Date : December 07, 2020

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20K30-PTH01
Customer identification : Neroli - Egypt - N10108203R
Type : Essential oil
Source : *Citrus x aurantium*
Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014 ✲ISO - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Fanny Charlier, B. Sc., chimiste à l'entraînement
Analysis date : December 01, 2020

Checked and approved by :

_____
Alexis St-Gelais, M. Sc., chimiste 2013-174

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

MÉTHODE CERTIFIÉE
✲ISO 17025:2017
CERTIFIED METHOD

Laboratoire
Phy toChemia

Physicochemical data

Physical aspect: Light yellow liquid
Refractive index: 1.4691 ± 0.0003 (20 °C; method PC-MAT-016)

ISO 3517:2012 - Oil of neroli - Egypt

Compound	Min. %	Max. %	Observed %	Complies?
Methyl anthranilate		1.0	0.4	Yes
Indole		0.5	0.2	Yes
Geraniol	1	5	2	Yes
Nerol	0.5	2.0	0.9	Yes
(2E,6E)-Farnesol	0.5	4.0	1.4	Yes
(E)-Nerolidol	0.5	5.0	1.6	Yes
Geranyl acetate	1	5	2	Yes
Neryl acetate		7	1	Yes
Linalyl acetate	3	20	5	Yes
α-Terpineol	2	8	4	Yes
Linalool	26	55	42	Yes
(E)-β-Ocimene	3	9	4	Yes
Limonene	7	17	13	Yes
Myrcene	1	4	1	Yes
β-Pinene	2	8	8	Yes
Sabinene		3	2	Yes
α-Pinene		2	1	Yes
Refractive index	1.4650	1.4720	1.4691	Yes

Conclusion

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

Laboratoire
PhytoChemia

Plus que des analyses... des conseils

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Ethanol	0.02	Aliphatic alcohol
2-Methylbutanol	0.01	Aliphatic alcohol
Toluene	0.01	Simple phenolic
Tricyclene	tr	Monoterpene
α-Thujene	0.01	Monoterpene
α-Pinene	1.15	Monoterpene
Camphene	0.02	Monoterpene
α-Fenchene	0.01	Monoterpene
β-Pinene	7.91	Monoterpene
Sabinene	2.03	Monoterpene
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	1.14	Monoterpene
6-Methyl-5-hepten-2-ol	0.02	Aliphatic alcohol
α-Phellandrene	0.11	Monoterpene
Octanal	tr	Aliphatic aldehyde
Δ3-Carene	0.02	Monoterpene
α-Terpinene	0.02	Monoterpene
ortho-Cymene	0.01	Monoterpene
para-Cymene	0.02	Monoterpene
Limonene	12.69	Monoterpene
β-Phellandrene	0.11	Monoterpene
(*Z*)-β-Ocimene	1.51	Monoterpene
(*E*)-β-Ocimene	4.21	Monoterpene
γ-Terpinene	0.04	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.14	Monoterpenic alcohol
Terpinolene	0.30	Monoterpene
trans-Linalool oxide (fur.)	0.09	Monoterpenic alcohol
α-Pinene oxide	0.01	Monoterpenic ether
Linalool	41.66	Monoterpenic alcohol
Phenylethyl alcohol	0.11	Simple phenolic
cis-para-Menth-2-en-1-ol	0.04	Monoterpenic alcohol
allo-Ocimene	0.08	Monoterpene
Benzeneacetonitrile	0.07	Simple phenolic
neo-allo-Ocimene	0.04	Monoterpene
Lilac aldehyde A	0.01	Monoterpenic aldehyde
Borneol	0.02	Monoterpenic alcohol
Terpinen-4-ol	0.08	Monoterpenic alcohol
α-Terpineol	4.45	Monoterpenic alcohol
Myrtenol	0.04	Monoterpenic alcohol
Safranal	0.02	Monoterpenic aldehyde
Lilac alcohol A	0.01	Monoterpenic alcohol
(3*E*,5*E*)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.03	Monoterpenic alcohol
Nerol	0.88	Monoterpenic alcohol
Citronellol	0.02	Monoterpenic alcohol

