

**Date :** December 11, 2018

**CERTIFICATE OF ANALYSIS – GC PROFILING**

**SAMPLE IDENTIFICATION**

**Internal code :** 18L10-PTH02-1-CC

**Customer identification :** Peru Balsam - El Salvador - PN0101811R

**Type :** Resin

**Source :** *Myroxylon balsamum*

**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 :** Sylvain Mercier, M. Sc., Chimiste

**Analysis date :** December 10, 2018

Checked and approved by :

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

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*PHYSICOCHEMICAL DATA*

**Physical aspect:** Orange viscous liquid  
**Refractive index:**  $1.5695 \pm 0.0003$  (20 °C)

*CONCLUSION*

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

## ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetic acid	tr		Aliphatic acid
Toluene	0.02	0.02	Simple phenolic
Styrene	0.02	0.02	Simple phenolic
Benzaldehyde	0.06	0.06	Simple phenolic
6-Methyl-5-hepten-2-one	tr		Aliphatic ketone
Myrcene	0.01	tr	Monoterpene
para-Cymene	0.01	tr	Monoterpene
1,8-Cineole	0.01*	tr	Monoterpenic ether
Limonene	[0.01]*	0.01	Monoterpene
Benzyl alcohol	0.82	0.86	Simple phenolic
Acetophenone	0.02	0.01	Simple phenolic
Benzyl formate	0.01	0.02	Phenolic ester
ortho-Guaiacol	0.07	0.07	Simple phenolic
Methyl benzoate	0.02	0.02	Phenolic ester
Benzyl acetate	0.01	0.01*	Phenolic ester
Ethyl benzoate	0.02	0.02	Phenolic ester
Terpinen-4-ol	0.02	0.01	Monoterpenic alcohol
4-Ethylguaiacol	0.03	0.03	Norphenylpropanoid
4-Vinylguaiacol	0.15	0.15	Simple phenolic
Unknown	0.01		Unknown
Hydrocinnamic acid	0.03	78.80*	Phenylpropanoid
Eugenol	0.02	0.02	Phenylpropanoid
Cyclosativene I	tr	tr	Sesquiterpene
$\alpha$ -Copaene	tr	tr	Sesquiterpene
Methyl ( <i>E</i> )-cinnamate	0.16	1.18*	Phenylpropanoid ester
Vanillin	0.24	0.24	Simple phenolic
Coumarin	0.02	0.02	Coumarin
( <i>E</i> )-Cinnamic acid	4.48*	4.41	Phenylpropanoid
$\gamma$ -Muurolene	[4.48]*	tr	Sesquiterpene
Ethyl ( <i>E</i> )-cinnamate	[4.48]*	0.02	Phenylpropanoid ester
( <i>E</i> )- $\beta$ -Farnesene	[4.48]*	0.12	Sesquiterpene
Geranylacetone	[4.48]*	tr	Monoterpenic ketone
( <i>E</i> )-Isoeugenol	[4.48]*	0.04*	Phenylpropanoid
Methyl ( <i>Z</i> )-isoeugenol	[4.48]	0.01	Phenylpropanoid
$\alpha$ -Selinene	0.01	0.01	Sesquiterpene
$\alpha$ -Muurolene	0.02	[0.01]*	Sesquiterpene
Unknown	0.01		Unknown
(3 <i>E</i> ,6 <i>E</i> )- $\alpha$ -Farnesene	0.09	0.06	Sesquiterpene
$\beta$ -Bisabolene	[0.09]	0.04	Sesquiterpene
Guaiacylacetone	0.22	0.22	Phenylpropanoid
( <i>E</i> )- $\gamma$ -Bisabolene	0.01	tr	Sesquiterpene
( <i>E</i> )- $\alpha$ -Bisabolene	0.02	0.02	Sesquiterpene
Unknown	0.04	0.03	Unknown
( <i>E</i> )-Nerolidol	1.12	[1.18]*	Sesquiterpenic alcohol
Unknown	0.03	0.03	Unknown
Butyrovanihone?	0.02		Phenylbutanoid
$\tau$ -Cadinol	0.01	tr	Sesquiterpenic alcohol
$\alpha$ -Cadinol	tr	tr	Sesquiterpenic alcohol

