

Date : May 22, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18E08-NAD3-1-CC

Customer identification : Grapefruit Oil Pink - R122257-04

Type : Essential oil

Source : *Citrus x paradisi* cv. Pink

Customer : TrulQ Global, LLC

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 : Benoit Roger, Ph. D.

Analysis date : May 15, 2018

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Bright orange liquid

Refractive index: 1.4728 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Toluene	tr	tr*	Simple phenolic
Heptanal	tr	tr	Aliphatic aldehyde
α -Thujene	tr	[tr]*	Monoterpene
α -Pinene	0.45	0.45	Monoterpene
Camphene	tr	tr	Monoterpene
β -Pinene	0.39*	0.06	Monoterpene
Sabinene	[0.39]*	0.33	Monoterpene
Heptanol	tr	tr*	Aliphatic alcohol
Myrcene	1.59	1.60	Monoterpene
Octanal	0.33*	0.31	Aliphatic aldehyde
α -Phellandrene	[0.33]*	0.03	Monoterpene
Δ 3-Carene	0.01		Monoterpene
Limonene	94.32*	94.35	Monoterpene
1,8-Cineole	[94.32]*	0.21*	Monoterpenic ether
β -Phellandrene	[94.32]*	[0.21]*	Monoterpene
para-Cymene	[94.32]*	0.06	Monoterpene
(Z)- β -Ocimene	0.01	0.01	Monoterpene
(E)- β -Ocimene	0.09	0.09	Monoterpene
γ -Terpinene	0.06	0.06	Monoterpene
cis-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Octanol	0.03	0.03	Aliphatic alcohol
Terpinolene	0.01	0.01	Monoterpene
6,7-Epoxymyrcene	tr	tr	Monoterpenic ether
Linalool	0.08	0.08	Monoterpenic alcohol
Nonanal	0.05	0.04	Aliphatic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.01	0.01	Monoterpenic alcohol
cis-Limonene oxide	0.01	0.01	Monoterpenic ether
cis-para-Mentha-2,8-dien-1-ol	0.01	0.08*	Monoterpenic alcohol
(Z)-Myroxide	0.01*	[tr]*	Monoterpenic ether
trans-Limonene oxide	[0.01]*	0.01	Monoterpenic ether
(E)-Myroxide	tr	0.04*	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	0.11*	Monoterpenic alcohol
trans-Isopiperitenol	tr	tr	Monoterpenic alcohol
Decanal	0.32	0.30	Aliphatic aldehyde
Octyl acetate	0.04	[0.04]*	Aliphatic ester
trans-Carveol	tr	0.01	Monoterpenic alcohol
Neral	0.08	[0.08]*	Monoterpenic aldehyde
Geranial	0.09	0.09	Monoterpenic aldehyde
Undecanal	0.01	tr	Aliphatic aldehyde
α -Terpinyl acetate	0.01	0.02	Monoterpenic ester
Limonene hydroperoxide IV	tr		Monoterpenic peroxide
Neryl acetate	tr	0.01	Monoterpenic ester
α -Copaene	0.06	0.06	Sesquiterpene
Geranyl acetate	0.09*	0.06	Monoterpenic ester
β -Cubebene	[0.09]*	0.04	Sesquiterpene

β-Elemene	0.02	0.28*	Sesquiterpene
Dodecanal	0.05	0.05	Aliphatic aldehyde
β-Caryophyllene	0.28	[0.28]*	Sesquiterpene
α-Humulene	0.06	0.05	Sesquiterpene
(E)-β-Farnesene	0.02	0.02	Sesquiterpene
Germacrene D	0.04	[0.11]*	Sesquiterpene
Bicyclogermacrene	0.01	0.02*	Sesquiterpene
α-Murolene	0.01	[0.02]*	Sesquiterpene
Cubebol	tr	tr	Sesquiterpenic alcohol
δ-Cadinene	0.07	0.07	Sesquiterpene
α-Elemol	0.01	0.02	Sesquiterpenic alcohol
(E)-Nerolidol	tr	tr	Sesquiterpenic alcohol
Germacrene D-4-ol	0.02	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	0.01	Sesquiterpenic ether
β-Sinensal	0.01	0.01	Sesquiterpenic aldehyde
Myristic acid	0.03	0.03	Aliphatic acid
Nootkatone	0.10	0.10	Sesquiterpenic ketone
Palmitic acid	0.04	0.04	Aliphatic acid
Bergapten	tr		Furanocoumarin
Osthole	0.01		Coumarin
Linoleic acid	0.01	0.01	Aliphatic acid
Oleic acid	0.02	0.01	Aliphatic acid
Stearic acid	0.05	0.01	Aliphatic acid
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	tr		Coumarin
Isoauraptene	0.02		Coumarin
Meranzin	0.04		Coumarin
Auraptenol	0.01		Coumarin
Auraptene	0.10		Coumarin
Epoxyaurapten	0.04		Coumarin
Tangeretin	0.01		Flavonoid
Total identified	99.39%	99.37%	

