

Date : 2023-10-03

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code :** 23126-PTH03

**Customer Identification :** Organic Clove Bud - Madagascar - CH0114R

**Type :** Essential Oil

**Source :** *Eugenia caryophyllus* [syn. *Syzygium aromaticum*]

**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 :** 2023-10-02

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.5353 \pm 0.0003$  (20 °C)

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

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

**Date :** 2023-09-26

## 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
Limonene	0.02	Monoterpene
Linalool	0.02	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	Terpene derivative
Methyl salicylate	0.06	Phenolic ester
Chavicol	0.11	Phenylpropanoid
Eugenol	[81.07]	Phenylpropanoid
Dihydroeugenol	[81.07]	Phenylpropanoid
$\alpha$ -Copaene	0.19	Sesquiterpene
$\beta$ -Elemene	0.02	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
Methyleugenol	0.03	Phenylpropanoid
$\beta$ -Caryophyllene	6.91	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.04	Sesquiterpene
9-epi-Isocaryophyllene	0.01	Sesquiterpene
(E)-Isoeugenol	0.26	Phenylpropanoid
$\alpha$ -Humulene	0.52	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.05	Sesquiterpene
$\gamma$ -Murolene	0.02	Sesquiterpene
$\alpha$ -Selinene	0.02	Sesquiterpene
$\alpha$ -Murolene	0.02	Sesquiterpene
$\gamma$ -Cadinene	0.06	Sesquiterpene
trans-Calamenene	0.10	Sesquiterpene
$\delta$ -Cadinene	0.20	Sesquiterpene
$\beta$ -Sesquiphellandrene	0.02	Sesquiterpene
Eugenyl acetate	8.98	Phenylpropanoid ester
$\alpha$ -Calacorene	0.08	Sesquiterpene
Unknown	0.06	Unknown
Unknown	0.03	Phenylpropanoid
Caryophyllenyl alcohol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.24	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Unknown	0.02	Oxygenated sesquiterpene
Widdrol	0.02	Sesquiterpenic alcohol
Humulene epoxide II	0.03	Sesquiterpenic ether
(E)-Isoeugenyl acetate	0.02	Phenylpropanoid ester
1-epi-Cubenol	0.04	Sesquiterpenic alcohol
Caryophylladienol I	0.03	Sesquiterpenic alcohol
Caryophylladienol II	0.04	Sesquiterpenic alcohol
$\tau$ -Cadinol	0.03	Sesquiterpenic alcohol

$\alpha$ -Cadinol	0.01	Sesquiterpenic alcohol
14-Hydroxy-(Z)-caryophyllene	0.06	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(E)-caryophyllene	0.01	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5 $\beta$ -ol	0.06	Sesquiterpenic alcohol
(E)-Coniferyl alcohol	0.03	Phenylpropanoid
(E)-Coniferaldehyde	0.06	Phenylpropanoid
Unknown	0.05	Lignan
Unknown	0.05	Lignan
<b>Consolidated total</b>	<b>99.80</b>	

