



GC/MS BATCH NUMBER: G50106

ESSENTIAL OIL: GRAPEFRUIT PINK
BOTANICAL NAME: CITRUS X PARADISI
ORIGIN: SOUTH AFRICA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF GRAPEFRUIT PINK OIL	%
LIMONENE + B-PHELLANDRENE	94.2
MYRCENE	1.6

Comments from Robert Tisserand: Sparkling fresh, sweet-citrus odor quality. Nine of ten key ISO constituents are within range, with neral marginally high - not a concern.

Date : February 23, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B12-PTH8-1-CC

Customer identification : Grapefruit Pink - South Africa - G5010681R

Type : Essential oil

Source : *Citrus x paradisi* cv. Red

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sarah-Eve Tremblay, M. Sc. A., Chimiste

Analysis date : February 20, 2018

Checked and approved by :



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

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This report is digitally signed, it is only considered valid if the digital signature is intact.

PHYSICOCHEMICAL DATA

Physical aspect: Bright orange liquid

Refractive index: 1.4725 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetone	tr		Aliphatic ketone
Heptanal	tr	tr	Aliphatic aldehyde
α -Thujene	tr	tr	Monoterpene
α -Pinene	0.48	0.48	Monoterpene
Camphene	tr	tr	Monoterpene
Sabinene	0.40*	0.34	Monoterpene
β -Pinene	[0.40]*	0.06	Monoterpene
Heptanol	tr	tr	Aliphatic alcohol
Myrcene	1.62	1.65	Monoterpene
α -Phellandrene	0.35	0.03	Monoterpene
Octanal	[0.35]	0.31	Aliphatic aldehyde
Δ^3 -Carene	[0.35]	0.01	Monoterpene
Limonene	94.34*	94.16*	Monoterpene
1,8-Cineole	[94.34]*	0.25	Monoterpenic ether
β -Phellandrene	[94.34]*	[94.16]*	Monoterpene
(Z)- β -Ocimene	0.01	0.06*	Monoterpene
(E)- β -Ocimene	0.09	0.09	Monoterpene
γ -Terpinene	0.06	[0.06]*	Monoterpene
<i>cis</i> -Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Octanol	0.02	0.03	Aliphatic alcohol
Terpinolene	tr	0.01	Monoterpene
Linalool	0.08	0.08	Monoterpenic alcohol
Nonanal	0.04	0.04	Aliphatic aldehyde
Heptyl acetate	tr	tr	Aliphatic ester
(E)-4,8-Dimethylnona-1,3,7-triene	tr	0.01	Terpene derivative
<i>trans</i> -para-Mentha-2,8-dien-1-ol	0.01	0.01	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.01	0.01	Monoterpenic ether
<i>cis</i> -para-Mentha-2,8-dien-1-ol	0.02	0.02*	Monoterpenic alcohol
(E)-Myroxide	tr	0.06*	Monoterpenic ether
Citronellal	0.05	0.05	Monoterpenic aldehyde
Terpinen-4-ol	0.01	tr	Monoterpenic alcohol
Cryptone	tr	tr	Normonoterpenic ketone
α -Terpineol	0.07	0.10*	Monoterpenic alcohol
<i>trans</i> -Isopiperitenol	0.01	tr	Monoterpenic alcohol
Decanal	0.29	0.28	Aliphatic aldehyde
Octyl acetate	0.03	0.04	Aliphatic ester
<i>trans</i> -Carveol	0.01	0.01	Monoterpenic alcohol
Carvone	0.08*	0.01*	Monoterpenic ketone
Neral	[0.08]*	0.09	Monoterpenic aldehyde
Geranial	0.09	0.08	Monoterpenic aldehyde
<i>cis</i> -para-Mentha-2,8-diene-1-hydroperoxide	tr		Monoterpenic peroxide
α -Terpinyl acetate	0.01	0.02	Monoterpenic ester
Limonene hydroperoxide IV	tr		Monoterpenic peroxide
Neryl acetate	tr	0.01	Monoterpenic ester
<i>trans</i> -para-Mentha-6,8-diene-2-hydroperoxide	0.05*		Monoterpenic peroxide
α -Copaene	[0.05]*	[0.06]*	Sesquiterpene