Laboratoire PhytoChemia

Plus que des analyses... des conseils

|		
Neral	0.03	Monoterpenic aldehyde
(*trans*?)-Linalool oxide acetate (fur.)?	0.02	Monoterpenic ester
Linalyl acetate	4.60	Monoterpenic ester
Geraniol	1.92	Monoterpenic alcohol
Geranial	0.01	Monoterpenic aldehyde
Indole	0.24	Indole
Methyl anthranilate	0.40	Phenolic ester
α-Terpinyl acetate	0.04	Monoterpenic ester
Eugenol	0.14	Phenylpropanoid
8-Hydroxylinalool isomer	0.01	Monoterpenic alcohol
Neryl acetate	1.28	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
Geranyl acetate	2.47	Monoterpenic ester
β-Elemene	0.01	Sesquiterpene
(*Z*)-Jasmone	0.01	Jasmonate
Dimethyl anthranilate	0.01	Phenolic ester
β-Caryophyllene	0.51	Sesquiterpene
α-Humulene	0.03	Sesquiterpene
Geranylacetone	0.02	Monoterpenic ketone
(*E*)-β-Farnesene	0.03	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
Bicyclogermacrene	0.07	Sesquiterpene
(3*Z*,6*E*)-α-Farnesene	0.01	Sesquiterpene
δ-Cadinene	0.01	Sesquiterpene
α-Elemol	0.02	Sesquiterpenic alcohol
(*E*)-Nerolidol	1.57	Sesquiterpenic alcohol
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Viridiflorol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.01	Sesquiterpenic alcohol