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

Note: no correction factor was applied

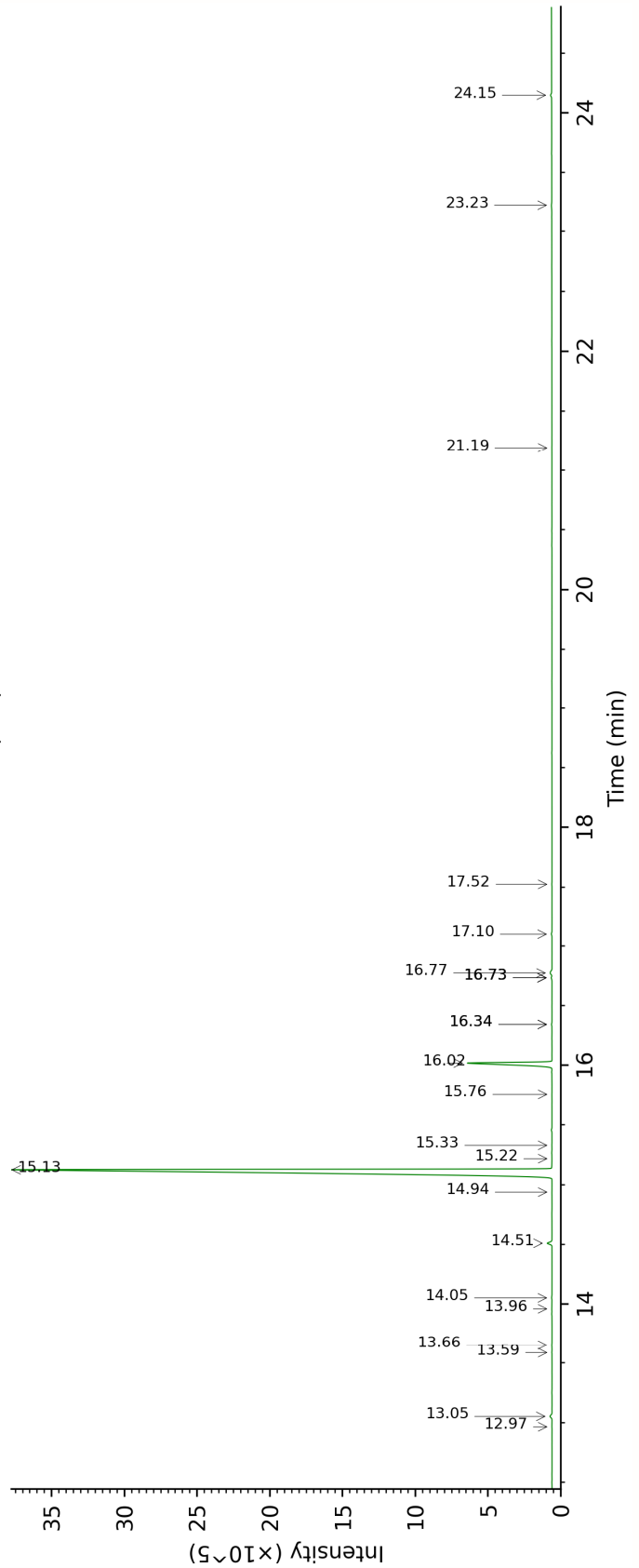
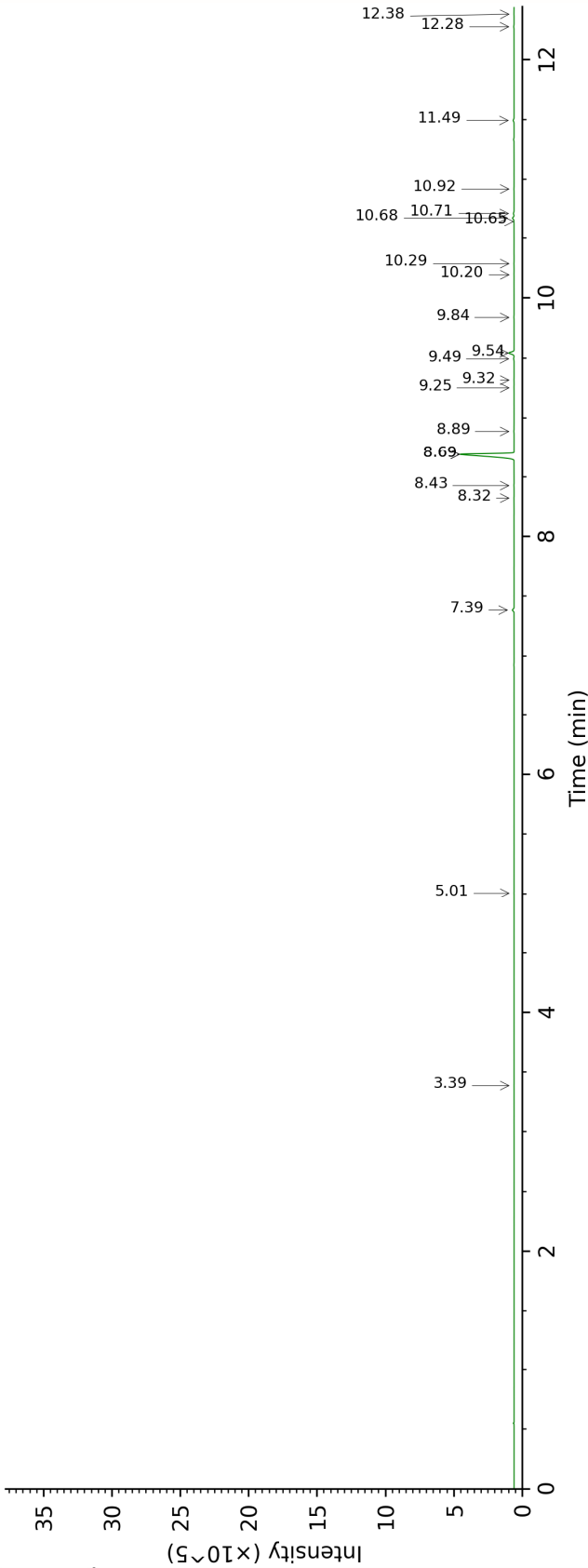
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

