

Date : June 16, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22F09-PTH07


Customer identification : Clove Bud - Indonesia - CG0108R

Type : Essential oil

Source : *Syzygium aromaticum*

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Seydou Ka, Ph. D.

Analysis date : June 15, 2022

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.5352 ± 0.0003 (20 °C; method PC-MAT-016)

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
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Limonene	tr*	Monoterpene
1,8-Cineole	tr*	Monoterpenic ether
Linalool	0.01	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	Terpene derivative
Methyl salicylate	0.02	Phenolic ester
α -Terpineol	tr	Monoterpenic alcohol
α -Cubebene	0.07	Sesquiterpene
Eugenol	81.41	Phenylpropanoid
α -Copaene	0.16	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
β -Caryophyllene	6.32	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.01	Sesquiterpene
9-epi-Isocaryophyllene	0.03	Sesquiterpene
α -Humulene	0.75	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.03	Sesquiterpene
γ -Murolene	0.01	Sesquiterpene
β -Selinene	0.01	Sesquiterpene
α -Selinene	0.02	Sesquiterpene
α -Murolene	0.01	Sesquiterpene
γ -Cadinene	0.04	Sesquiterpene
<i>trans</i> -Calamenene	0.04	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
Eugenyl acetate	9.48	Phenylpropanoid ester
α -Calacorene	0.03	Sesquiterpene
Unknown	0.05	Unknown
Caryophyllene oxide	0.34	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Humulene epoxide I	0.01	Sesquiterpenic ether
Humulene epoxide II	0.04	Sesquiterpenic ether
(E)-Isoeugenyl acetate	0.01	Phenylpropanoid ester
1-epi-Cubenol	0.03	Sesquiterpenic alcohol
Caryophylladienol II	0.02	Sesquiterpenic alcohol
Cubenol	0.01	Sesquiterpenic alcohol
Unknown	0.03	Sesquiterpenic alcohol
14-Hydroxy-(Z)-caryophyllene	0.03	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(E)-caryophyllene	0.01	Sesquiterpenic alcohol
14-Hydroxy-(E)-caryophyllene	0.03	Sesquiterpenic alcohol
Unknown	0.01	Unknown
Consolidated total	99.22%	