Geranyl acetate	0.08*	0.06	Monoterpenic ester
β-Cubebene	[0.08]*	0.03	Sesquiterpene
β-Elemene	0.02	0.25*	Sesquiterpene
Dodecanal	0.04	0.03	Aliphatic aldehyde
β-Caryophyllene	0.25	[0.25]*	Sesquiterpene
α-Humulene	0.05	0.05	Sesquiterpene
(E)-β-Farnesene	0.05	[0.02]*	Sesquiterpene
Germacrene D	0.05	[0.10]*	Sesquiterpene
Bicyclogermacrene	0.01	[0.01]*	Sesquiterpene
α-Murolene	0.01	0.02	Sesquiterpene
Cubebol	0.01	tr	Sesquiterpenic alcohol
δ-Cadinene	0.07	0.06	Sesquiterpene
α-Elemol	0.01	0.01	Sesquiterpenic alcohol
(E)-Nerolidol	tr	0.01	Sesquiterpenic alcohol
Germacrene D-4-ol	0.01	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	tr	Sesquiterpenic ether
β-Sinensal	0.01	0.01	Sesquiterpenic aldehyde
Myristic acid	0.03	0.04	Aliphatic acid
Nootkatone	0.09	0.09	Sesquiterpenic ketone
Palmitic acid	0.05	0.06	Aliphatic acid
Bergapten	tr		Furanocoumarin
Osthole	0.01		Coumarin
Linoleic acid	0.01		Aliphatic acid
Oleic acid	0.02		Aliphatic acid
cis-Vaccenic acid?	0.03	0.04	Aliphatic acid
Stearic acid	0.08	0.09	Aliphatic acid
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	tr		Coumarin
Isoauraptene	0.02		Coumarin
Meranzin	0.04		Coumarin
Auraptanol	0.01		Coumarin
Auraptene	0.12		Coumarin
Epoxyauraptene	0.04		Coumarin
Tangeretin	0.01		Flavonoid
Total identified	99.52%	99.31%	