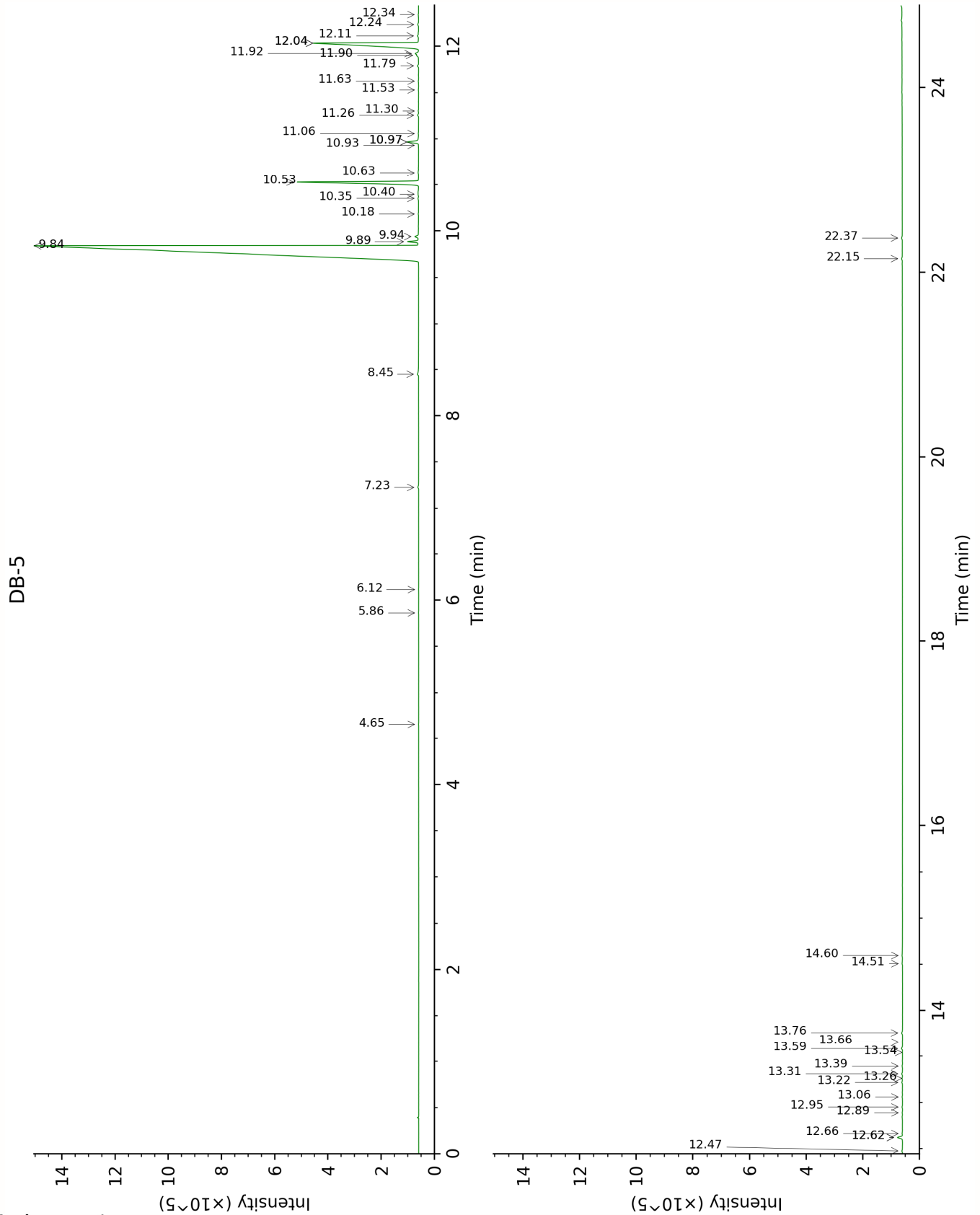
**Unknowns:** Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

