

**Date :** June 18, 2019

**CERTIFICATE OF ANALYSIS – GC PROFILING**

**SAMPLE IDENTIFICATION**

**Internal code :** 19F07-PTH03-1-SCC

**Customer identification :** Carrot Seed – India - C40110692R

**Type :** Essential oil

**Source :** *Daucus carota* ct. Carotol

**Customer :** Plant Therapy

**ANALYSIS**

**Method:** PC-PA-014 - 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 :** June 16, 2019

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 liquid

**Refractive index:**  $0.0000 \pm 0.0003$  (20 °C)

*CONCLUSION*

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

## ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

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

Identification	%	Classe
Acetone	tr	Aliphatic ketone
Isobutyral	tr	Aliphatic aldehyde
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Toluene	tr	Simple phenolic
Hexanal	tr	Aliphatic aldehyde
Heptanal	0.02	Aliphatic aldehyde
Hashishene	0.02	Monoterpene
$\alpha$ -Thujene	0.01	Monoterpene
$\alpha$ -Pinene	0.30	Monoterpene
Camphene	0.03	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
Sabinene	0.03	Monoterpene
$\beta$ -Pinene	0.28	Monoterpene
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Myrcene	0.26	Monoterpene
Octanal	0.02	Aliphatic aldehyde
$\Delta$ 3-Carene	tr	Monoterpene
$\alpha$ -Terpinene	tr	Monoterpene
para-Cymene	0.03	Monoterpene
Limonene	0.17	Monoterpene
$\beta$ -Phellandrene	0.01	Monoterpene
(Z)- $\beta$ -Ocimene	0.01	Monoterpene
$\gamma$ -Terpinene	0.01	Monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.01	Monoterpene
para-Cymenene	0.01	Monoterpene
trans-Linalool oxide (fur.)	tr	Monoterpenic alcohol
Linalool	0.03	Monoterpenic alcohol
Perillene	0.02	Monoterpenic ether
Nonanal	0.02	Aliphatic aldehyde
Nopinone	0.01	Normonoterpenic ketone
trans-Pinocarveol	0.05	Monoterpenic alcohol
cis-Verbenol	0.01	Monoterpenic alcohol
trans-Verbenol	0.03	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.01	Monoterpenic alcohol
Pinocavone	0.01	Monoterpenic ketone
(2E)-Nonenal	0.03	Aliphatic aldehyde
Terpinen-4-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
Myrtenal	0.01	Monoterpenic aldehyde
$\alpha$ -Terpineol	0.05	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
para-Mentha-1,5-dien-7-ol	0.02	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
trans-Carveol	0.02	Monoterpenic alcohol
cis-Carveol	0.01	Monoterpenic alcohol

Unknown	0.03	Oxygenated monoterpene
Neral	0.02	Monoterpenic aldehyde
Unknown	0.01	Unknown
Bornyl acetate	0.01	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
4-Vinylguaiacol	0.06	Simple phenolic
$\alpha$ -Terpinyl acetate	0.06	Monoterpenic ester
$\alpha$ -Cubebene	0.01	Sesquiterpene
Dehydro-ar-ionene	0.01	Miscellaneous
Neryl acetate	0.01	Monoterpenic ester
$\alpha$ -Copaene	0.01	Sesquiterpene
Daucene	2.01	Sesquiterpene
Unknown	0.27	Oxygenated sesquiterpene
Unknown	0.33	Sesquiterpene
Unknown	0.02	Unknown
Longifolene	0.04	Sesquiterpene
Sesquithujene	0.02	Sesquiterpene
$\beta$ -Caryophyllene	0.42	Sesquiterpene
<i>cis</i> - $\alpha$ -Bergamotene	0.04	Sesquiterpene
$\beta$ -Copaene	0.10	Sesquiterpene
Isosativene	0.02	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	0.11	Sesquiterpene
$\gamma$ -Elemene	0.02	Sesquiterpene
Unknown	0.37	Oxygenated sesquiterpene
Sesquisabinene A	0.14	Sesquiterpene
$\alpha$ -Humulene	0.07	Sesquiterpene
Acora-3,10(14)-diene	0.08	Sesquiterpene
Unknown	0.17	Sesquiterpene
( <i>E</i> )- $\beta$ -Farnesene	1.10	Sesquiterpene
Unknown	0.71	Sesquiterpene
$\gamma$ -Murolene	0.02	Sesquiterpene
Germacrene D	0.03	Sesquiterpene
$\beta$ -Selinene	0.04	Sesquiterpene
<i>trans</i> - $\beta$ -Bergamotene	0.11	Sesquiterpene
ar-Curcumene	0.04	Sesquiterpene
Isodaucene	0.69	Sesquiterpene
$\alpha$ -Zingiberene	0.06	Sesquiterpene
Methyl ( <i>E</i> )-isoeugenol	0.46	Phenylpropanoid
Unknown	0.16	Oxygenated sesquiterpene
$\beta$ -Bisabolene	1.69	Sesquiterpene
$\delta$ -Cadinene	0.06	Sesquiterpene
$\beta$ -Sesquiphellandrene	0.24	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.18	Sesquiterpene
Dauca-4(11),8-diene	0.03	Sesquiterpene
$\alpha$ -Cadinene	0.05	Sesquiterpene
( <i>E</i> )- $\alpha$ -Bisabolene	0.06	Sesquiterpene
Isocaryophyllene epoxide B	0.05	Sesquiterpenic ether
Unknown	0.05	Oxygenated sesquiterpene
Unknown	1.65	Oxygenated sesquiterpene
Elemicin	0.40	Phenylpropanoid
Germacrene D-4-ol	0.07	Sesquiterpenic alcohol
Caryophyllene oxide	0.53	Sesquiterpenic ether

