

Date : 2026-07-22

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 26D29-PTH02

Customer Identification : Ginger Root CO2 - India - G40117

Type : CO2 Extract

Source : *Zingiber officinale*

Customer : Plant Therapy

Checked and approved by:

Sylvain Mercier, M. Sc., Chimiste 2014-005

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2026-05-05 to make a modification in the sample identification section.

GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-004 - Terpenes and volatiles profiling by response factor

Results : See analysis summary (next page)

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

Date : 2026-05-05

PHYSICOCHEMICAL DATA

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY

Identification	mg/g	% m/m	Class
2-Heptanone	0.26	0.03	Aliphatic ketone
2-Heptanol	0.80	0.08	Aliphatic alcohol
Tricyclene	0.43	0.04	Monoterpene
α -Thujene	0.06	0.01	Monoterpene
α -Pinene	7.02	0.70	Monoterpene
Camphene	24.23	2.42	Monoterpene
Sabinene	0.27	0.03	Monoterpene
β -Pinene	1.12	0.11	Monoterpene
6-Methyl-5-hepten-2-one	1.55	0.16	Aliphatic ketone
Myrcene	3.67	0.37	Monoterpene
Unknown	0.11	0.01	Unknown
α -Phellandrene	1.19	0.12	Monoterpene
Octanal	0.42	0.04	Aliphatic aldehyde
Δ^3 -Carene	0.20	0.02	Monoterpene
α -Terpinene	0.09	0.01	Monoterpene
<i>para</i> -Cymene	0.46	0.05	Monoterpene
β -Phellandrene	22.17	2.22	Monoterpene
Limonene	6.30	0.63	Monoterpene
1,8-Cineole	20.28	2.03	Monoterpenic ether
2-Heptyl acetate	0.04	0.00	Aliphatic ester
γ -Terpinene	0.16	0.02	Monoterpene
<i>cis</i> -Sabinene hydrate	0.08	0.01	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.09	0.01	Monoterpenic alcohol
<i>trans</i> -Linalool oxide (fur.)	0.38	0.04	Monoterpenic alcohol
Terpinolene	1.02	0.10	Monoterpene
Unknown	1.14	0.11	Oxygenated monoterpene
Rosefuran	1.05	0.10	Monoterpenic ether
Linalool	3.64	0.36	Monoterpenic alcohol
2-Nonanol	0.84	0.08	Aliphatic alcohol
endo-Fenchol	0.20	0.02	Monoterpenic alcohol
(<i>E</i>)-4,8-Dimethylnona-1,3,7-triene	0.25	0.02	Terpene derivative
<i>trans</i> -Pinene hydrate	0.67	0.07	Monoterpenic alcohol
Unknown	0.14	0.01	Unknown
Camphor	0.76	0.08	Monoterpenic ketone
Camphene hydrate	0.87	0.09	Monoterpenic alcohol
exo-Isocitral	0.09	0.01	Monoterpenic aldehyde
Citronellal	0.38	0.04	Monoterpenic aldehyde
Borneol	9.50	0.95	Monoterpenic alcohol
Isoneral	0.47	0.05	Monoterpenic aldehyde
Rosefuran oxide	[4.00]	[0.40]	Monoterpenic ether
Terpinen-4-ol	[3.40]	[0.34]	Monoterpenic alcohol