**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.

DB-WAX





## FULL ANALYSIS DATA

Limonene	Column DB-WAX			Column DB-5		
	3.39	1155.3	0.01	4.65	1026.7	0.02
Linalool	8.32	1514.7	0.01	5.86	1102.3	0.02
(E)-4,8-Dimethylnona-1,3,7-triene	5.01	1275.5	0.01	6.12	1118.4	0.01
Methyl salicylate	10.71	1703.8	0.07	7.23	1189.1	0.06
Chavicol	16.74*	2261.3	[0.07]	8.45	1269.9	0.11
Eugenol	15.13*†	2099.7	[80.37]	9.84*†	1365.9	[80.63]
Dihydroeugenol	14.51*†	2040.7	[0.45]	9.89*†	1369.0	[0.43]
α-Copaene	7.39	1444.6	0.16	9.94	1372.9	0.19
β-Elemene	8.69*	1542.9	[6.85]	10.18	1389.9	0.02
Isocaryophyllene	8.43	1522.7	0.02	10.35	1401.8	0.03
Methyleugenol	13.59	1954.5	0.02	10.40	1405.1	0.03
β-Caryophyllene	8.69*	1542.9	[6.85]	10.53	1414.8	6.91
Caryophylla-4(12),8(13)-diene	8.89	1558.1	0.03	10.63	1422.5	0.04
9-epi-Isocaryophyllene	9.32	1591.0	0.02	10.93	1444.7	0.01
(E)-Isoeugenol	16.78	2265.4	0.26	10.97*	1447.4	[0.63]
α-Humulene	9.54	1609.1	0.52	10.97*	1447.4	[0.63]
allo-Aromadendrene	9.25	1586.1	0.02	11.06	1454.2	0.02
trans-Cadina-1(6),4-diene	9.49	1605.2	0.05	11.26	1468.9	0.05
γ-Murolene	9.84	1633.0	0.02	11.30	1472.3	0.02
α-Selinene	10.20	1661.6	0.01	11.53	1489.2	0.02
α-Murolene	10.29	1669.0	0.02	11.63	1496.3	0.02
γ-Cadinene	10.65	1698.2	0.02	11.79	1508.8	0.06
trans-Calamenene	11.49	1769.2	0.09	11.90	1517.7	0.10
δ-Cadinene	10.68	1700.6	0.16	11.92	1519.2	0.20
β-Sesquiphellandrene	10.92	1721.0	0.02	12.04*	1528.0	[9.08]
Eugenyl acetate	16.02	2188.1	8.98	12.04*	1528.0	[9.08]
α-Calacorene	12.38	1846.3	0.02	12.11	1534.1	0.08
Unknown SYAR II [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.28	1837.0	0.04	12.24	1543.7	0.06
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]	21.19	2764.7	0.01	12.34	1552.1	0.03
Caryophyllenyl	13.96	1988.6	0.06	12.48	1562.4	0.04



alcohol						
Caryophyllene oxide	13.05	1905.6	0.24	12.62*	1573.8	[0.25]
Caryophyllene oxide isomer	12.97	1897.6	0.02	12.62*	1573.8	[0.25]
Unknown SYAR IV [m/z 161, 187 (32), 105 (30), 205 (24)... 222 (3)]	15.33	2119.9	0.02	12.66	1577.1	0.02
Widdrol	14.94	2081.3	0.02	12.89	1594.8	0.02
Humulene epoxide II	13.66	1960.6	0.04	12.95	1599.7	0.03
(E)-Isoeugenyl acetate	17.52	2344.5	0.02	13.06	1608.4	0.02
1-epi-Cubenol	14.05	1997.3	0.05	13.22	1621.4	0.04
Caryophylladienol I	16.34*	2221.3	[0.05]	13.26	1625.0	0.03
Caryophylladienol II	16.34*	2221.3	[0.05]	13.31	1629.1	0.04
τ-Cadinol	15.22	2108.9	0.01	13.39	1636.0	0.03
α-Cadinol	15.76	2162.0	0.02	13.54	1648.2	0.01
14-Hydroxy-(Z)-caryophyllene	16.74*	2261.3	[0.07]	13.58	1651.7	0.06
14-Hydroxy-9-epi-(E)-caryophyllene	16.74*	2261.3	[0.07]	13.66	1657.7	0.01
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	17.10	2299.3	0.07	13.76	1666.1	0.06
(E)-Coniferyl alcohol	23.23	3024.6	0.07	14.51	1729.1	0.03
(E)-Coniferaldehyde	24.15	3148.9	0.12	14.60	1736.7	0.06
Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117 (30), 91 (22)...]				22.15	2501.0	0.05
Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)]				22.37	2527.9	0.05
Total reported		99.13%			99.72%	

\*: 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