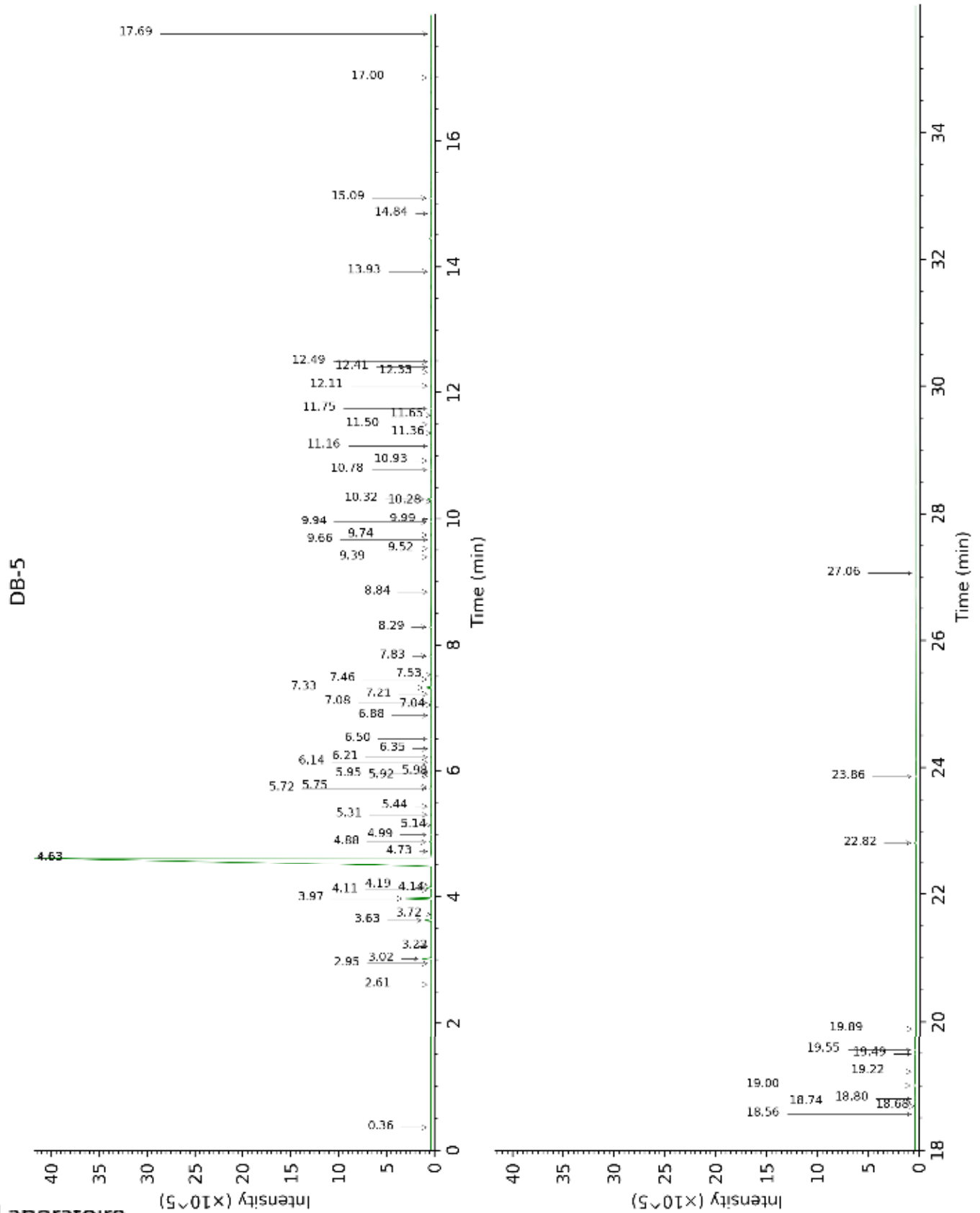
*: Two or more compounds are coeluting on this column