α-Bisabolol	0.01	Sesquiterpenic alcohol
(2*E*,6*Z*)-Farnesol	0.02	Sesquiterpenic alcohol
(2*E*,6*E*)-Farnesol	1.41	Sesquiterpenic alcohol
(2*E*,6*E*)-Farnesal	0.02	Sesquiterpenic aldehyde
(2*E*,6*E*)-Farnesyl acetate	0.02	Sesquiterpenic ester
Phytol	0.01	Diterpenic alcohol
Tricosane	0.03	Alkane
Pentacosane	0.02	Alkane
Heptacosane	0.01	Alkane
Consolidated total	**94.31%**	
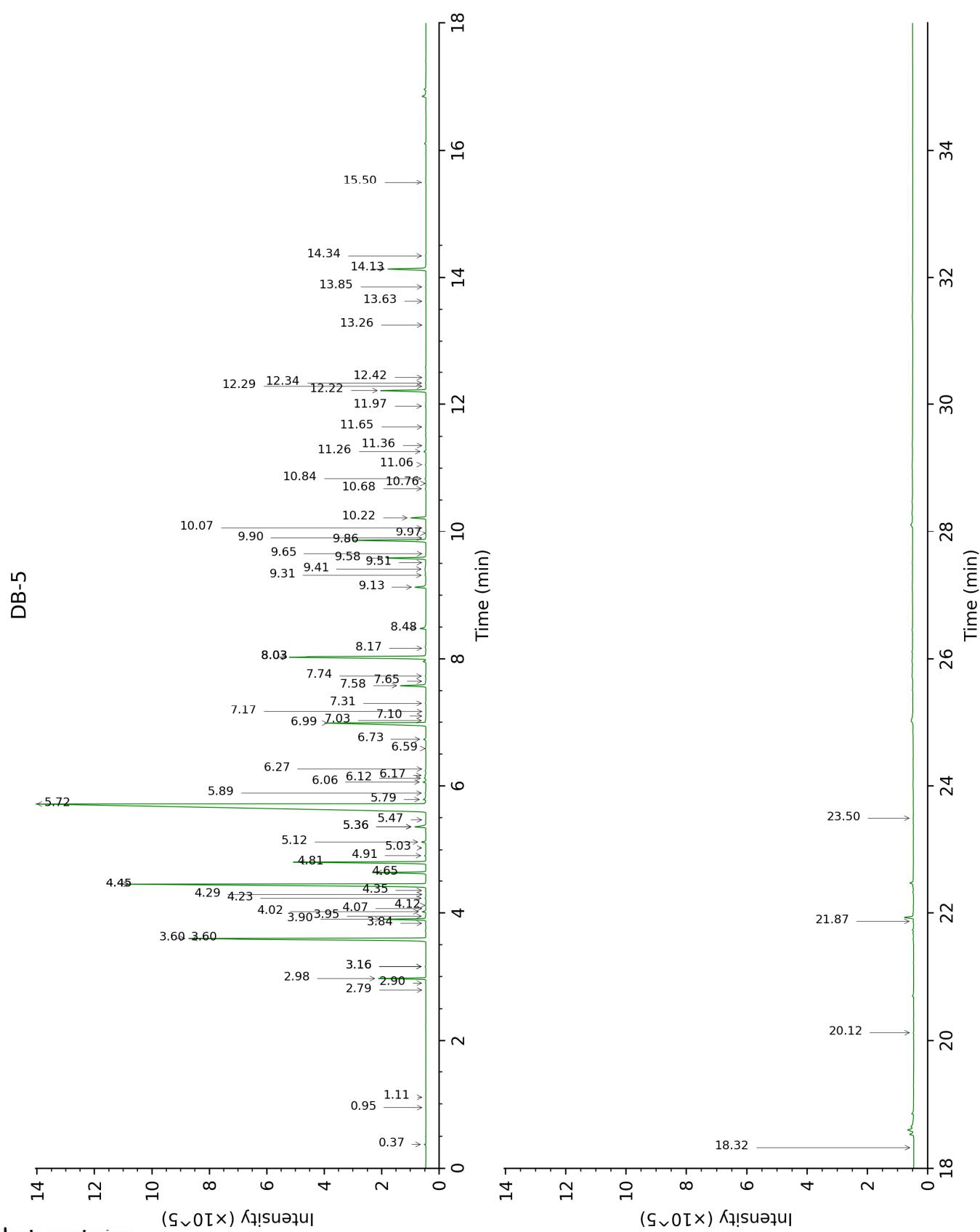
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied
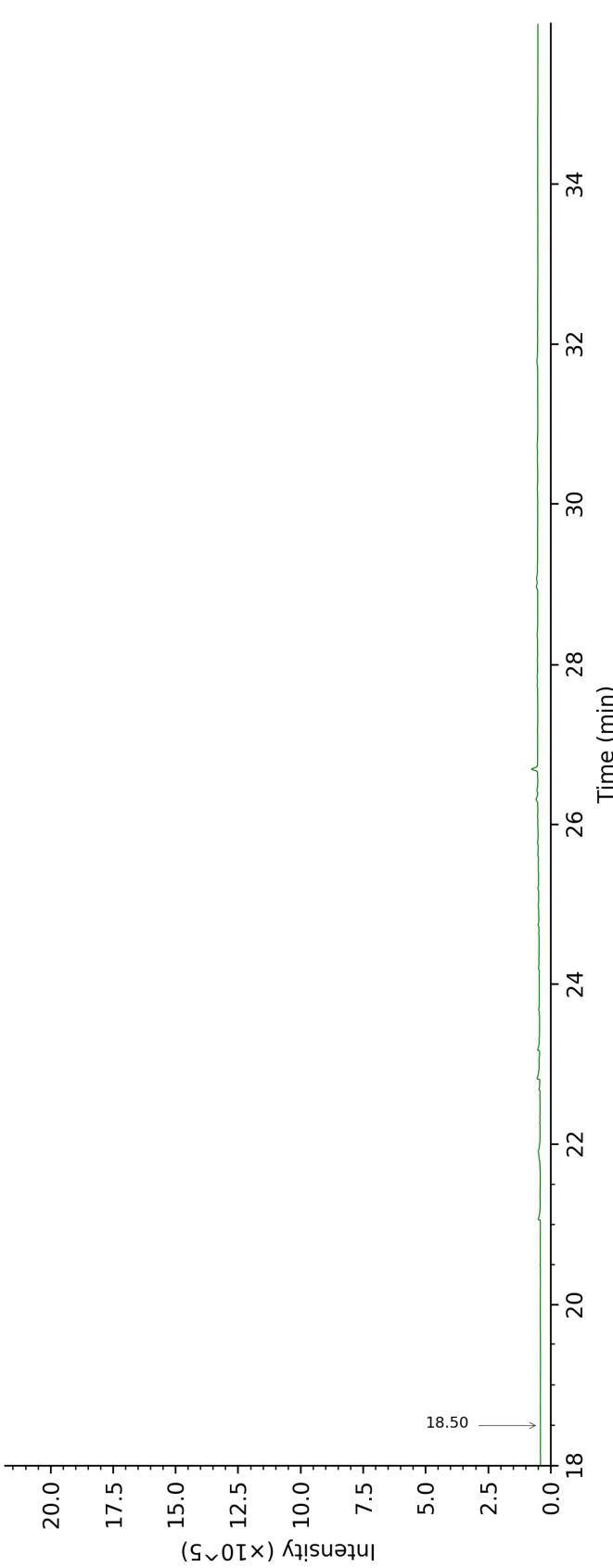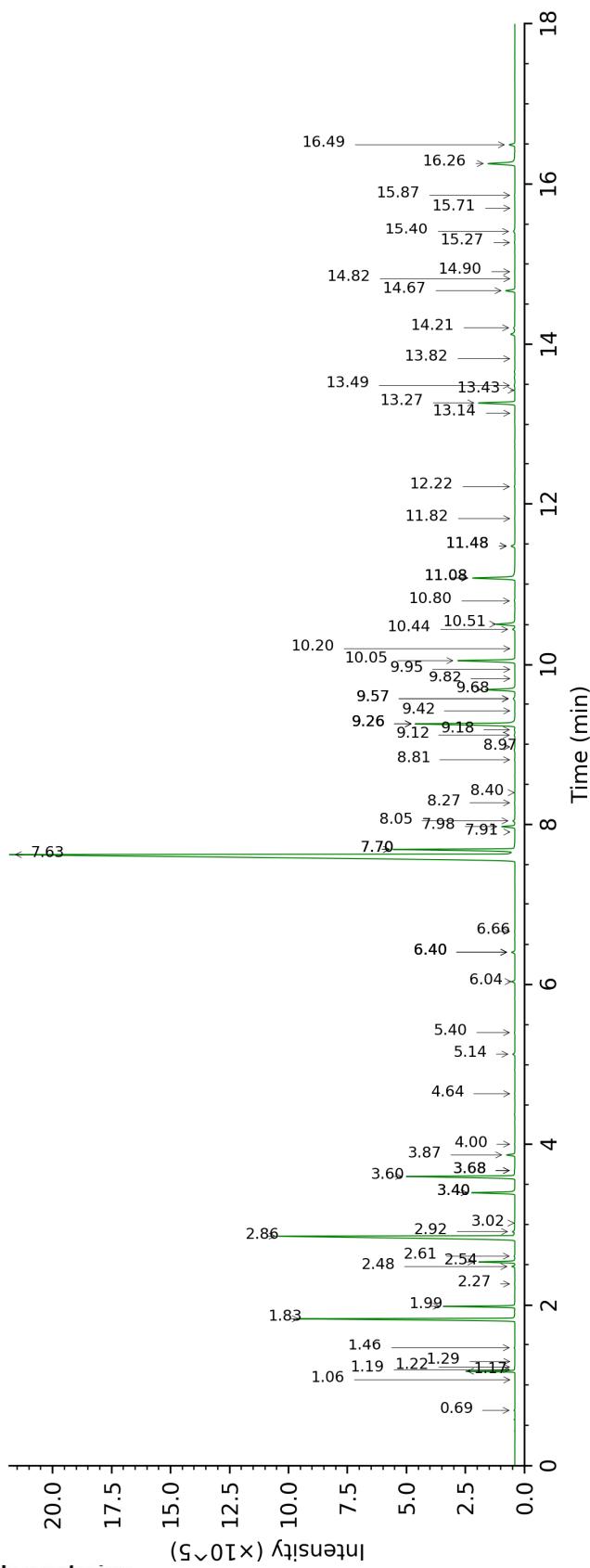
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.

