

Date : 2024-04-18

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24D04-PTH01

Customer Identification : Clove Bud - Indonesia - CG0110R

Type : Essential Oil

Source : *Syzygium aromaticum*

Customer : Plant Therapy

Checked and approved by:

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 : 2024-04-10

PHYSICOCHEMICAL DATA

Refractive index : 1.05367 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2024-04-05

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	0.01	Furan
α -Pinene	tr	Monoterpene
6-Methyl-5-hepten-2-one	tr	Aliphatic ketone
Limonene	tr	Monoterpene
Linalool	0.01	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	Terpene derivative
Methyl salicylate	0.06	Phenolic ester
Chavicol	0.10	Phenylpropanoid
Eugenol	84.54	Phenylpropanoid
Dihydroeugenol	0.02	Phenylpropanoid
α -Copaene	0.07	Sesquiterpene
Vanillin	0.01	Simple phenolic
Isocaryophyllene	0.02	Sesquiterpene
Methyleugenol	0.03	Phenylpropanoid
β -Caryophyllene	4.03	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.02	Sesquiterpene
(E)-Isoeugenol	0.01	Phenylpropanoid
α -Humulene	0.62	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
trans-Cadina-1(6),4-diene	0.02	Sesquiterpene
γ -Muurolene	0.01	Sesquiterpene
β -Selinene	0.01	Sesquiterpene
α -Selinene	0.01	Sesquiterpene
α -Muurolene	0.01	Sesquiterpene
γ -Cadinene	0.02	Sesquiterpene
δ -Cadinene	0.13	Sesquiterpene
trans-Cadina-1,4-diene	0.01	Sesquiterpene
Eugenyl acetate	9.23	Phenylpropanoid ester
Unknown	0.03	Unknown
Unknown	0.01	Phenylpropanoid
(E)-Nerolidol	0.01	Sesquiterpenic alcohol
Caryophyllenyl alcohol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Clovenol?	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.17	Sesquiterpenic ether
Humulene epoxide I	0.01	Sesquiterpenic ether
Humulene epoxide II	0.03	Sesquiterpenic ether
1-epi-Cubenol	0.02	Sesquiterpenic alcohol
Caryophylladienol I	0.01	Sesquiterpenic alcohol
Caryophylladienol II	0.03	Sesquiterpenic alcohol

Cubenol	0.01	Sesquiterpenic alcohol
τ -Muurolol	tr	Sesquiterpenic alcohol
14-Hydroxy-(Z)-caryophyllene	0.03	Sesquiterpenic alcohol
14-Hydroxy-(E)-caryophyllene	0.02	Sesquiterpenic alcohol
Unknown	0.01	Unknown
(E)-Coniferyl alcohol	0.04	Phenylpropanoid
(E)-Coniferaldehyde	0.04	Phenylpropanoid
Unknown	0.15	Lignan
Unknown	0.04	Lignan
Consolidated total	99.73	