Caryophyllene oxide isomer	0.05	Sesquiterpenic ether
Carotol	70.89	Sesquiterpenic alcohol
Humulene epoxide I	0.53	Sesquiterpenic ether
<i>trans</i> -Dauc-8-en-4 $\beta$ -ol	3.30	Sesquiterpenic alcohol
Unknown	0.40	Oxygenated sesquiterpene
Unknown	0.29	Oxygenated sesquiterpene
Unknown	0.60	Oxygenated sesquiterpene
Unknown	0.26	Oxygenated sesquiterpene
Daucol	4.33	Sesquiterpenic alcohol
Unknown	0.39	Oxygenated sesquiterpene
Unknown	0.38	Unknown
$\alpha$ -Asarone	0.04	Phenylpropanoid
Juniper camphor	0.03	Sesquiterpenic alcohol
(2Z,6E)-Farnesol	0.05	Sesquiterpenic alcohol
(2E,6E)-Farnesol	0.06	Sesquiterpenic alcohol
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Phytone	0.09	Terpenic ketone
<b>Consolidated total</b>	<b>96.58%</b>	

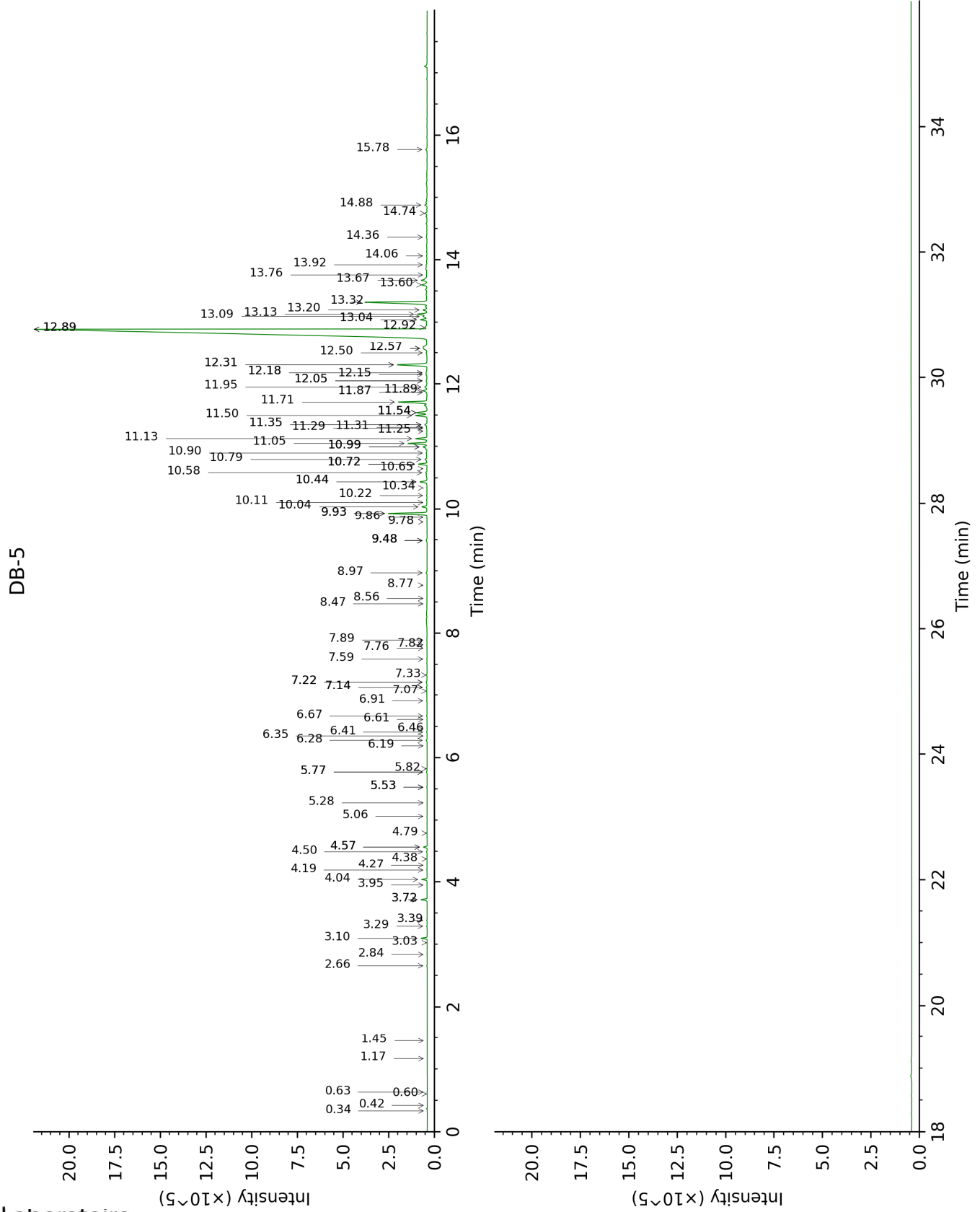
tr: The compound has been detected below 0.005% of total signal.

