PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: CC0105

ESSENTIAL OIL: CINNAMON BARK
BOTANICAL NAME: CINNAMOMUM ZEYLANICUM
ORIGIN: INDONESIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CINNAMON BARK OIL	%
(E)-CINNAMALDEHYE	70.6
(E)-CINNAMYL ACETATE	5.3
β-CARYOPHYLLENE	5.1
LINALOOL	4.2
EUGENOL	3.7
1,8-CINEOLE + β-PHELLANDRENE	1.2

Comments from Robert Tisserand: Rich, warm, spicy-powdery odor quality. Constituents are in expected amounts.

Date : September 19, 2018

Certificate of Analysis – GC Profiling

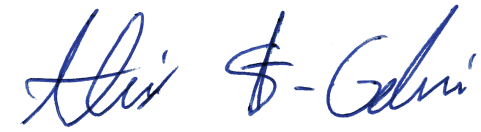
Sample identification

Internal code : 18I10-PTH2-1-CC
Customer identification : Cinnamon Bark - Indonesia - CC010587R
Type : Essential oil
Source : *Cinnamomum zeylanicum*
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 : Lindsay Girard, B. Sc.
Analysis date : September 11, 2018

Checked and approved by :



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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid
Refractive index: 1.5835 ± 0.0003 (20 °C)

CONCLUSION

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

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ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Hexanal	tr	tr	Aliphatic aldehyde
Ethyl 2-methylbutyrate	tr	0.01	Aliphatic ester
Styrene	0.01	0.02	Simple phenolic
Tricyclene	tr	tr	Monoterpene
α-Thujene	0.08	0.08	Monoterpene
α-Pinene	0.37	0.46	Monoterpene
Camphene	0.15	0.15	Monoterpene
Benzaldehyde	0.22	0.23	Simple phenolic
β-Pinene	0.19*	0.15	Monoterpene
Sabinene	[0.19]*	0.05	Monoterpene
Myrcene	0.06	0.06	Monoterpene
α-Phellandrene	0.67	0.68	Monoterpene
Δ3-Carene	0.06	0.05	Monoterpene
α-Terpinene	0.26	0.26	Monoterpene
ortho-Cymene	0.01	0.80*	Simple phenolic
para-Cymene	0.76	[0.80]*	Monoterpene
Limonene	1.52*	0.33	Monoterpene
1,8-Cineole	[1.52]*	1.16*	Monoterpenic ether
β-Phellandrene	[1.52]*	[1.16]*	Monoterpene
Benzyl alcohol	0.02	0.35*	Simple phenolic
(*Z*)-β-Ocimene	0.04	0.05	Monoterpene
(*E*)-β-Ocimene	0.03	0.03	Monoterpene
γ-Terpinene	0.04	0.05	Monoterpene
cis-Sabinene hydrate	tr	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.02	0.02	Monoterpenic alcohol
Isoterpinolene	0.01	0.01	Monoterpene
para-Cymenene	0.14*	0.03	Monoterpene
Terpinolene	[0.14]*	0.09	Monoterpene
trans-Linalool oxide (fur.)	[0.14]*	0.03	Monoterpenic alcohol
Linalool	4.18	4.18	Monoterpenic alcohol
Phenylethyl alcohol	0.01	0.01	Simple phenolic
cis-para-Menth-2-en-1-ol	0.02	0.01	Monoterpenic alcohol
Camphor	0.02	0.45*	Monoterpenic ketone
Hydrocinnamal	0.31	0.29*	Phenylpropanoid
Borneol	0.07	0.47*	Monoterpenic alcohol
Terpinen-4-ol	0.17	0.17	Monoterpenic alcohol
para-Cymen-8-ol	0.03	0.03	Monoterpenic alcohol
α-Terpineol	0.42	[0.47]*	Monoterpenic alcohol
α-Phellandrene epoxide	0.04	0.06	Monoterpenic ether
(*Z*)-Cinnamal	0.39	[0.35]*	Phenylpropanoid
Hydrocinnamyl alcohol	0.03	0.05	Phenylpropanoid
ortho-Anisaldehyde	0.01	0.01	Simple phenolic
(*E*)-Cinnamal	70.58	70.81*	Phenylpropanoid
Safrole	0.14	0.17	Phenylpropanoid
(*E*)-Cinnamyl alcohol	0.09	0.10	Phenylpropanoid
α-Cubebene	0.01	0.01	Sesquiterpene
Eugenol	3.70	3.66	Phenylpropanoid
α-Copaene	0.44	[0.45]*	Sesquiterpene