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

Note: no correction factor was applied

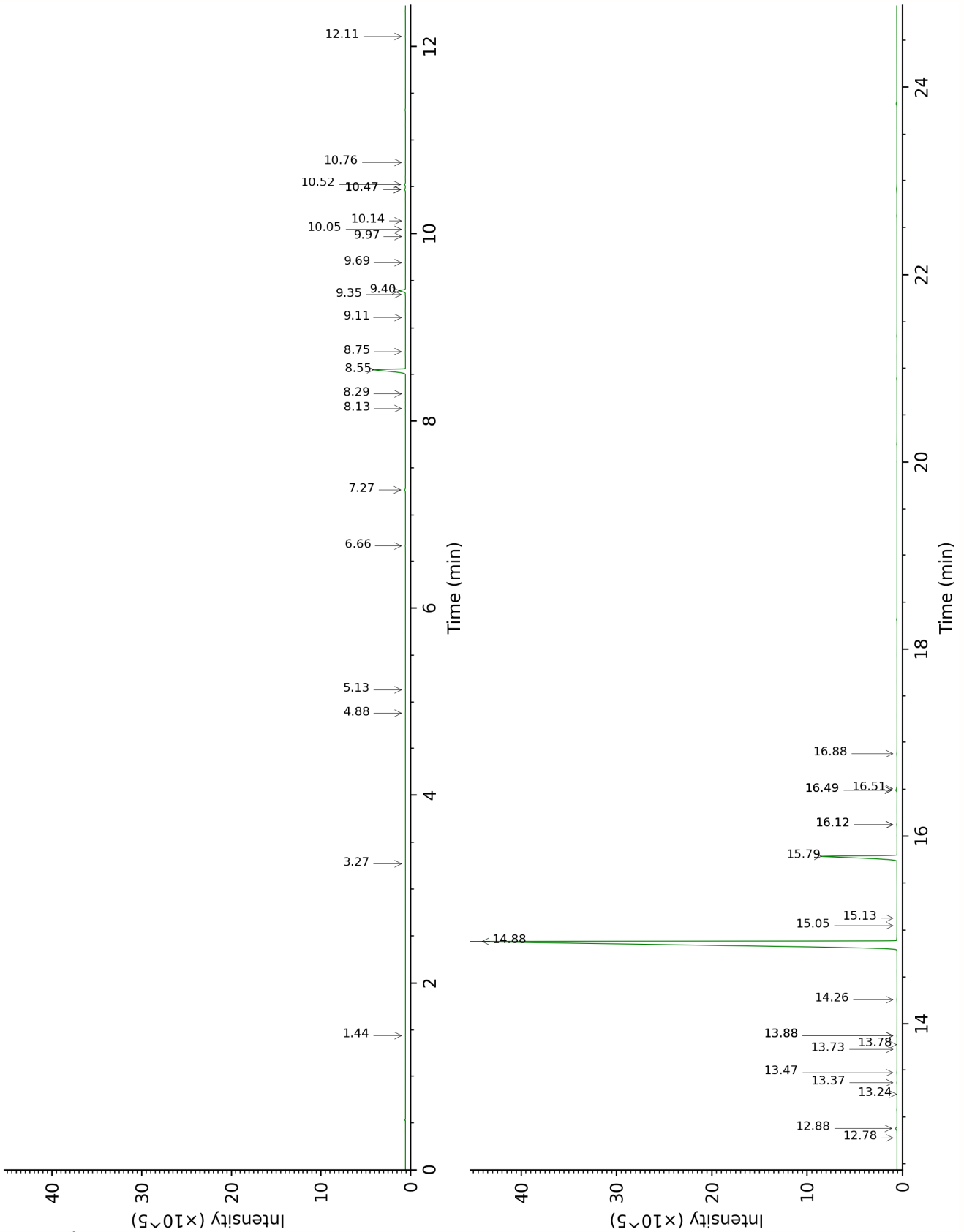
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