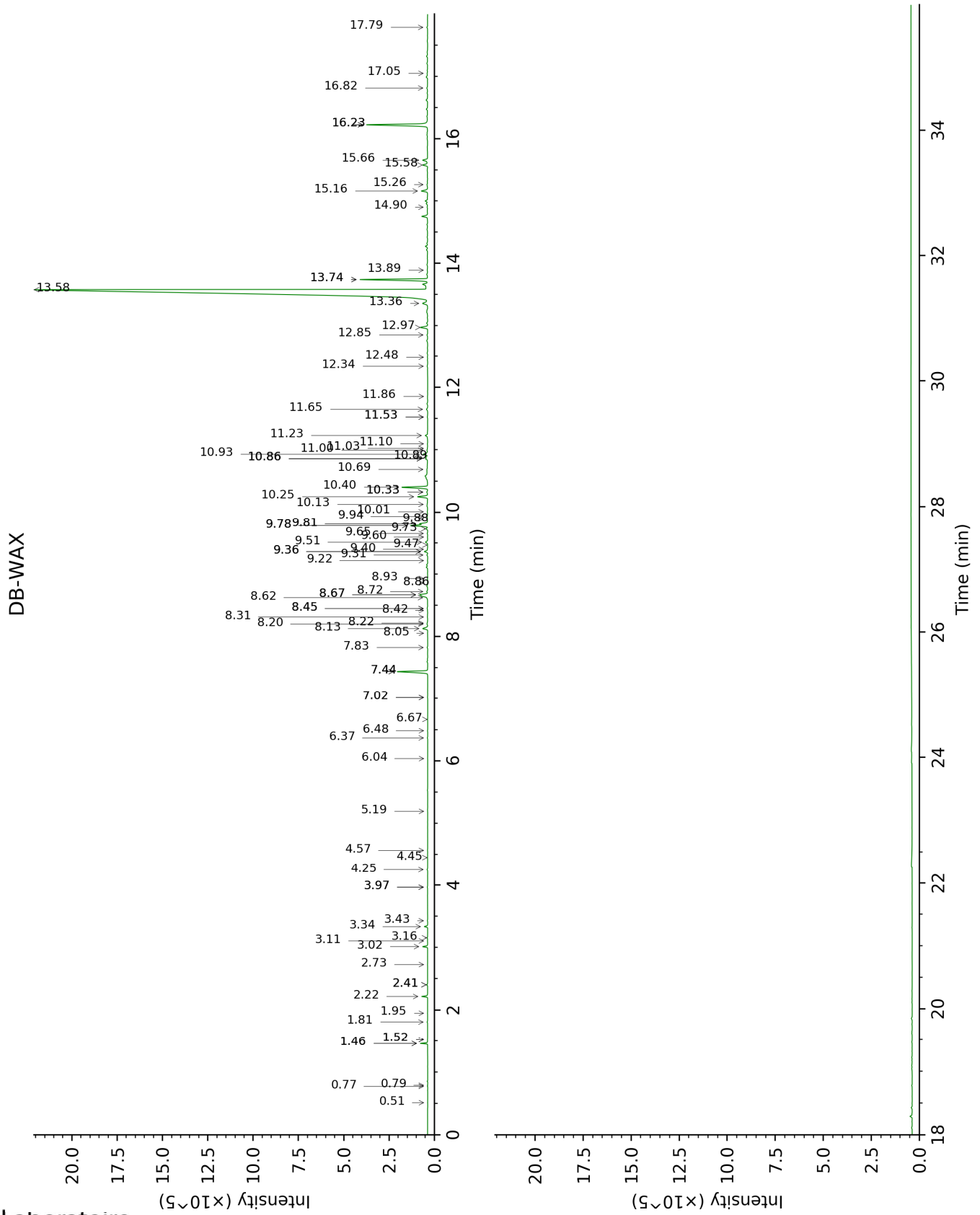
Note: no correction factor was applied

**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.

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







FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetone	0.34	512	tr	0.51	785	tr
Isobutyral	0.42	528	tr			
Isovaleral	0.60	639	0.01	0.79	887	0.01
2-Methylbutyral	0.63	650	0.01	0.77	881	0.01
Toluene	1.17	760	tr	1.52*	1002	0.01
Hexanal	1.45	800	tr	1.95	1043	0.01
Heptanal	2.66	900	0.02	3.16	1147	0.02
Hashishene	2.84	912	0.02	1.46*	996	0.28
$\alpha$ -Thujene	3.03	924	0.01	1.52*	1002	[0.01]
$\alpha$ -Pinene	3.10	929	0.30	1.46*	996	[0.28]
Camphene	3.29	942	0.03	1.81	1029	0.03
Thuja-2,4(10)-diene	3.39	948	0.02	2.41*	1087	0.05
Sabinene	3.72*	970	0.32	2.41*	1087	[0.05]
$\beta$ -Pinene	3.72*	970	[0.32]	2.22	1069	0.28
6-Methyl-5-hepten-2-one	3.95	985	0.01	5.19	1302	0.01
Myrcene	4.04	991	0.26	3.02	1136	0.24
Octanal	4.19	1001	0.02	4.57	1255	0.01
$\Delta^3$ -Carene	4.27	1006	tr	2.73	1114	0.01
$\alpha$ -Terpinene	4.38	1012	tr	3.11	1143	0.01
para-Cymene	4.50	1020	0.03	4.25	1231	0.03