*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered

[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total

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

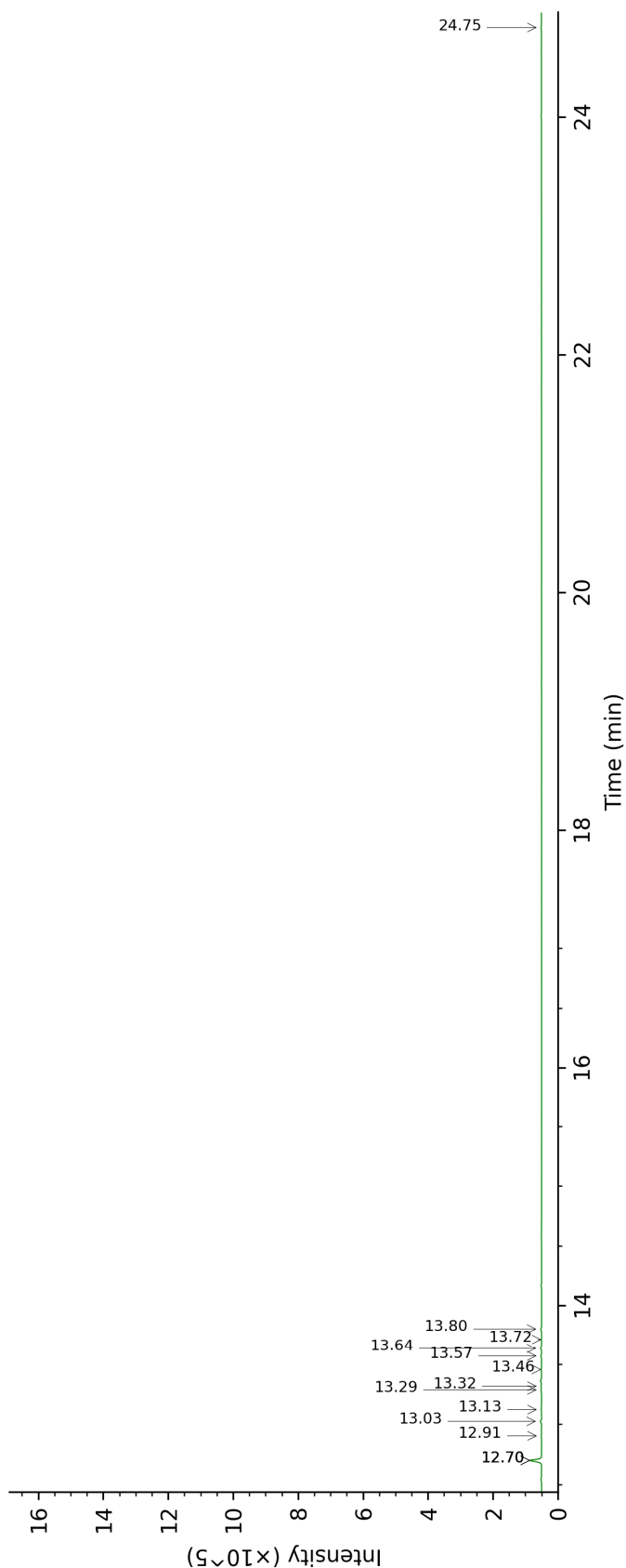
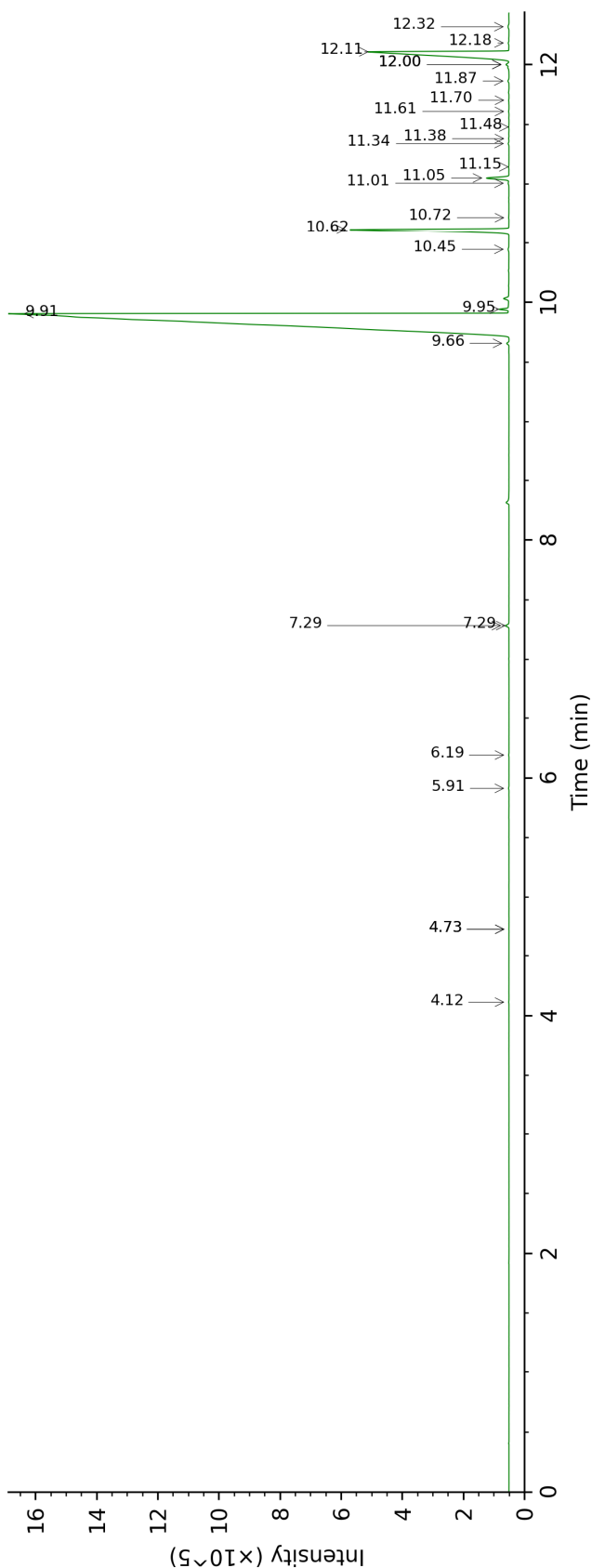
Note: no correction factor was applied

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.