Laboratoire
PhytoChemia

Plus que des analyses... des conseils

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

DB-5

Laboratoire
Phy&toChemia

Plus que des analyses... des conseils

DB-WAX

Laboratoire
PhytoChemia

Plus que des analyses... des conseils

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.37	523	0.02	0.69	905	0.01
2-Methylbutanol	0.95	740	0.01	3.02	1174	0.02
Toluene	1.11	763	0.01	1.22	1004	0.01
Tricyclene	2.79	919	tr	1.06	976	tr
α-Thujene	2.90	926	0.01	1.19	999	0.01
α-Pinene	2.98	931	1.15	1.17	995	1.13
Camphene	3.16*	943	0.02	1.46	1032	0.02
α-Fenchene	3.16*	943	[0.02]	1.29	1015	0.01
β-Pinene	3.60*	972	10.08	1.83	1070	7.91
Sabinene	3.60*	972	[10.08]	1.99	1086	2.03
6-Methyl-5-hepten-2-one	3.84	988	0.02	4.64	1295	0.01
Myrcene	3.90	992	1.14	2.54	1135	1.12
6-Methyl-5-hepten-2-ol	3.95	996	0.02	6.40*	1424	0.13
α-Phellandrene	4.02	1000	0.11	2.48	1131	0.10
Octanal	4.07	1004	tr	4.00	1248	0.01
Δ3-Carene	4.12	1007	0.02	2.27	1114	0.01
α-Terpinene	4.23	1014	0.02	2.61	1141	0.03
ortho-Cymene	4.29	1018	0.01	3.68*	1224	0.03
para-Cymene	4.35	1021	0.02	3.68*	1224	[0.03]
Limonene	4.45*	1028	12.90	2.86	1161	12.69
β-Phellandrene	4.45*	1028	[12.90]	2.92	1165	0.11
(Z)-β-Ocimene	4.65	1040	1.51	3.40*	1204	1.53
(E)-β-Ocimene	4.81	1050	4.21	3.60	1219	4.17
γ-Terpinene	4.91	1056	0.04	3.40*	1204	[1.53]
cis-Sabinene hydrate	5.03	1064	0.01	6.40*	1424	[0.13]
cis-Linalool oxide (fur.)	5.12	1070	0.14	6.04	1397	0.12
Terpinolene	5.36*	1085	0.43	3.87	1238	0.30
trans-Linalool oxide (fur.)	5.36*	1085	[0.43]	6.40*	1424	[0.13]
α-Pinene oxide	5.47	1092	0.01			
Linalool	5.72	1108	41.66	7.63	1517	41.21
Phenylethyl alcohol	5.79	1113	0.11	11.48*	1838	0.19
cis-para-Menth-2-en-1-ol	5.89	1119	0.04	7.70*	1522	4.63
allo-Ocimene	6.06	1130	0.08	5.14	1331	0.08
Benzeneacetonitrile	6.12	1134	0.07	11.48*	1838	[0.19]
neo-allo-Ocimene	6.17	1137	0.04	5.40	1350	0.02
Lilac aldehyde A	6.27	1144	0.01			
Borneol	6.59	1165	0.02	9.26*	1647	4.47
Terpinen-4-ol	6.73	1174	0.08	8.05	1550	0.10
α-Terpineol	6.99	1191	4.45	9.26*	1647	[4.47]
Myrtenol	7.03	1193	0.04	10.44	1747	0.10
Safranal	7.10	1198	0.02	8.40	1578	0.01
Lilac alcohol A	7.17	1203	0.01	9.42	1660	0.01