(2E,6Z)-Farnesol	0.02	[0.04]*	Sesquiterpenic alcohol
Benzyl benzoate	78.32	[78.80]*	Phenolic ester
Benzyl hydrocinnamate	0.12	0.14	Phenylpropanoid ester
Unknown	0.03		Unknown
Benzyl (Z)-cinnamate	0.31		Phenylpropanoid ester
Benzyl (E)-cinnamate	8.32	8.36	Phenylpropanoid ester
Benzyl (E)-ferulate?	0.11		Phenylpropanoid ester
Benzyl α-linolenate	0.02		Phenolic ester
1,2,2α,3,3,4,6,7,8,8α-Decahydro-2α,7,8-trimethylacenaphthylene		tr	Sesquiterpene
<b>Total identified</b>	<b>94.97%</b>	<b>95.04%</b>	

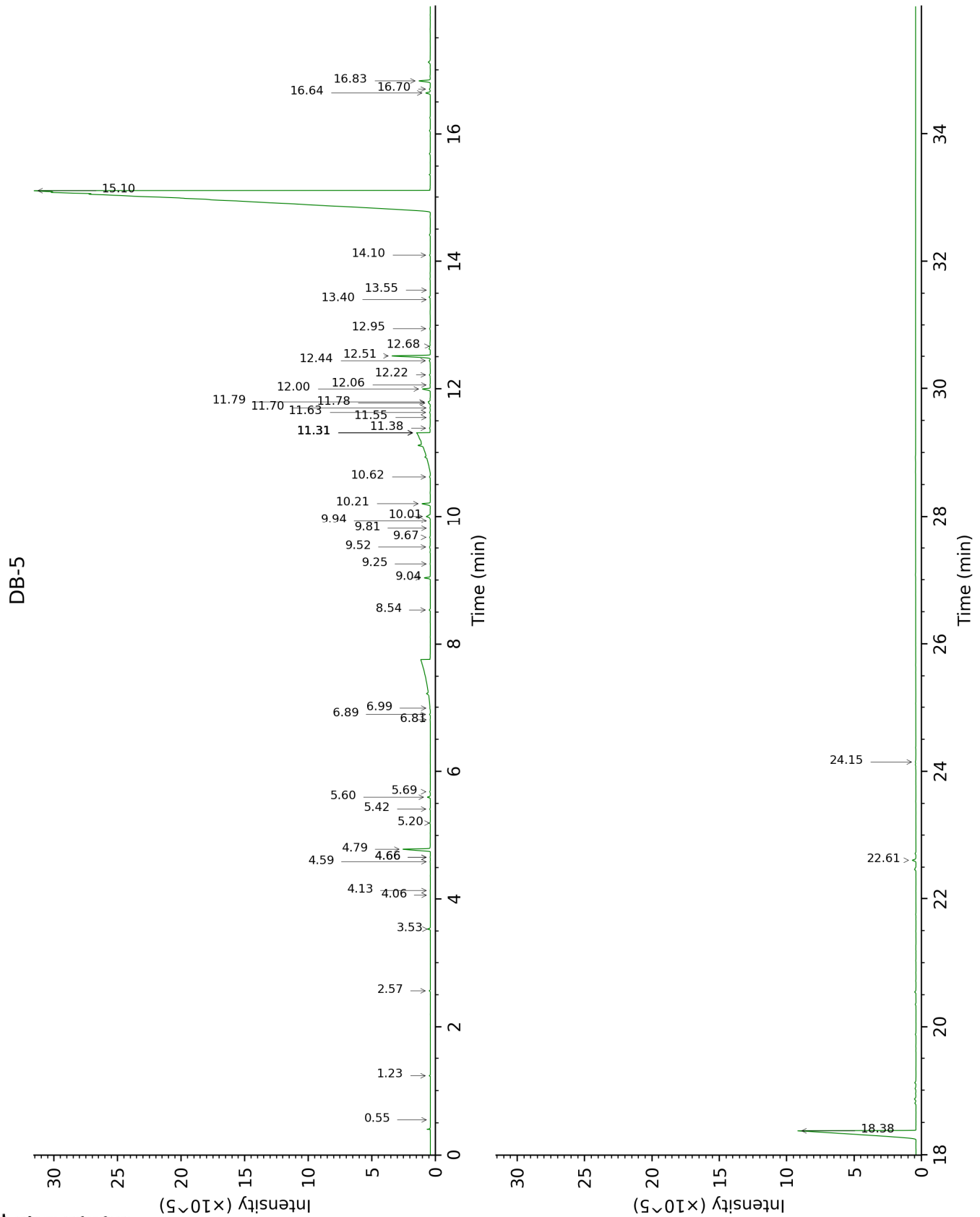
\*: Two or more compounds are coeluting on this column