Cryptone	0.26	0.03	Normonoterpenic ketone
<i>para</i> -Cymen-8-ol	0.36	0.04	Monoterpenic alcohol
α -Terpineol	4.74	0.47	Monoterpenic alcohol
Myrtenal	1.09	0.11	Monoterpenic aldehyde
Myrtenol	0.49	0.05	Monoterpenic alcohol
Decanal	0.58	0.06	Aliphatic aldehyde
Bornyl formate	0.11	0.01	Monoterpenic ester
2,3-Epoxyneral?	0.28	0.03	Monoterpenic aldehyde
Citronellol	2.02	0.20	Monoterpenic alcohol
Neral	0.47	0.05	Monoterpenic aldehyde
Unknown	0.66	0.07	Oxygenated monoterpene
Geraniol	1.01	0.10	Monoterpenic alcohol
Geranial	0.28	0.03	Monoterpenic aldehyde
Citronellyl formate	0.18	0.02	Monoterpenic ester
Bornyl acetate	0.79	0.08	Monoterpenic ester
2-Undecanone	2.14	0.21	Aliphatic ketone
2-Undecanol	0.47	0.05	Aliphatic alcohol
Carvacrol	0.15	0.02	Monoterpenic alcohol
δ -Elemene	0.92	0.09	Sesquiterpene
α -Cubebene	0.23	0.02	Sesquiterpene
Citronellyl acetate	0.44	0.04	Monoterpenic ester
Cyclosativene I	2.22	0.22	Sesquiterpene
Cyclosativene II	0.90	0.09	Sesquiterpene
Neryl acetate	0.16	0.02	Monoterpenic ester
α -Copaene	5.51	0.55	Sesquiterpene
Geranyl acetate	1.16	0.12	Monoterpenic ester
β -Cubebene	0.54	0.05	Sesquiterpene
β -Elemene	6.74	0.67	Sesquiterpene
Vanillin	0.14	0.01	Simple phenolic
γ -4-Dimethylbenzenebutyral	0.27	0.03	Simple phenolic
Sesquithujene	2.22	0.22	Sesquiterpene
β -Caryophyllene	1.05	0.10	Sesquiterpene
β -Copaene	0.61	0.06	Sesquiterpene
γ -Elemene	1.94	0.19	Sesquiterpene
(Z)- β -Farnesene?	1.16	0.12	Sesquiterpene
<i>trans</i> - α -Bergamotene	1.33	0.13	Sesquiterpene
Sesquisabinene A	0.57	0.06	Sesquiterpene
Unknown	1.43	0.14	Sesquiterpene
α -Humulene	0.65	0.06	Sesquiterpene
Sesquisabinene B	2.70	0.27	Sesquiterpene
allo-Aromadendrene	4.27	0.43	Sesquiterpene
(E)- β -Farnesene	3.59	0.36	Sesquiterpene
Selina-4,11-diene	2.15	0.21	Sesquiterpene
γ -Murolene	2.27	0.23	Sesquiterpene
Germacrene D	18.48	1.85	Sesquiterpene

ar-Curcumene	73.35	7.34	Sesquiterpene
Unknown	17.13	1.71	Sesquiterpene
Bicyclosiquiphellandrene?	35.71	3.57	Sesquiterpene
epi-Cubebol	0.96	0.10	Sesquiterpenic alcohol
α -Zingiberene	258.25	25.82	Sesquiterpene
γ -Cadinene	4.35	0.44	Sesquiterpene
β -Bisabolene	54.30	5.43	Sesquiterpene
Cubebol	1.78	0.18	Sesquiterpenic alcohol
(3E,6E)- α -Farnesene	74.11	7.41	Sesquiterpene
trans-Calamenene	0.33	0.03	Sesquiterpene
δ -Cadinene	11.37	1.14	Sesquiterpene
β -Sesquiphellandrene	103.57	10.36	Sesquiterpene
Unknown	2.53	0.25	Oxygenated sesquiterpene
(E)- γ -Bisabolene	2.63	0.26	Sesquiterpene
Unknown	0.49	0.05	Oxygenated sesquiterpene
α -Calacorene	0.38	0.04	Sesquiterpene
α -Elemol	3.59	0.36	Sesquiterpenic alcohol
Germacrene B	5.22	0.52	Sesquiterpene
cis-Sesquisabinene hydrate	2.14	0.21	Sesquiterpenic alcohol
(E)-Nerolidol	5.50	0.55	Sesquiterpenic alcohol
1'-Hydroxyeugenol	0.67	0.07	Phenylpropanoid
ar-Turmerol	0.81	0.08	Sesquiterpenic alcohol
trans-Sesquisabinene hydrate	4.87	0.49	Sesquiterpenic alcohol
Unknown	1.07	0.11	Oxygenated sesquiterpene
Unknown	0.56	0.06	Oxygenated sesquiterpene
10-epi- γ -Eudesmol	1.36	0.14	Sesquiterpenic alcohol
cis-Zingiberenol	6.99	0.70	Sesquiterpenic alcohol
Unknown	4.20	0.42	Oxygenated sesquiterpene
Unknown	1.30	0.13	Oxygenated sesquiterpene
γ -Eudesmol	1.12	0.11	Sesquiterpenic alcohol
trans-Zingiberenol	3.30	0.33	Sesquiterpenic alcohol
β -Eudesmol	3.50	0.35	Sesquiterpenic alcohol
Zingerone	8.21	0.82	Phenylbutanoid
α -Eudesmol	3.09	0.31	Sesquiterpenic alcohol
Selin-11-en-4 α -ol	1.98	0.20	Sesquiterpenic alcohol
(3E,5E)-7-Hydroxyfarnesene	1.56	0.16	Sesquiterpenic alcohol
β -Bisabolol	1.79	0.18	Sesquiterpenic alcohol
Zingerone methyl ether	0.66	0.07	Simple phenolic
α -Bisabolol	3.14	0.31	Sesquiterpenic alcohol
Unknown	6.50	0.65	Oxygenated sesquiterpene
Unknown	6.44	0.64	Oxygenated sesquiterpene
ar-Curcumen-15-al	0.42	0.04	Sesquiterpenic aldehyde
Unknown	2.00	0.20	Oxygenated sesquiterpene
Oplopanone	0.46	0.05	Sesquiterpenic alcohol
(2E,6E)-Farnesal	0.39	0.04	Sesquiterpenic aldehyde