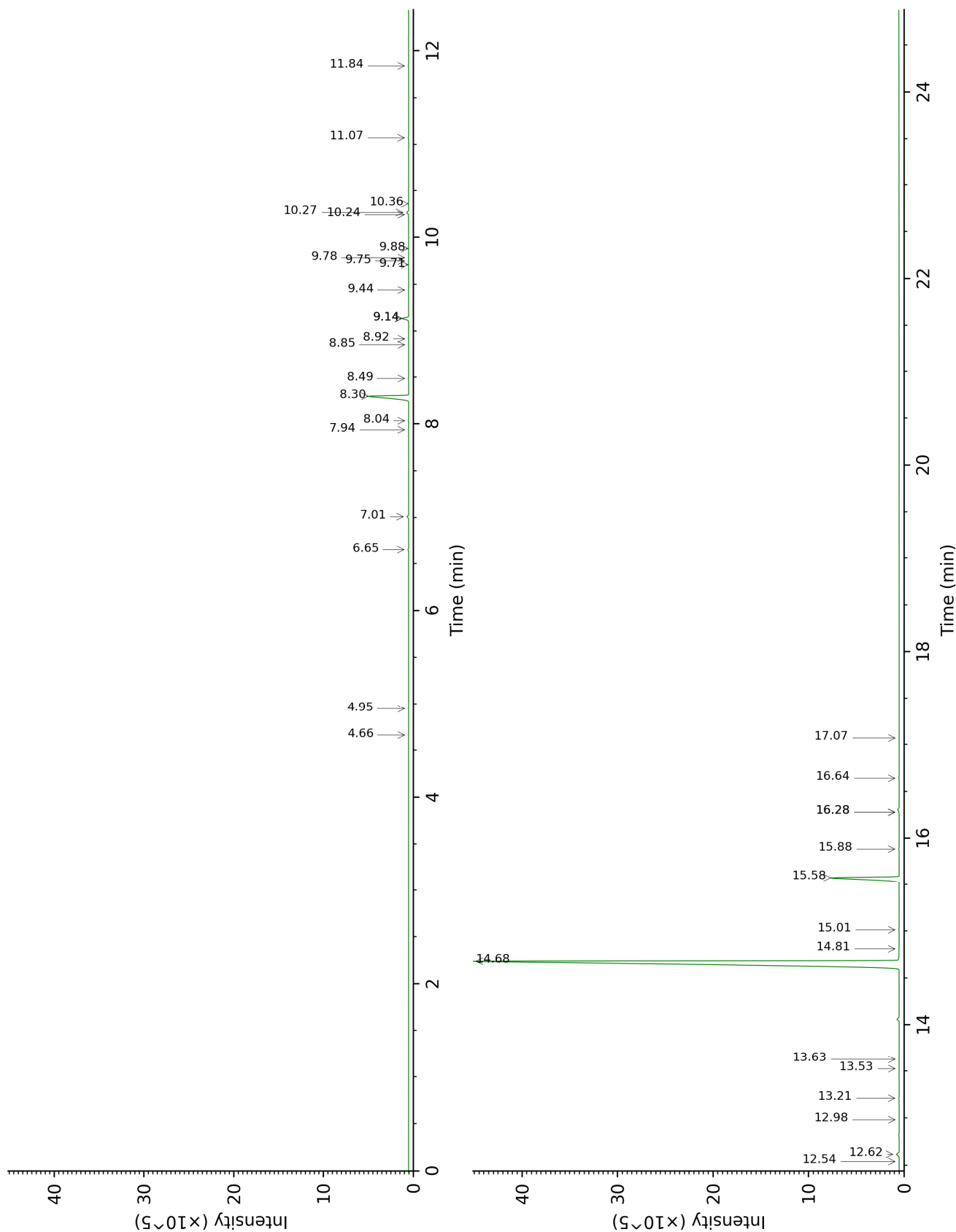
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

