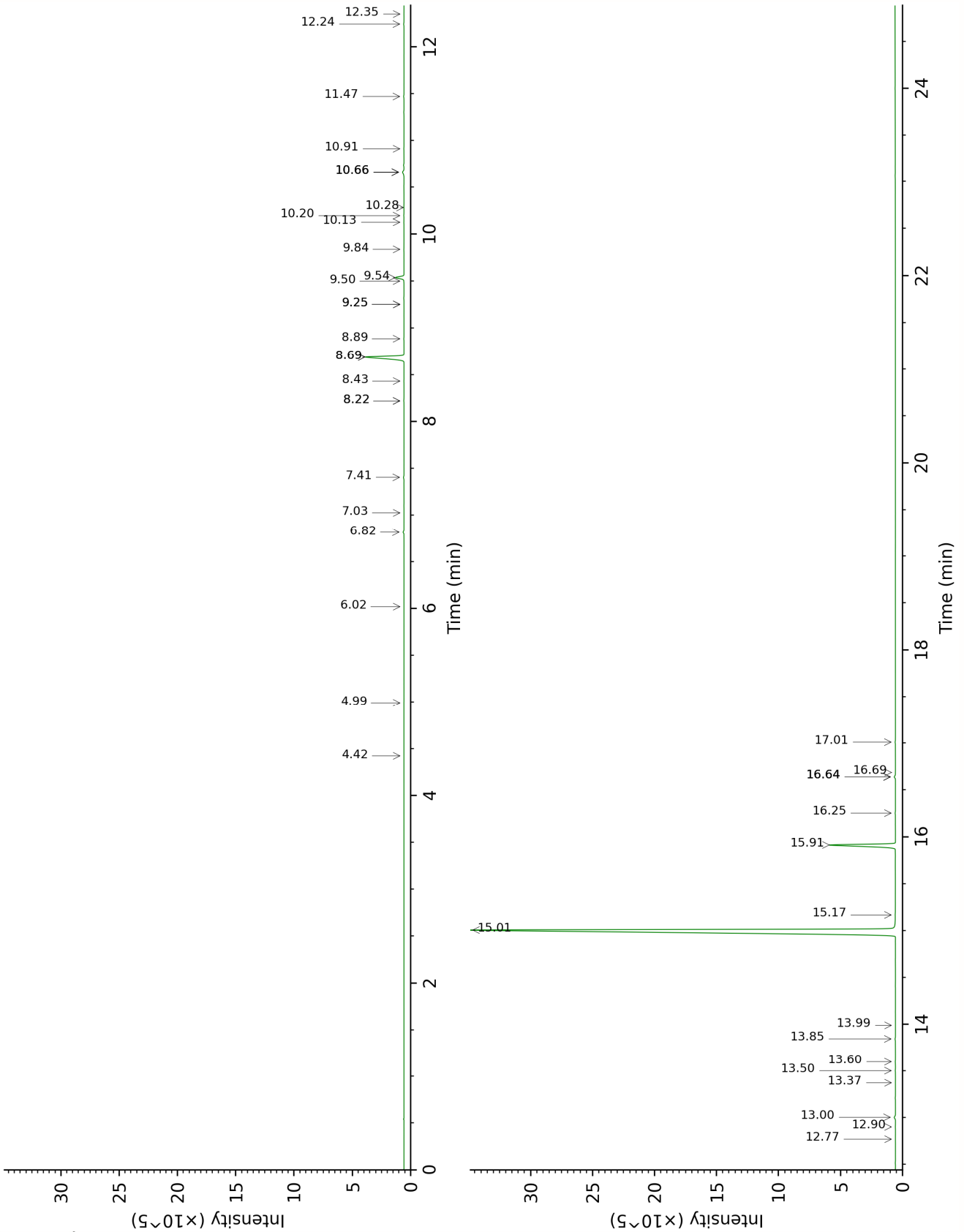
Note: no correction factor was applied

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.
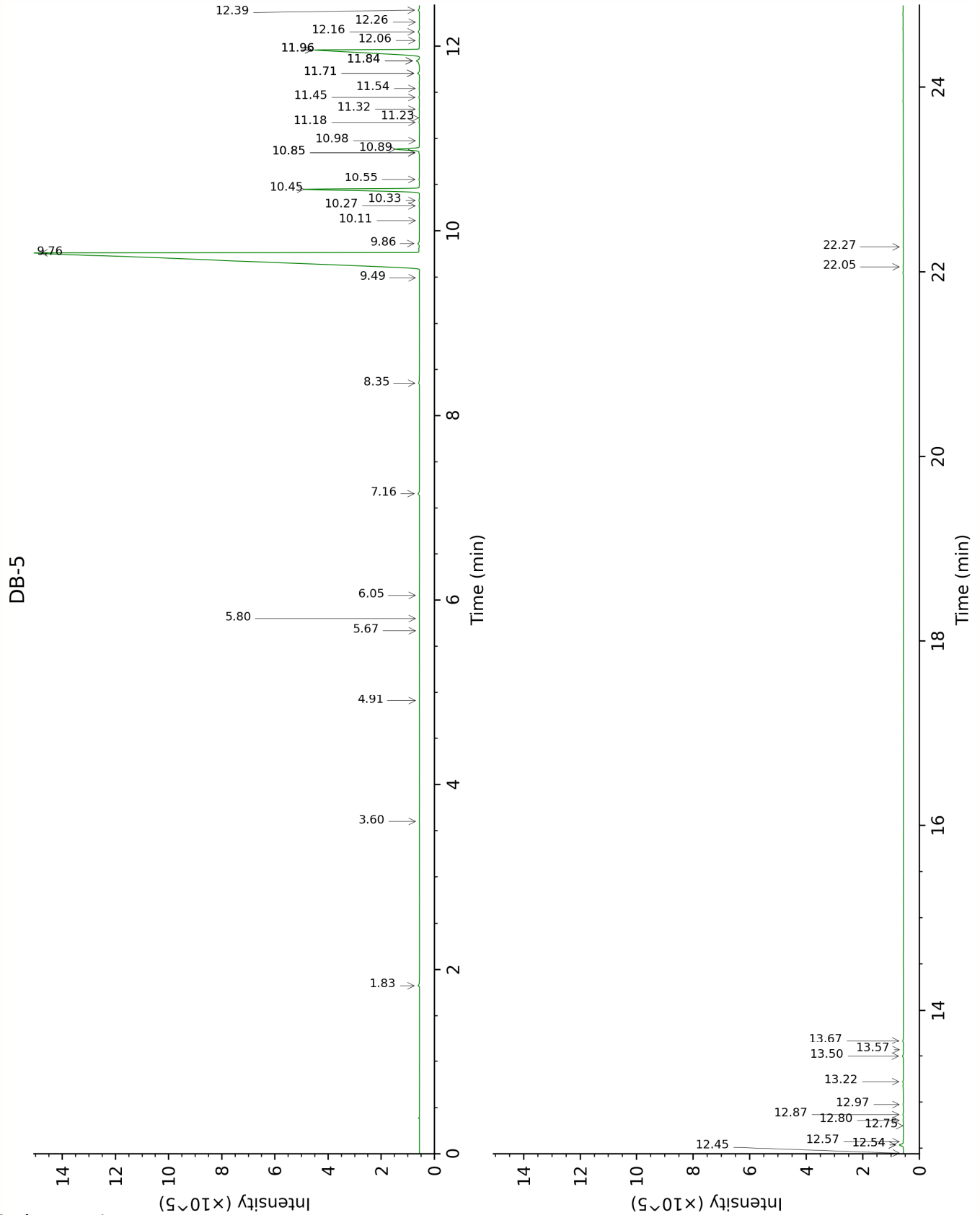
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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)

Time (min)

Intensity (×10^5)