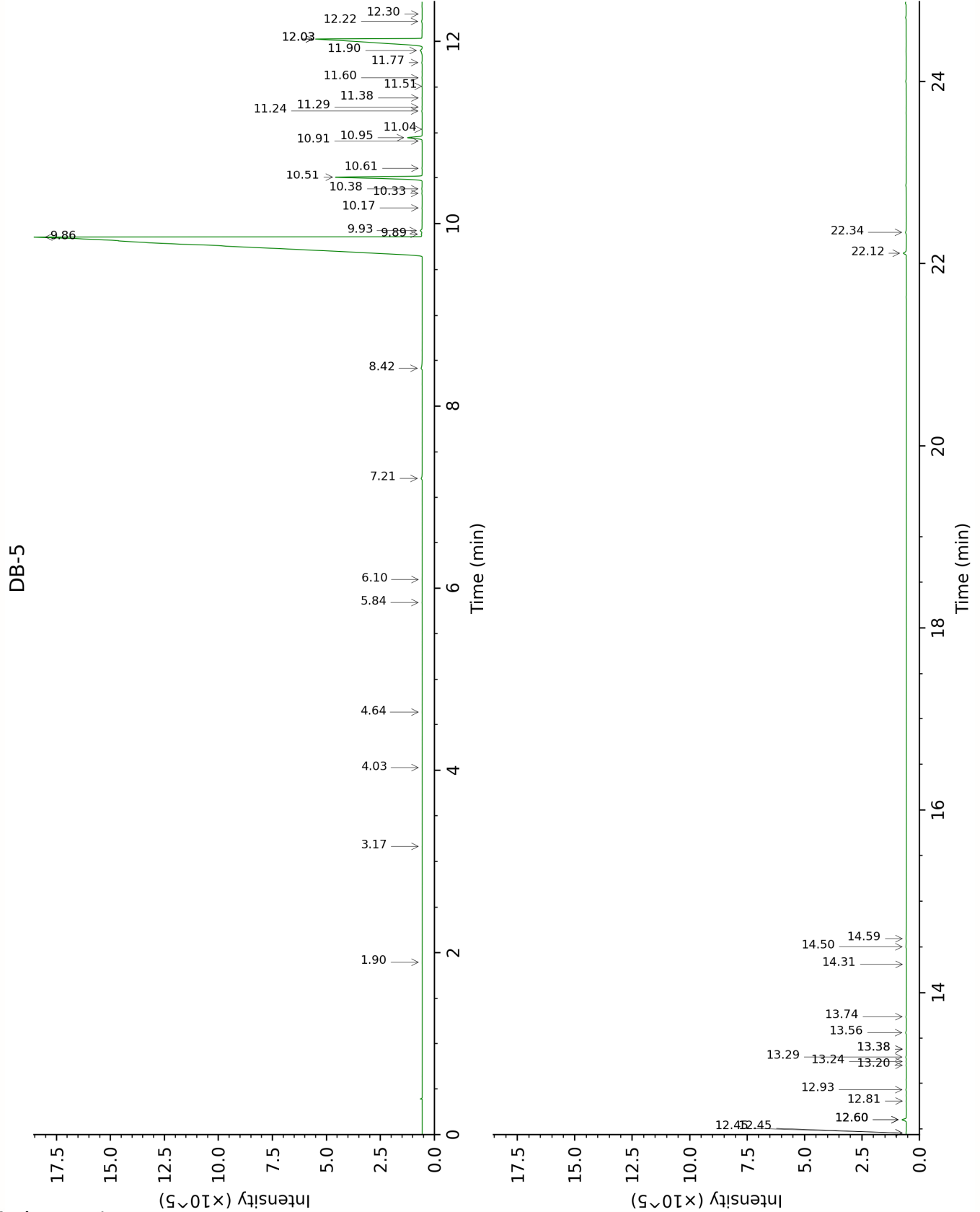
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