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

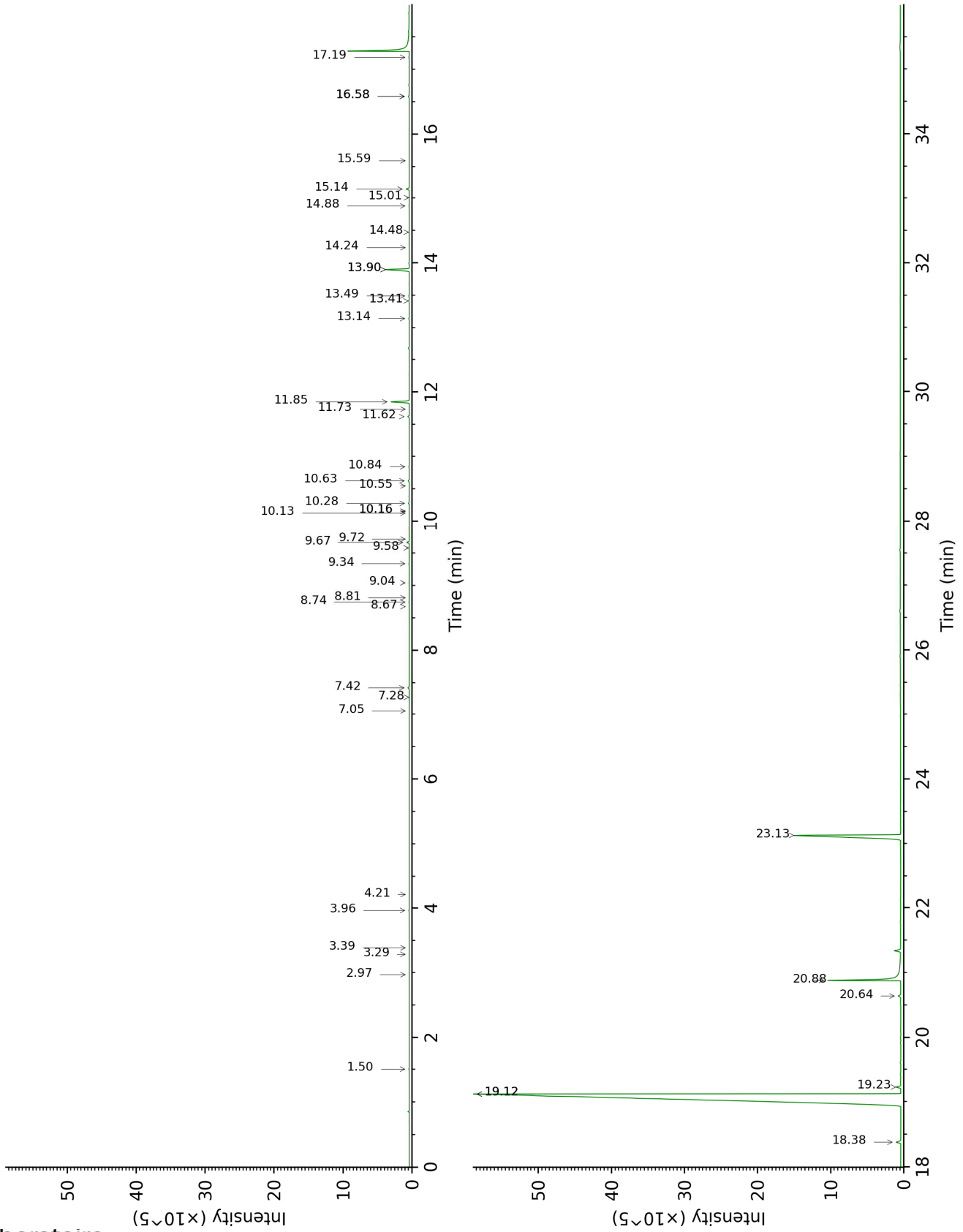
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