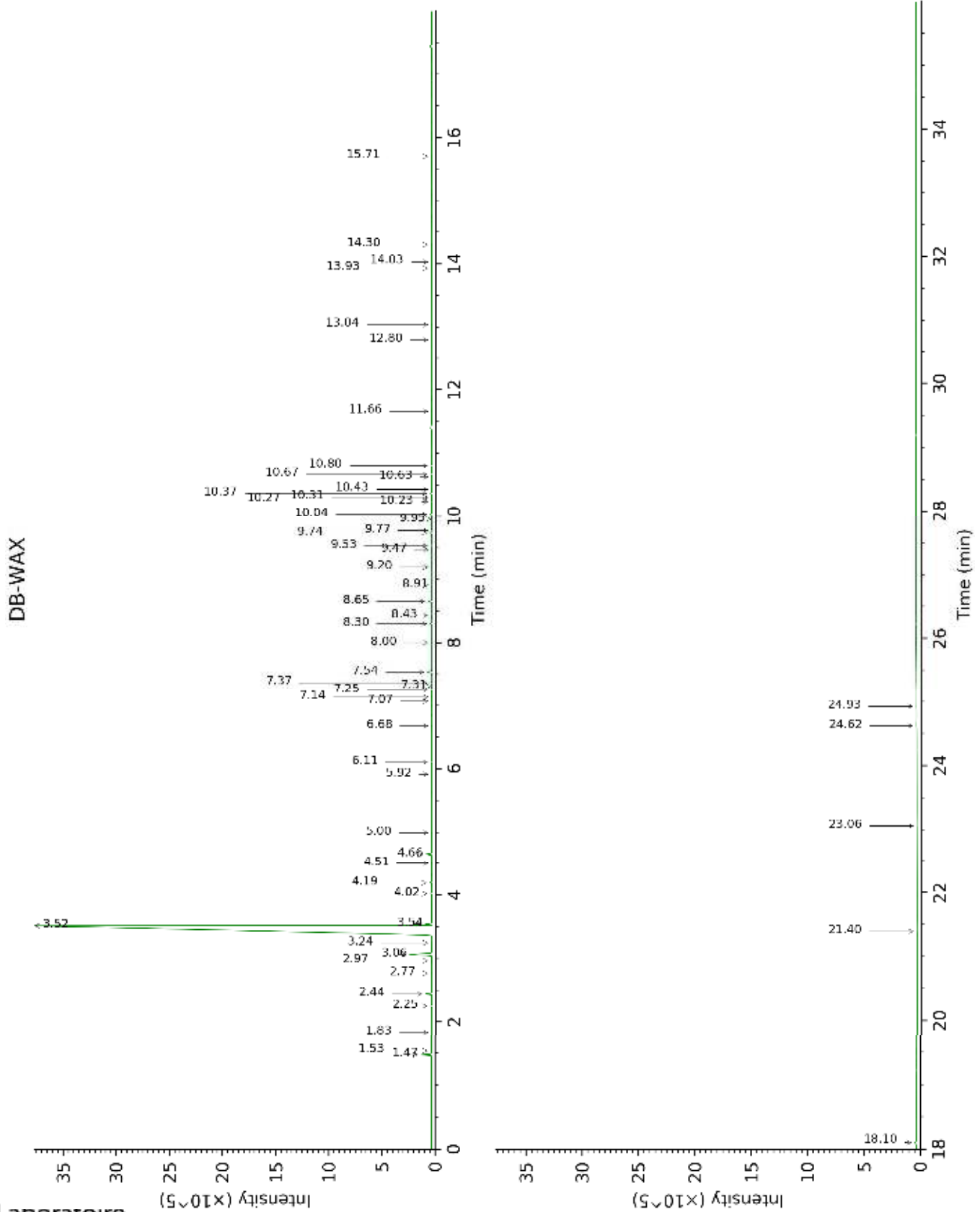
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetone	0.36	495	tr			
Heptanal	2.61	898	tr	3.24	1149	tr
α -Thujene	2.95	921	tr	1.54	1001	tr
α -Pinene	3.02	926	0.48	1.47	995	0.48
Camphene	3.22	939	tr	1.83	1030	tr
Sabinene	3.63*	966	0.40	2.44	1087	0.34
β -Pinene	3.63*	966	[0.40]	2.25	1069	0.06
Heptanol	3.72	972	tr	7.07	1425	tr
Myrcene	3.97	989	1.62	3.06	1135	1.65
α -Phellandrene	4.11†	998	0.35	2.97	1128	0.03
Octanal	4.14†	1000	[0.35]	4.66	1252	0.31
Δ^3 -Carene	4.19†	1003	[0.35]	2.76	1112	0.01
Limonene	4.63*	1031	94.34	3.52*	1170	94.16
1,8-Cineole	4.63*	1031	[94.34]	3.54	1172	0.25
β -Phellandrene	4.63*	1031	[94.34]	3.52*	1170	[94.16]
(Z)- β -Ocimene	4.73	1037	0.01	4.02*	1207	0.06
(E)- β -Ocimene	4.88	1046	0.09	4.19	1219	0.09
γ -Terpinene	4.99	1054	0.06	4.02*	1207	[0.06]
<i>cis</i> -Sabinene hydrate	5.14	1063	0.01	7.14	1430	0.01
Octanol	5.31	1073	0.02	8.43	1527	0.03
Terpinolene	5.44	1082	tr	4.51	1241	0.01
Linalool	5.72	1099	0.08	8.30	1517	0.08
Nonanal	5.75	1101	0.04	6.11	1355	0.04
Heptyl acetate	5.92	1112	tr	5.92	1342	tr
(E)-4,8-Dimethylnona-1,3,7-triene	5.95	1114	tr	5.00	1276	0.01
<i>trans</i> -para-Mentha-2,8-dien-1-ol	5.98	1116	0.01	9.20	1586	0.01
<i>cis</i> -Limonene oxide	6.14	1126	0.01	6.68	1396	0.01
<i>cis</i> -para-Mentha-2,8-dien-1-ol	6.22	1131	0.02	9.77*	1632	0.02
(E)-Myroxide	6.35	1139	tr	7.37*	1447	0.06
Citronellal	6.50	1149	0.05	7.25	1438	0.05
Terpinen-4-ol	6.88	1173	0.01	8.91	1564	tr
Cryptone	7.04	1184	tr	9.47	1608	tr
α -Terpineol	7.08	1186	0.07	10.04*	1653	0.10
<i>trans</i> -Isopiperitenol	7.21	1195	0.01	10.63	1701	tr
Decanal	7.33	1202	0.29	7.54	1460	0.28
Octyl acetate	7.46	1211	0.03	7.31	1443	0.04
<i>trans</i> -Carveol	7.53	1216	0.01	11.66	1788	0.01
Carvone	7.83*	1235	0.08	10.31*	1675	0.01
Neral	7.83*	1235	[0.08]	9.74	1629	0.09
Geranial	8.28	1266	0.09	10.37	1680	0.08
<i>cis</i> -para-Mentha-2,8-diene-1-hydroperoxide	8.84	1303	tr			
α -Terpinyl acetate	9.39	1342	0.01	9.95	1646	0.02
Limonene hydroperoxide IV	9.52	1351	tr			