Furfural	Column DB-WAX			Column DB-5		
	6.66	1403.2	0.02	1.90	833.3	0.01
α-Pinene	1.44	992.4	tr	3.17	931.0	tr
6-Methyl-5-hepten-2-one	5.13	1292.8	0.01	4.03	987.8	tr
Limonene	3.27	1157.2	0.01	4.64	1026.6	tr
Linalool	8.14	1513.8	0.01	5.84	1102.2	0.01
(E)-4,8-Dimethylnona-1,3,7-triene	4.88	1274.4	0.01	6.10	1118.1	0.01
Methyl salicylate	10.47*	1702.1	[0.09]	7.21	1189.3	0.06
Chavicol	16.49*	2264.4	[0.12]	8.42	1269.1	0.10
Eugenol	14.88	2098.9	84.54	9.86*†	1368.6	[84.49]
Dihydroeugenol	14.26	2038.0	0.02	9.89*†	1370.8	[0.04]
α-Copaene	7.27	1448.5	0.07	9.93*†	1373.6	[0.10]
Vanillin				10.17	1390.9	0.01
Isocaryophyllene	8.29	1526.2	0.01	10.33	1402.2	0.02
Methyleugenol	13.37	1952.5	0.02	10.38	1405.6	0.03
β-Caryophyllene	8.55	1546.3	4.02	10.51	1415.1	4.03
Caryophylla-4(12),8(13)-diene	8.75	1562.0	0.02	10.61	1422.9	0.02
(E)-Isoeugenol	16.51	2266.1	0.04	10.91	1445.1	0.01
α-Humulene	9.40	1613.3	0.61	10.95	1447.9	0.62
allo-Aromadendrene	9.11	1590.6	0.01	11.04	1454.7	0.01
trans-Cadina-1(6),4-diene	9.35	1609.8	0.02	11.24	1469.6	0.02
γ-Muurolene	9.69	1637.8	0.01	11.28	1472.8	0.01
β-Selinene	9.97	1660.7	0.01	11.38	1480.2	0.01
α-Selinene	10.05	1667.0	0.01	11.51	1489.6	0.01
α-Muurolene	10.14	1674.4	0.01	11.60	1496.6	0.01
γ-Cadinene	10.47*	1702.1	[0.09]	11.77	1509.2	0.02
δ-Cadinene	10.52	1706.5	0.08	11.90	1519.6	0.13
trans-Cadina-1,4-diene	10.76	1727.3	0.01	12.03*	1529.4	[9.27]
Eugenyl acetate	15.79	2190.9	9.23	12.03*	1529.4	[9.27]
Unknown SYAR II [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.11	1835.7	0.02	12.22	1544.5	0.03
Unknown SYAR III [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]				12.30	1550.9	0.01

(E)-Nerolidol	13.88*	2000.6	[0.02]	12.45*	1562.8	[0.02]
Caryophyllenyl alcohol	13.73	1986.8	0.02	12.45*	1562.8	[0.02]
Caryophyllene oxide isomer	12.78	1896.9	0.01	12.60*	1574.3	[0.18]
Clovenol?	15.05	2115.6	0.01	12.60*	1574.3	[0.18]
Caryophyllene oxide	12.88	1906.2	0.17	12.60*	1574.3	[0.18]
Humulene epoxide I	13.24	1940.9	0.01	12.81	1590.3	0.01
Humulene epoxide II	13.47	1962.6	0.03	12.93	1600.1	0.03
1-epi-Cubenol	13.88*	2000.6	[0.02]	13.20	1621.9	0.02
Caryophylladienol I	16.12*	2225.7	[0.03]	13.24	1625.3	0.01
Caryophylladienol II	16.12*	2225.7	[0.03]	13.29	1629.4	0.03
Cubenol	13.78	1991.6	0.01	13.38*	1636.5	[0.01]
τ-Muurolol	15.13	2123.8	tr	13.38*	1636.5	[0.01]
14-Hydroxy-(Z)-caryophyllene	16.49*	2264.4	[0.12]	13.56	1652.1	0.03
14-Hydroxy-(E)-caryophyllene	16.88	2305.4	0.03	13.74	1666.5	0.02
Unknown SYAR VI [m/z 180, 125 (44), 55 (32), 93 (25), 43 (24), 149 (23)...]				14.31	1714.2	0.01
(E)-Coniferyl alcohol				14.50	1730.9	0.04
(E)-Coniferaldehyde				14.59	1738.6	0.04
Unknown OCSA V [m/z 326, 148 (67), 147 (41), 117 (30), 91 (22)...]				22.12	2499.4	0.15
Unknown CIZE V [m/z 326, 150 (54), 161 (42), 202 (41), 201 (28)]				22.34	2526.7	0.04
Total reported		99.37%			99.75%	

*: 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

Essential Oil, *Syzygium aromaticum*
Internal code: 24D04-PTH01

Clove Bud - Indonesia - CG0110R

Report prepared for:
Plant Therapy

†: 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