Laboratoire PhytoChemia

Plus que des analyses... des conseils

Compound	RT	RI	%	RT	RI	%
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	7.31	1212	0.03	10.80	1778	0.03
Nerol	7.58	1231	0.88	10.51	1752	0.84
Citronellol	7.65	1236	0.02	10.20	1726	0.01
Neral	7.74	1242	0.03	8.97	1623	0.01
(trans?)-Linalool oxide acetate (fur.)?	8.03*	1262	6.54	8.27	1568	0.02
Linalyl acetate	8.03*	1262	[6.54]	7.70*	1522	[4.63]
Geraniol	8.03*	1262	[6.54]	11.08*	1802	1.98
Geranial	8.17	1272	0.01	9.57*	1673	0.10
Indole	8.48	1293	0.24	16.49	2339	0.26
Methyl anthranilate	9.13	1333	0.40	14.67	2145	0.40
α-Terpinyl acetate	9.31	1347	0.04	9.18	1641	0.03
Eugenol	9.41	1354	0.14	14.21	2098	0.08
8-Hydroxylinalool isomer	9.51	1361	0.01	15.70	2253	0.01
Neryl acetate	9.58	1366	1.28	9.68	1682	1.26
α-Copaene	9.65	1371	0.01	6.66	1443	0.01
Geranyl acetate	9.86	1386	2.47	10.05	1713	2.49
β-Elemene	9.90	1388	0.01	7.91	1539	0.01
(Z)-Jasmone	9.97	1394	0.01	11.82	1869	0.02
Dimethyl anthranilate	10.07	1400	0.01	13.14	1993	0.02
β-Caryophyllene	10.22	1412	0.51	7.98	1544	0.50
α-Humulene	10.68	1446	0.03	8.81	1610	0.02
Geranylacetone	10.76	1452	0.02	11.08*	1802	[1.98]
(E)-β-Farnesene	10.84	1458	0.03	9.12	1635	0.04
Germacrene D	11.06	1474	0.02	9.26*	1647	[4.47]
Bicyclogermacrene	11.26	1490	0.07	9.57*	1673	[0.10]
(3Z,6E)-α-Farnesene	11.36	1497	0.01	9.82	1694	0.01
δ-Cadinene	11.65	1519	0.01	9.94	1704	0.01
α-Elemol	11.97	1545	0.02	13.49	2026	0.04
(E)-Nerolidol	12.22	1564	1.57	13.27	2005	1.56
Spathulenol	12.28	1570	0.01	13.82	2059	0.02
Caryophyllene oxide	12.34	1574	0.02	12.22	1906	0.03
Viridiflorol	12.42	1581	0.01	13.43	2020	0.02
α-Cadinol	13.26	1648	0.01	14.90	2169	0.01
α-Bisabolol	13.63	1680	0.01	14.82	2160	0.01
(2E,6Z)-Farnesol	13.85	1698	0.02	15.87	2271	0.02
(2E,6E)-Farnesol	14.13	1722	1.41	16.26	2314	1.43
(2E,6E)-Farnesal	14.34	1740	0.02	15.27	2207	0.02
(2E,6E)-Farnesyl acetate	15.50	1843	0.02	15.40	2221	0.09
Phytol	18.32	2114	0.01	18.50	2572	0.01
Tricosane	20.12	2305	0.03			
Pentacosane	21.87	2504	0.02			
Heptacosane	23.50	2704	0.01			
Total identified		94.57%			93.73%	
Total reported		94.57%			93.73%	

*: Two or more compounds are coeluting on this column
[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
R.T.: Retention time (minutes)
R.I.: Retention index

Laboratoire
PhytoChemia

Plus que des analyses... des conseils

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com