Neryl acetate	9.66	1361	tr	10.43	1685	0.01
<i>trans</i> -para-Mentha-6,8-diene-2-hydroperoxide	9.74*	1366	0.05			
α -Copaene	9.74*	1366	[0.05]	7.37*	1447	[0.06]
Geranyl acetate	9.94*	1381	0.08	10.80	1716	0.06
β -Cubebene	9.94*	1381	[0.08]	8.00	1494	0.03
β -Elemene	9.99	1384	0.02	8.65*	1544	0.25
Dodecanal	10.28	1405	0.04	10.23	1669	0.03
β -Caryophyllene	10.32	1408	0.25	8.65*	1544	[0.25]
α -Humulene	10.78	1442	0.05	9.53	1612	0.05
(<i>E</i>)- β -Farnesene	10.92	1452	0.05	9.77*	1632	[0.02]
Germacrene D	11.16	1470	0.05	10.04*	1653	[0.10]
Bicyclogermacrene	11.36	1485	0.01	10.31*	1675	[0.01]
α -Muurolene	11.50	1495	0.01	10.27	1672	0.02
Cubebol	11.65	1506	0.01	12.80	1888	tr
δ -Cadinene	11.75	1514	0.07	10.67	1705	0.06
α -Elemol	12.11	1542	0.01	14.30	2028	0.01
(<i>E</i>)-Nerolidol	12.33	1560	tr	14.03	2002	0.01
Germacrene D-4-ol	12.41	1566	0.01	13.93	1992	0.01
Caryophyllene oxide	12.49	1572	0.01	13.04	1910	tr
β -Sinensal	13.93	1689	0.01	15.71	2165	0.01
Myristic acid	14.84	1768	0.03	21.40	2809	0.04
Nootkatone	15.09	1789	0.09	18.10	2418	0.09
Palmitic acid	17.00	1965	0.05	23.06	3026	0.06
Bergapten	17.69	2032	tr			
Osthole	18.56	2118	0.01			
Linoleic acid	18.68	2131	0.01			
Oleic acid	18.74	2137	0.02			
<i>cis</i> -Vaccenic acid?	18.80	2142	0.03	24.93	3289	0.04
Stearic acid	19.00	2164	0.08	24.62	3245	0.09
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	19.22	2186	tr			
Isoauraptene	19.49	2214	0.02			
Meranzin	19.55	2221	0.04			
Auraptenol	19.89	2258	0.01			
Auraptene	22.82	2594	0.12			
Epoxyaurapten	23.86	2724	0.04			
Tangeretin	27.06	3138	0.01			
Total identified		99.52%			99.31%	
Total reported		99.52%			99.31%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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