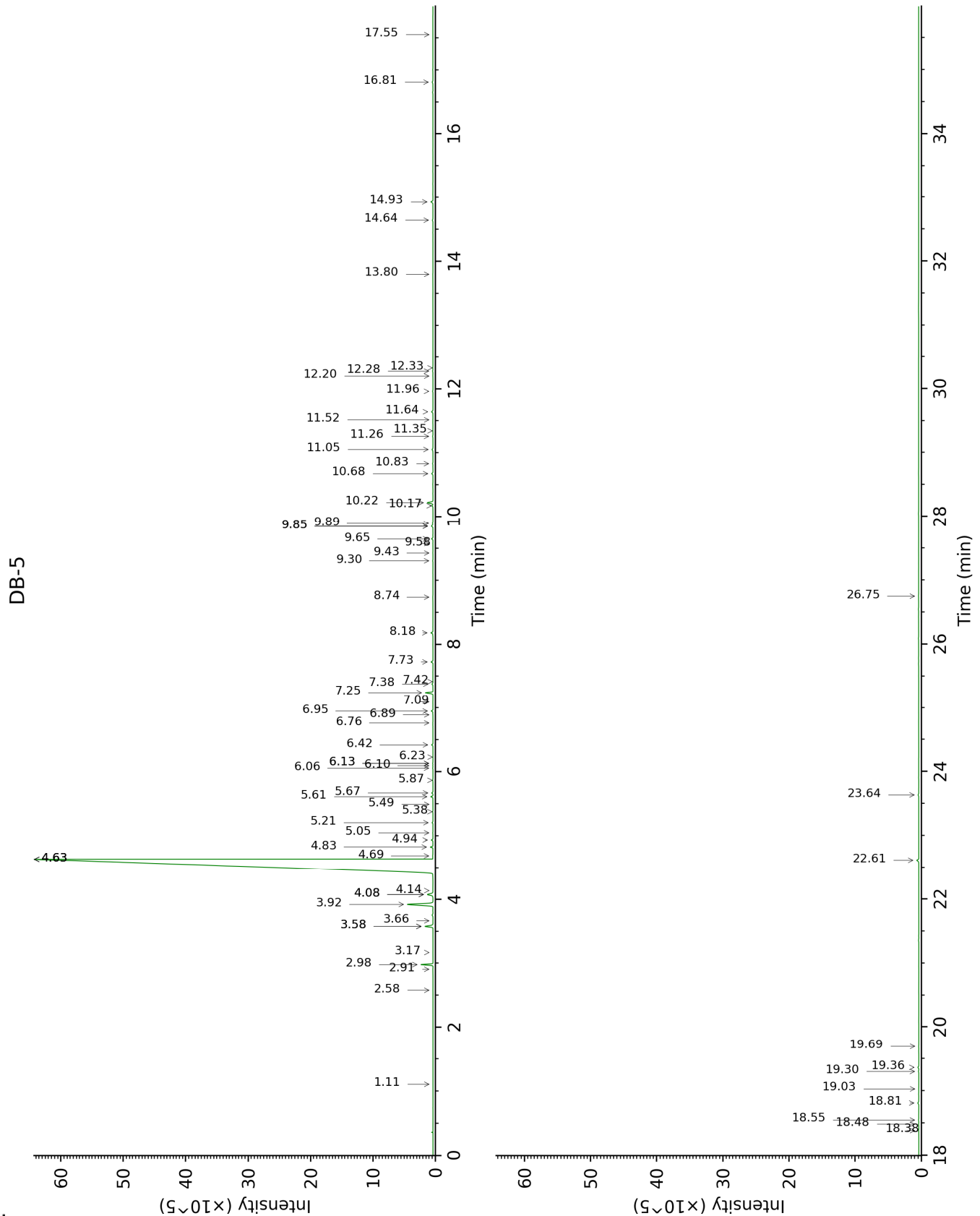
*: Two or more compounds are coeluting on this column