Limonene	4.57*	1024	0.19	3.34	1161	0.17
$\beta$ -Phellandrene	4.57*	1024	[0.19]	3.43	1169	0.01
(Z)- $\beta$ -Ocimene	4.79	1038	0.01	3.97*	1210	0.02
$\gamma$ -Terpinene	5.06	1055	0.01	3.97*	1210	[0.02]
cis-Linalool oxide (fur.)	5.28	1069	0.01	6.66	1399	0.01
Terpinolene	5.53*	1084	0.03	4.45	1246	0.01
para-Cymenene	5.53*	1084	[0.03]	6.48	1385	0.01
trans-Linalool oxide (fur.)	5.53*	1084	[0.03]	7.02*	1425	0.02
Linalool	5.77*	1100	0.05	8.22	1516	0.03
Perillene	5.77*	1100	[0.05]	6.37	1377	0.02
Nonanal	5.82	1103	0.02	6.04	1353	0.01
Nopinone	6.19	1127	0.01	8.42	1531	0.02
trans-Pinocarveol	6.28	1132	0.05	9.31	1601	0.05
cis-Verbenol	6.35	1137	0.01	9.40	1608	0.02
trans-Verbenol	6.41	1141	0.03	9.65	1629	0.03
meta-Mentha-4,6-dien-8-ol	6.46	1144	0.01	9.47	1614	0.01
Pinocarvone	6.61	1154	0.01	8.06	1503	0.01
(2E)-Nonenal	6.67	1158	0.03	7.83	1486	0.03
Terpinen-4-ol	6.91	1173	0.02	8.72	1555	0.07
para-Cymen-8-ol	7.07	1183	0.01	11.65	1796	0.10
Myrtenal	7.14*	1188	0.03	8.86	1566	0.01
$\alpha$ -Terpineol	7.14*	1188	[0.03]	9.88	1648	0.05
Myrtenol	7.22*	1193	0.04	11.02	1743	0.02
para-Mentha-1,5-	7.22*	1193	[0.04]	11.10	1749	0.02