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DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetic acid	0.55	608	tr			
Toluene	1.23	756	0.02	1.50	1002	0.02
Styrene	2.57	884	0.02	3.96	1210	0.02
Benzaldehyde	3.53	951	0.06	7.42	1459	0.06
6-Methyl-5-hepten-2-one	4.06	986	tr			
Myrcene	4.13	991	0.01	2.97	1133	tr
para-Cymene	4.59	1020	0.01	4.21	1229	tr
1,8-Cineole	4.66*	1025	0.01	3.39	1166	tr
Limonene	4.66*	1025	[0.01]	3.29	1158	0.01
Benzyl alcohol	4.79	1033	0.82	11.85	1814	0.86
Acetophenone	5.20	1058	0.02	9.04	1582	0.01
Benzyl formate	5.42	1072	0.01	9.58	1625	0.02
ortho-Guaiacol	5.60	1084	0.07	11.62	1794	0.07
Methyl benzoate	5.69	1089	0.02	8.74	1559	0.02
Benzyl acetate	6.81	1162	0.01	10.16*	1672	0.01
Ethyl benzoate	6.89	1167	0.02	9.34	1606	0.02
Terpinen-4-ol	6.99	1174	0.02	8.67	1554	0.01
4-Ethylguaiacol	8.54	1278	0.03	13.42	1955	0.03
4-Vinylguaiacol	9.04	1306	0.15	15.14	2120	0.15
Unknown [m/z 105, 77 (59), 122 (29), 51 (18), 106 (8), 50 (8)...]	9.25	1322	0.01			
Hydrocinnamic acid	9.52	1341	0.03	19.12*	2547	78.80
Eugenol	9.67	1352	0.02	14.88	2094	0.02
Cyclosativene I	9.81	1362	tr	7.05	1432	tr
α-Copaene	9.94	1371	tr	7.28	1448	tr
Methyl (E)-cinnamate	10.00	1375	0.16	13.90*	2000	1.18
Vanillin	10.21	1390	0.24	18.38	2462	0.24
Coumarin	10.62	1420	0.02	17.19	2331	0.02
(E)-Cinnamic acid	11.31*†	1472	4.48	20.88	2758	4.41
γ-Muurolene	11.31*†	1472	[4.48]	9.72	1636	tr
Ethyl (E)-cinnamate	11.31*†	1472	[4.48]	14.48	2055	0.02
(E)-β-Farnesene	11.31*†	1472	[4.48]	9.67	1632	0.12
Geranylacetone	11.31*†	1472	[4.48]	11.73	1804	tr
(E)-Isoeugenol	11.31*†	1472	[4.48]	16.58*	2267	0.04
Methyl (Z)-isoeugenol	11.38†	1478	[4.48]	14.24	2032	0.01
α-Selinene	11.55	1490	0.01	10.13	1669	0.01
α-Muurolene	11.63	1496	0.02	10.16*	1672	[0.01]
Unknown [m/z 151, 166 (47), 77 (35), 147 (35), 105 (25), 148 (24)...]	11.70	1501	0.01			
(3E,6E)-α-Farnesene	11.78†	1507	0.09	10.63	1710	0.06
β-Bisabolene	11.80†	1509	[0.09]	10.28	1682	0.04
Guaiacylacetone	12.00	1525	0.22	19.23	2559	0.22
(E)-γ-Bisabolene	12.06	1530	0.01	10.55	1704	tr
(E)-α-Bisabolene	12.22	1542	0.02	10.84	1729	0.02
Unknown [m/z 109, 69]	12.44	1560	0.04	13.14	1930	0.03



(74), 43 (55), 41 (30), 93 (28), 55 (23)...						
(E)-Nerolidol	12.51	1566	1.12	13.90*	2000	[1.18]
Unknown [m/z 109, 69 (75), 43 (55), 41 (29), 93 (28), 55 (26), 71 (22)...	12.68	1578	0.03	13.49	1962	0.03
Butyrovanihone?	12.95	1600	0.02			
$\tau$ -Cadinol	13.40	1638	0.01	15.01	2107	tr
$\alpha$ -Cadinol	13.55	1650	tr	15.59	2165	tr
(2E,6Z)-Farnesol	14.10	1695	0.02	16.58*	2267	[0.04]
Benzyl benzoate	15.10	1783	78.32	19.12*	2547	[78.80]
Benzyl hydrocinnamate	16.64	1922	0.12	20.64	2728	0.14
Unknown [m/z 91, 107 (51), 180 (40), 105 (32), 77 (29), 57 (26)...	16.70	1928	0.03			
Benzyl (Z)-cinnamate	16.83	1940	0.31			
Benzyl (E)-cinnamate	18.38	2091	8.32	23.13	3051	8.36
Benzyl (E)-ferulate?	22.61	2558	0.11			
Benzyl $\alpha$ -linolenate	24.15	2749	0.02			
1,2,2 $\alpha$ ,3,3,4,6,7,8,8 $\alpha$ -Decahydro-2 $\alpha$ ,7,8-trimethylacenaphthylene				8.81	1564	tr
<b>Total identified</b>		<b>94.97%</b>			<b>95.04%</b>	
<b>Total reported</b>		<b>95.08%</b>			<b>95.09%</b>	

\*: 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