DB-5



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
6-Methyl-5-hepten-2-one	4.12	987	0.01	4.95	1298	0.01
Limonene	4.73*	1026	tr			
1,8-Cineole	4.73*	1026	[tr]			
Linalool	5.91	1101	0.01	7.94	1516	0.01
(E)-4,8-Dimethylnona-1,3,7-triene	6.19	1119	0.01	4.66	1277	0.01
Methyl salicylate	7.29*	1189	0.11	10.36	1710	0.02
α -Terpineol	7.29*	1189	[0.11]	9.71	1657	tr
α -Cubebene	9.66	1347	0.07	6.65	1419	0.07
Eugenol	9.91†	1365	81.78	14.68	2103	81.41
α -Copaene	9.94†	1368	[81.78]	7.01	1446	0.16
Isocaryophyllene	10.45	1403	0.03	8.04	1524	0.01
β -Caryophyllene	10.62	1416	6.32	8.30	1544	6.31
Caryophylla-4(12),8(13)-diene	10.72	1423	0.01	8.49	1559	0.01
9-epi-Isocaryophyllene	11.01	1445	0.03	8.92	1593	0.01
α -Humulene	11.05	1448	0.75	9.14*	1610	0.74
allo-Aromadendrene	11.15	1455	0.01	8.85	1588	0.01
trans-Cadina-1(6),4-diene	11.34	1470	0.03	9.14*	1610	[0.74]
γ -Murolene	11.38	1473	0.01	9.44	1635	0.01
β -Selinene	11.48	1480	0.01	9.75	1660	0.01
α -Selinene	11.61	1490	0.02	9.78	1663	0.01
α -Murolene	11.70	1497	0.01	9.88	1671	0.01
γ -Cadinene	11.86	1509	0.04	10.27	1702	0.22
trans-Calamenene	12.00*	1520	0.11	11.07	1771	0.04
δ -Cadinene	12.00*	1520	[0.11]	10.24	1700	0.02
Eugenyl acetate	12.11	1528	9.48	15.58	2194	9.46
α -Calacorene	12.18	1534	0.03			
Unknown [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.32	1545	0.05	11.84	1838	0.02
Caryophyllene oxide	12.70*	1575	0.41	12.62	1908	0.34
Caryophyllene oxide isomer	12.70*	1575	[0.41]	12.54	1901	0.01
Unknown [m/z 161, 187 (32), 105 (30), 205 (24)... 222 (3)]	12.70*	1575	[0.41]	14.81	2116	0.03
Humulene epoxide I	12.91	1591	0.01	12.98	1942	0.01

Humulene epoxide II	13.03	1601	0.04	13.21	1963	0.04
(E)-Isoeugenyl acetate	13.13	1608	0.01	17.07	2351	0.01
1-epi-Cubenol	13.29	1622	0.03	13.63	2001	0.02
Caryophylladienol II	13.32	1625	0.02	15.88	2226	0.04
Cubenol	13.46	1636	0.01	13.53	1992	0.01
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	13.58	1646	0.03	15.01	2137	0.03
14-Hydroxy-(Z)-caryophyllene	13.64	1651	0.03	16.28*	2267	0.03
14-Hydroxy-9-epi-(E)-caryophyllene	13.72	1657	0.01	16.28*	2267	[0.03]
14-Hydroxy-(E)-caryophyllene	13.80	1665	0.03	16.64	2305	0.03
Unknown [m/z 164, 165 (12), 55 (11), 81 (10), 69 (10), 95 (10)...]	24.75	2821	0.01			
Total identified		99.51%			99.12%	
Total reported		99.59%			99.20%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not 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