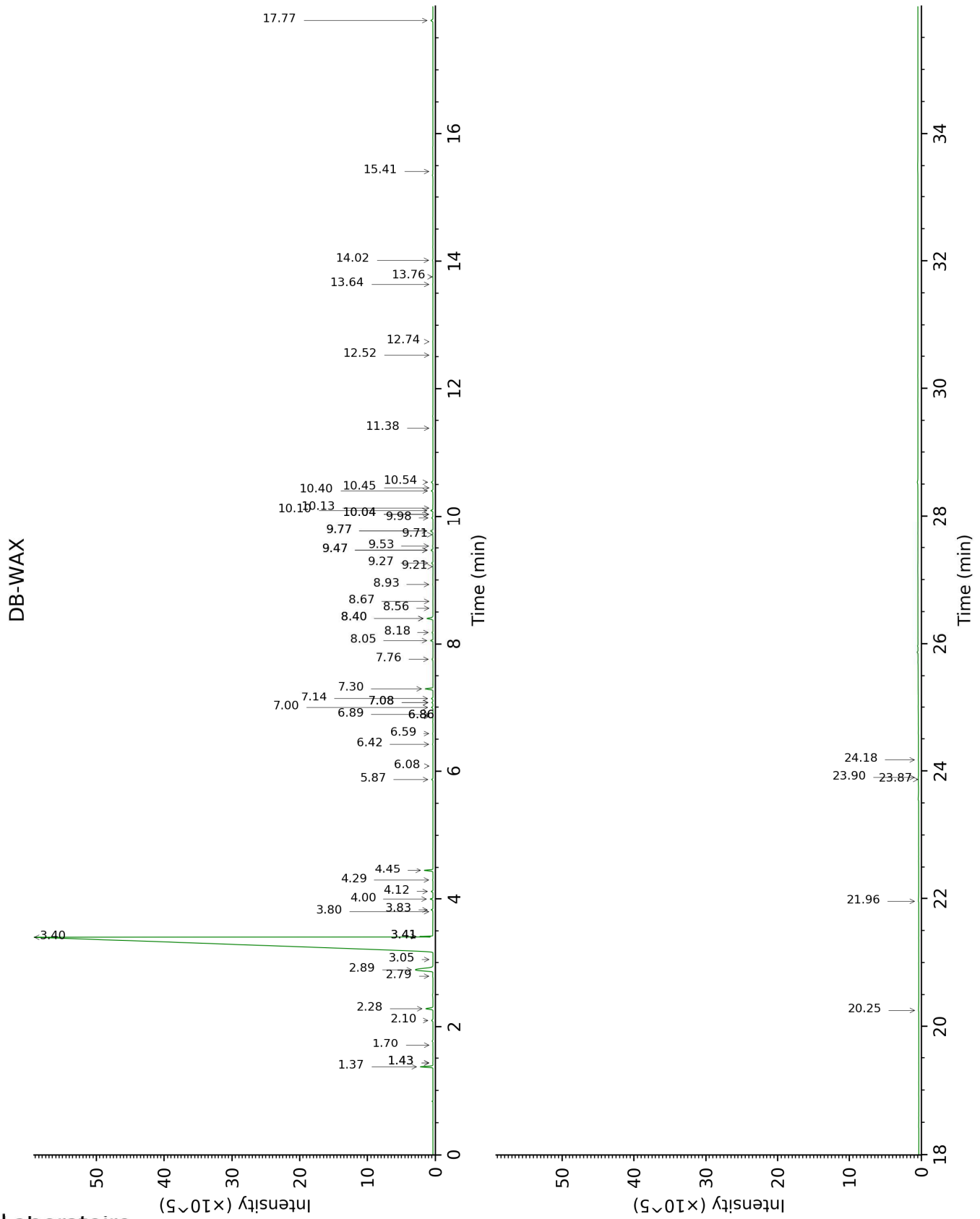
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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	%
Toluene	1.11	752	tr	1.43*	1001	tr
Heptanal	2.58	899	tr	3.05	1148	tr
α -Thujene	2.91	922	tr	1.43*	1001	[tr]
α -Pinene	2.98	926	0.45	1.37	992	0.45
Camphene	3.17	939	tr	1.70	1028	tr
β -Pinene	3.58*	967	0.39	2.10	1068	0.06
Sabinene	3.58*	967	[0.39]	2.28	1086	0.33
Heptanol	3.66	973	tr	6.86*	1426	tr
Myrcene	3.92	990	1.59	2.89	1136	1.60
Octanal	4.08*	1000	0.33	4.44	1251	0.31
α -Phellandrene	4.08*	1000	[0.33]	2.79	1128	0.03
Δ 3-Carene	4.14	1004	0.01			
Limonene	4.63*	1036	94.32	3.40	1175	94.35
1,8-Cineole	4.63*	1036	[94.32]	3.41*	1176	0.21
β -Phellandrene	4.63*	1036	[94.32]	3.41*	1176	[0.21]
para-Cymene	4.63*	1036	[94.32]	4.12	1228	0.06
(Z)- β -Ocimene	4.69	1039	0.01	3.80	1205	0.01
(E)- β -Ocimene	4.83	1048	0.09	4.00	1219	0.09
γ -Terpinene	4.94	1055	0.06	3.83	1207	0.06
cis-Sabinene hydrate	5.05	1062	0.01	6.89	1428	0.01
Octanol	5.21	1072	0.03	8.18	1525	0.03
Terpinolene	5.38	1083	0.01	4.29	1240	0.01
6,7-Epoxymyrcene	5.49	1090	tr	6.08	1369	tr
Linalool	5.61	1098	0.08	8.06	1515	0.08
Nonanal	5.67	1101	0.05	5.87	1354	0.04
trans-para-Mentha-2,8-dien-1-ol	5.87	1114	0.01	8.93	1583	0.01
cis-Limonene oxide	6.06	1126	0.01	6.42	1393	0.01
cis-para-Mentha-2,8-dien-1-ol	6.10	1129	0.01	9.47*	1626	0.08
(Z)-Myroxide	6.13*	1131	0.01	6.86*	1426	[tr]
trans-Limonene oxide	6.13*	1131	[0.01]	6.59	1406	0.01
(E)-Myroxide	6.23	1137	tr	7.08*	1442	0.04
Citronellal	6.42	1150	0.05	7.00	1436	0.05
Terpinen-4-ol	6.76	1172	0.01	8.56	1554	tr
Cryptone	6.89	1180	tr	9.21	1605	tr
α -Terpineol	6.95	1184	0.07	9.77*	1650	0.11
trans-Isopiperitenol	7.09	1193	tr	10.45	1706	tr
Decanal	7.24	1203	0.32	7.30	1458	0.30
Octyl acetate	7.38	1212	0.04	7.08*	1442	[0.04]
trans-Carveol	7.42	1214	tr	11.38	1785	0.01
Neral	7.73	1235	0.08	9.47*	1626	[0.08]
Geranial	8.18	1266	0.09	10.10	1677	0.09
Undecanal	8.74	1303	0.01	8.67	1562	tr
α -Terpinyl acetate	9.30	1343	0.01	9.71	1645	0.02
Limonene hydroperoxide IV	9.43	1352	tr			
Neryl acetate	9.58	1363	tr	10.14	1680	0.01