Xanthorizzhol	1.51	0.15	Sesquiterpenic alcohol
Unknown	0.92	0.09	Oxygenated sesquiterpene
Unknown	1.12	0.11	Oxygenated sesquiterpene
Unknown	0.78	0.08	Oxygenated sesquiterpene
Unknown	1.13	0.11	Oxygenated sesquiterpene
Unknown	0.35	0.03	Oxygenated sesquiterpene
Unknown	4.93	0.49	Oxygenated sesquiterpene
Unknown	1.01	0.10	Oxygenated sesquiterpene
Unknown	0.33	0.03	Oxygenated sesquiterpene
Unknown	0.46	0.05	Unknown
Unknown	0.20	0.02	Oxygenated sesquiterpene
Geranyl- <i>para</i> -cymene	1.81	0.18	Diterpene
Palmitic acid	0.34	0.03	Aliphatic acid
[4]-Shogaol	0.36	0.04	Gingerol derivative
Unknown	0.08	0.01	Gingerol derivative
Unknown	0.96	0.10	Gingerol derivative
Unknown	0.21	0.02	Oxygenated diterpene
Linoleic acid	0.44	0.04	Aliphatic acid
Oleic acid	1.19	0.12	Aliphatic acid
[4]-Isogingerol?	0.49	0.05	Gingerol derivative
[6]-Isoshogaol?	0.35	0.03	Gingerol derivative
[6]-Paradol	0.79	0.08	Gingerol derivative
Methyl [6]-paradol?	0.17	0.02	Gingerol derivative
[6]-Shogaol	0.44	0.04	Gingerol derivative
Methyl [6]-shogaol	0.22	0.02	Gingerol derivative
Acetoxy-[6]-dihydroparadol	0.15	0.01	Gingerol derivative
Diacetoxy-[4]-gingerdiol	0.08	0.01	Gingerol derivative
Geranyl laurate	0.52	0.05	Monoterpenic ester
[6]-Isogingerol?	0.06	0.01	Gingerol derivative
1-(4'-Hydroxy-3'-methoxyphenyl)-7-dodecen-3-one?	0.05	0.01	Gingerol derivative
[8]-Paradol	0.06	0.01	Gingerol derivative
Acetoxy-[6]-gingerol	0.11	0.01	Gingerol derivative
Unknown	0.07	0.01	Gingerol derivative
[8]-Shogaol	0.99	0.10	Gingerol derivative
5-Acetoxy-[6]-gingerdiol	0.18	0.02	Gingerol derivative
Methyl 5-acetoxy-[6]-gingerdiol	0.13	0.01	Gingerol derivative
Diacetoxy-[6]-gingerdiol	0.99	0.10	Gingerol derivative
1-Dehydro-[6]-gingerdione	0.90	0.09	Gingerol derivative
[8]-Gingerol	5.05	0.50	Gingerol derivative
[10]-Isoshogaol	0.07	0.01	Gingerol derivative
[10]-Shogaol	0.40	0.04	Gingerol derivative
1-Dehydro-[8]-gingerdione	0.11	0.01	Gingerol derivative
[12]-Isoshogaol?	0.07	0.01	Gingerol derivative
Consolidated total	950.20	95.02	

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

Note: Individual compounds contents were corrected following the method of Cachet et al., 2016 (Flavour and Fragrance Journal guidelines).

Unknown compounds are expressed in equivalents of internal standard without correction.

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: 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.