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DB-5

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FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Furfural						
	6.82	1406.2	0.11	1.83	828.7	0.07
5-Methylfurfural	8.22*	1510.8	[0.04]	3.60	961.3	0.02
2-Heptyl acetate	4.42	1233.6	0.01	4.91	1045.4	0.01
2-Nonanone	6.02	1348.9	0.01	5.67	1093.1	0.01
Linalool	8.22*	1510.8	[0.04]	5.80	1101.4	0.01
(*E*)-4,8-Dimethylnona-1,3,7-triene	4.99	1273.5	0.02	6.05	1117.3	0.01
Methyl salicylate	10.66*	1705.1	[0.27]	7.16	1188.0	0.10
Chavicol	16.64*	2263.0	[0.15]	8.35	1267.2	0.08
α-Cubebene	7.03	1421.8	0.01	9.50	1345.9	0.01
Eugenol	15.01	2097.5	81.19	9.76	1364.8	81.06
α-Copaene	7.41	1449.9	0.08	9.86	1372.0	0.08
β-Elemene	8.69*	1547.1	[6.39]	10.11	1389.3	tr
Isocaryophyllene	8.43	1527.2	0.02	10.27	1400.5	0.02
Methyleugenol	13.50	1954.2	0.03	10.33	1404.7	0.03
β-Caryophyllene	8.69*	1547.1	[6.39]	10.45	1413.7	6.37
Caryophylla-4(12),8(13)-diene	8.89	1562.5	0.03	10.55	1421.5	0.03
9-epi-Isocaryophyllene	9.25*	1590.7	[0.01]	10.85*	1443.6	[0.03]
(*E*)-Isoeugenol	16.69	2267.9	0.01	10.85*	1443.6	[0.03]
α-Humulene	9.54	1613.6	1.18	10.89	1446.5	1.17
all*o*-Aromadendrene	9.25*	1590.7	[0.01]	10.98	1453.2	0.02
trans-Cadina-1(6),4-diene	9.50	1610.6	0.02	11.18	1468.0	0.02
γ-Muurolene	9.84	1637.8	0.02	11.23	1471.7	0.02
β-Selinene	10.13	1661.0	0.03	11.32	1478.6	0.02
α-Selinene	10.20	1666.7	0.03	11.45	1488.1	0.03
α-Muurolene	10.28	1673.7	0.02	11.54	1495.3	0.02
γ-Cadinene	10.66*	1705.1	[0.27]	11.71*	1507.7	[0.09]
Cubebol	12.77	1887.0	0.01	11.71*	1507.7	[0.09]
trans-Calamenene	11.47	1773.3	0.06	11.84*	1518.3	[0.23]
δ-Cadinene	10.66*	1705.1	[0.27]	11.84*	1518.3	[0.23]
trans-Cadina-1,4-diene	10.91	1726.1	0.03	11.96*	1527.5	[9.38]
Eugenyl acetate	15.91	2187.8	9.07	11.96*	1527.5	[9.38]
α-Calacorene	12.35	1849.9	0.01	12.06	1535.5	0.03
Unknown SYAR II [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.24	1840.5	0.05	12.16	1542.9	0.08

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Compound	RT	RI	%	RT	RI	%
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]				12.26	1551.1	0.01
Caryophyllenyl alcohol	13.85	1985.9	0.06	12.39	1561.4	0.06
(*E*)-Nerolidol	13.99	1999.6	0.01	12.45	1565.7	0.01
Caryophyllene oxide	13.00	1908.3	0.18	12.54*	1572.9	[0.21]
Caryophyllene oxide isomer	12.90	1898.9	0.02	12.54*	1572.9	[0.21]
Clovenol?	15.17	2113.5	0.03	12.57	1575.7	0.02
Humulene epoxide I	13.37	1942.3	0.01	12.75	1589.2	0.01
Unknown SYAR XII [m/z 164, 93 (48), 43 (44), 91 (27), 55 (27)...]				12.80	1593.7	0.03
Humulene epoxide II	13.60	1963.1	0.03	12.87	1598.6	0.04
(*E*)-Isoeugenyl acetate				12.98	1607.4	0.02
Caryophylladienol II	16.25	2222.9	0.04	13.22	1627.9	0.04
14-Hydroxy-(*Z*)-caryophyllene	16.64*	2263.0	[0.15]	13.50	1650.7	0.06
14-Hydroxy-9-epi-(*E*)-caryophyllene	16.64*	2263.0	[0.15]	13.57	1656.5	0.01
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	17.01	2301.9	0.05	13.67	1664.9	0.05
Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117 (30), 91 (22)...]				22.05	2499.4	0.02
Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)]				22.27	2525.3	0.01
Total reported		99.37%			99.68%	

*: 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.

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Essential Oil, *Syzygium aromaticum*
Internal code: 24J04-PTH04

Clove Bud - Indonesia - CG0111R

Report prepared for:
Plant Therapy

Note: no correction factor was applied
R.T.: Retention time (minutes)
R.I.: Retention index

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