dien-7-ol						
Verbenone	7.33	1201	0.03	9.78*†	1639	1.58
<i>trans</i> -Carveol	7.59	1218	0.02	11.53*	1785	0.03
<i>cis</i> -Carveol	7.76	1230	0.01	11.86	1814	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.82	1234	0.03	11.53*	1785	[0.03]
Neral	7.89	1239	0.02	9.60	1624	0.02
Unknown [m/z 192, 93 (97), 177 (57), 121 (57), 91 (48), 136 (48)...]	8.47	1278	0.01			
Bornyl acetate	8.56	1284	0.01	8.45*	1534	0.05
Unknown [m/z 109, 43 (84), 134 (43), 41 (28), 151 (26), 91 (24)...]	8.77	1299	0.01			
4-Vinylguaiacol	8.97	1308	0.06	15.26	2131	0.05
$\alpha$ -Terpinyl acetate	9.48*	1344	0.08	9.94	1652	0.06
$\alpha$ -Cubebene	9.48*	1344	[0.08]	7.02*	1425	[0.02]
Dehydro-ar-ionene	9.48*	1344	[0.08]			
Neryl acetate	9.78	1365	0.01	10.33*	1684	0.08
$\alpha$ -Copaene	9.86	1370	0.01	7.44*	1457	2.02
Daucene	9.93*	1375	2.27	7.44*	1457	[2.02]
Unknown [m/z 159, 177 (67), 93 (64), 107 (55), 91 (39), 81 (38)...220(5)]	9.93*	1375	[2.27]			
Unknown [m/z 161, 91 (40), 105 (38), 79 (31), 93 (29), 119 (29)... 204 (1)]	10.04	1383	0.33	8.13	1509	0.39
Unknown [m/z 163, 43 (22), 121 (18), 164 (15), 145 (14)... 193 (2)]	10.10	1388	0.02	12.48	1870	0.03
Longifolene	10.22	1395	0.04	8.20	1514	0.05
Sesquithujene	10.34	1404	0.02	8.32	1523	0.03
$\beta$ -Caryophyllene	10.44*	1411	0.46	8.67*	1551	0.53
<i>cis</i> - $\alpha$ -Bergamotene	10.44*	1411	[0.46]	8.45*	1534	[0.05]
$\beta$ -Copaene	10.58	1422	0.10	8.62	1547	0.06
Isosativene	10.65	1427	0.02	8.93	1571	0.02
<i>trans</i> - $\alpha$ -Bergamotene	10.72*	1432	0.50	8.67*	1551	[0.53]
$\gamma$ -Elemene	10.72*	1432	[0.50]	9.22	1594	0.02
Unknown [m/z 193, 139 (95), 69 (86), 179 (84), 207 (80), 97 (76)... 222 (31)]	10.72*	1432	[0.50]			
Sesquisabinene A	10.80	1438	0.14	9.36*	1605	0.22
$\alpha$ -Humulene	10.90	1445	0.07	9.51	1618	0.16