α-Copaene	9.65	1368	0.06	7.14	1446	0.06
Geranyl acetate	9.85*	1382	0.09	10.54	1713	0.06
β-Cubebene	9.85*	1382	[0.09]	7.76	1492	0.04
β-Elemene	9.89	1385	0.02	8.40*	1542	0.28
Dodecanal	10.17	1405	0.05	9.98	1667	0.05
β-Caryophyllene	10.22	1409	0.28	8.40*	1542	[0.28]
α-Humulene	10.68	1443	0.06	9.26	1609	0.05
(E)-β-Farnesene	10.83	1454	0.02	9.53	1631	0.02
Germacrene D	11.05	1471	0.04	9.77*	1650	[0.11]
Bicyclogermacrene	11.26	1486	0.01	10.04*	1672	0.02
α-Muurolene	11.34	1493	0.01	10.04*	1672	[0.02]
Cubebol	11.52	1506	tr	12.52	1885	tr
δ-Cadinene	11.64	1516	0.07	10.40	1702	0.07
α-Elemol	11.96	1541	0.01	14.02	2024	0.02
(E)-Nerolidol	12.20	1560	tr	13.76	1999	tr
Germacrene D-4-ol	12.28	1566	0.02	13.64	1988	0.01
Caryophyllene oxide	12.33	1570	0.01	12.74	1905	0.01
β-Sinensal	13.80	1690	0.01	15.41	2161	0.01
Myristic acid	14.64	1763	0.03	20.25	2700	0.03
Nootkatone	14.93	1788	0.10	17.77	2411	0.10
Palmitic acid	16.81	1961	0.04	21.96	2916	0.04
Bergapten	17.55	2033	tr			
Osthole	18.38	2117	0.01			
Linoleic acid	18.48	2127	0.01	24.18	3220	0.01
Oleic acid	18.55	2134	0.02	23.87	3176	0.01
Stearic acid	18.81	2161	0.05	23.90	3181	0.01
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	19.03	2184	tr			
Isoauraptene	19.30	2213	0.02			
Meranzin	19.36	2220	0.04			
Auraptanol	19.69	2255	0.01			
Auraptene	22.61	2592	0.10			
Epoxyauraptene	23.64	2721	0.04			
Tangeretin	26.75	3136	0.01			
Total identified		99.39%			99.37%	
Total reported		99.39%			99.37%	

*: 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

R.T.: Retention time (minutes)

R.I.: Retention index