Acora-3,10(14)-diene	11.00*	1453	0.25	9.36*	1605	[0.22]
Unknown [m/z 109, 124 (27), 79 (10), 91 (10), 145 (10)... 204? (1)]	11.00*	1453	[0.25]	10.86*†	1729	0.27
(E)-β-Farnesene	11.05	1457	1.10	9.78*†	1639	[1.58]
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.13	1462	0.71	9.81*†	1642	[1.58]
γ-Murolene	11.25	1471	0.02	9.81*†	1642	[1.58]
Germacrene D	11.29	1475	0.03	10.01	1658	0.04
β-Selinene	11.31	1476	0.04	10.13	1668	0.04
trans-β-Bergamotene	11.35*	1479	0.15	9.73	1635	0.11
ar-Curcumene	11.35*	1479	[0.15]	10.86*†	1729	[0.27]
Isodaucene	11.50	1490	0.69	10.25	1678	0.69
α-Zingiberene	11.54*	1493	0.69	10.33*	1684	[0.08]
Methyl (E)-isoeugenol	11.54*	1493	[0.69]	15.16	2121	0.46
Unknown [m/z 124, 134 (62), 43 (55), 119 (52), 71 (49), 41 (45), 109 (38), 121 (37)... 220 (14)]	11.54*	1493	[0.69]	11.23	1760	0.16
β-Bisabolene	11.71	1506	1.69	10.40	1690	1.65
δ-Cadinene	11.87†	1518	0.30	10.69	1714	0.06
β-Sesquiphellandrene	11.89†	1520	[0.30]	10.89†	1731	[0.27]
trans-Cadina-1,4-diene	11.95	1525	0.18	10.86*†	1729	[0.27]
Dauca-4(11),8-diene	12.05*	1533	0.07			
α-Cadinene	12.05*	1533	[0.07]	11.00	1740	0.05
(E)-α-Bisabolene	12.15	1540	0.06	10.93	1735	0.33
Isocaryophyllene epoxide B	12.18*	1542	0.10	12.34	1857	0.05
Unknown [m/z 121, 149 (93), 43 (71), 93 (67), 91 (65), 107 (58), 119 (56)...220 (18)]	12.18*	1542	[0.10]			
Unknown [m/z 135, 107 (92), 159 (89), 121 (84), 177 (80), 91 (79)... 220 (16)]	12.31*	1553	2.05	13.74*	1985	4.01
Elemicin	12.31*	1553	[2.05]	15.66	2172	0.40
Germacrene D-4-ol	12.50	1568	0.07	13.89	1998	0.06
Caryophyllene oxide	12.57*†	1573	0.63	12.97	1914	0.53

Caryophyllene oxide isomer	12.57*†	1573	[0.63]	12.85	1903	0.05
Carotol	12.89*†	1598	74.72	13.58	1970	70.89
Humulene epoxide I	12.89*†	1598	[74.72]	13.36	1949	0.53
<i>trans</i> -Dauc-8-en-4β-ol	12.92†	1600	[74.72]	13.74*	1985	[4.01]
Unknown [m/z 177, 159 (59), 137 (45), 109 (41), 93 (41)...222(2)]	13.04	1610	0.40			
Unknown [m/z 107, 105 (93), 119 (87), 132 (85), 43 (66), 91 (61)...218(35)]	13.09	1615	0.29			
Unknown [m/z 159, 177 (50), 93 (44), 91 (39), 105 (31), 135 (29)...222(9)]	13.13	1618	0.60			
Unknown [m/z 159, 93 (49), 177 (42), 91 (40), 107 (38), 105 (30), 121 (28)... 220 (7)]	13.20	1623	0.26			
Daucol	13.32	1633	4.33	16.23*	2229	4.38
Unknown [m/z 59, 95 (61), 149 (33), 81 (31), 107 (29), 108 (26)...222(1)]	13.60	1656	0.39	15.58	2164	0.36
Unknown [m/z 122, 69 (84), 41 (62), 79 (60), 123 (60), 55 (56)...]	13.67	1662	0.38			
α-Asarone	13.76	1669	0.04	17.79	2394	0.05
Juniper camphor	13.92	1682	0.03	16.23*	2229	[4.38]
(2Z,6E)-Farnesol	14.06	1694	0.05	16.82	2290	0.08
(2E,6E)-Farnesol	14.36	1720	0.06	17.05	2315	0.05
Unknown [m/z 110, 123 (50), 95 (31), 111 (31), 109 (24)... 236 (t)]	14.74	1752	0.13			
Unknown [m/z 139, 159 (31), 43 (20), 82 (15), 97 (13)... 236 (4)]	14.88	1764	0.13			
Phytone	15.78	1843	0.09	14.90	2095	0.04
<b>Total identified</b>		<b>92.93%</b>			<b>91.58%</b>	
<b>Total reported</b>		<b>96.61%</b>			<b>92.51%</b>	

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

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