cis-β-Elemene	0.01	0.01	Sesquiterpene
β-Cubebene	0.02	0.01	Sesquiterpene
β-Elemene	0.04	5.04*	Sesquiterpene
α-Gurjunene	0.02	0.02	Sesquiterpene
β-Caryophyllene	5.05	[5.04]*	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.01	0.01	Sesquiterpene
(*E*)-Cinnamyl acetate	5.99*	5.30	Phenylpropanoid ester
α-Humulene	[5.99]*	0.63	Sesquiterpene
(*E*)-Cinnamic acid	[5.99]*	0.02	Phenylpropanoid
allo-Aromadendrene	0.02	0.01	Sesquiterpene
γ-Muurolene	0.01	0.01	Sesquiterpene
Germacrene D	0.01	0.01	Sesquiterpene
Bicyclogermacrene	0.04*	0.03*	Sesquiterpene
Viridiflorene	[0.04]*	0.02	Sesquiterpene
α-Muurolene	tr	[0.03]*	Sesquiterpene
2,3-Epoxycinnamyl acetate I?	0.01	0.01	Phenylpropanoid ester
γ-Cadinene	0.01	[0.29]*	Sesquiterpene
Cubebol	0.04	0.04	Sesquiterpenic alcohol
δ-Cadinene	0.08*	[0.29]*	Sesquiterpene
trans-Calamenene	[0.08]*	0.02	Sesquiterpene
trans-Cadina-1,4-diene	0.20*	0.02	Sesquiterpene
Eugenyl acetate	[0.20]*	0.05	Phenylpropanoid ester
(*E*)-ortho-Methoxycinnamal	[0.20]*	0.16	Phenylpropanoid
α-Calacorene	0.02	0.03	Sesquiterpene
Caryophyllenyl alcohol	0.07*	0.02	Sesquiterpenic alcohol
β-Calacorene	[0.07]*	0.02	Sesquiterpene
Spathulenol	0.02	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.37*	0.33	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.37]*	0.02	Sesquiterpenic ether
Humulene epoxide II	0.07	[70.81]*	Sesquiterpenic ether
Tetradecanal	0.22	0.17	Aliphatic aldehyde
τ-Muurolol	0.01	0.01	Sesquiterpenic alcohol
Unknown	0.01	tr	Sesquiterpenic alcohol
Benzyl benzoate	0.71	0.71	Phenolic ester
Phenylethyl benzoate	0.01	0.01	Phenolic ester
Unknown	0.02		Unknown
Unknown	0.07	0.05	Unknown
Total identified	**98.38%**	**98.34%**	

*: 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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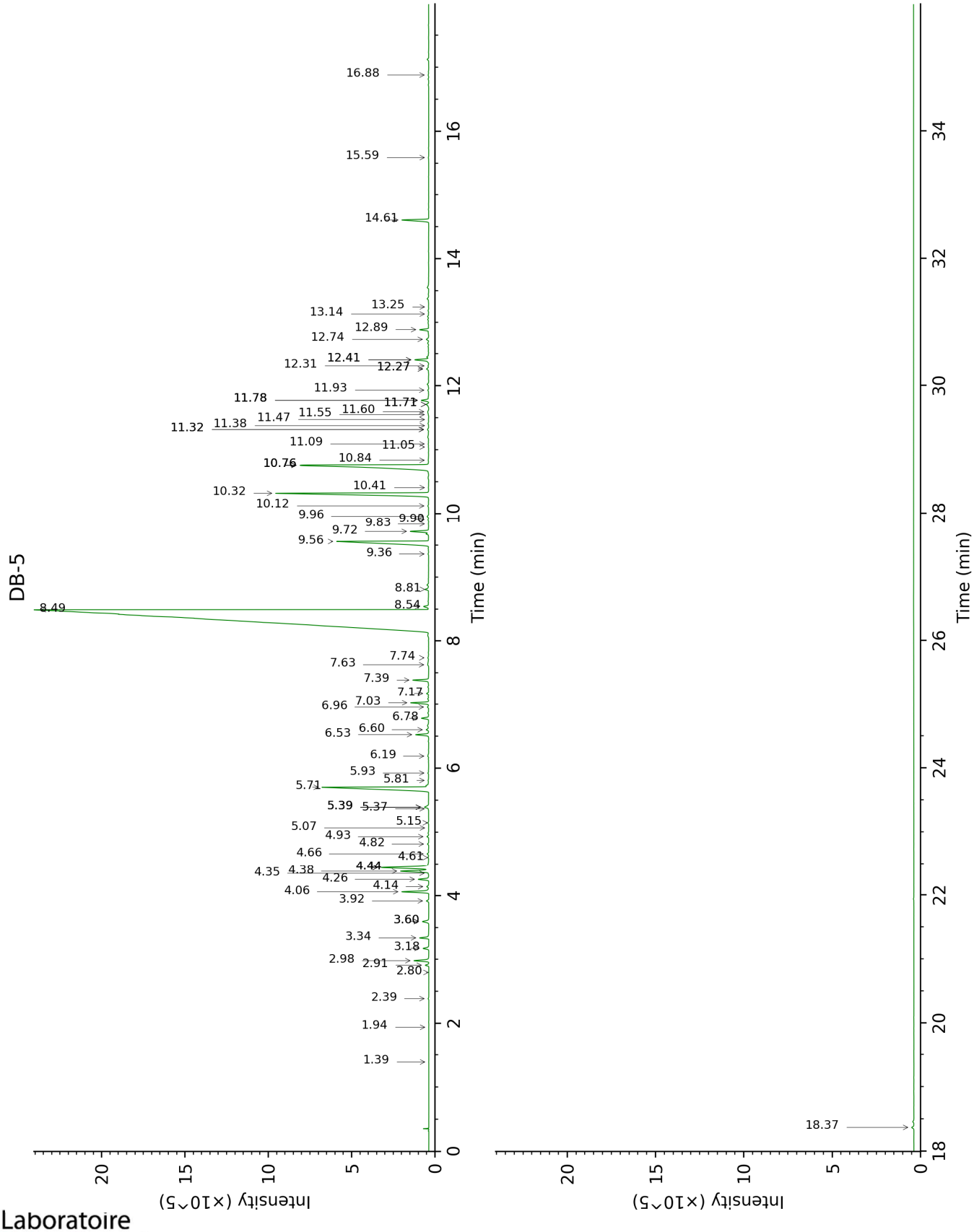
DB-5
16.88
15.59
14.61
13.14
13.25
12.89
12.74
12.31
12.41
12.27
11.93
11.78
11.71
11.60
11.55
11.47
11.38
11.32
11.09
11.05
10.84
10.76
10.41
10.32
10.12
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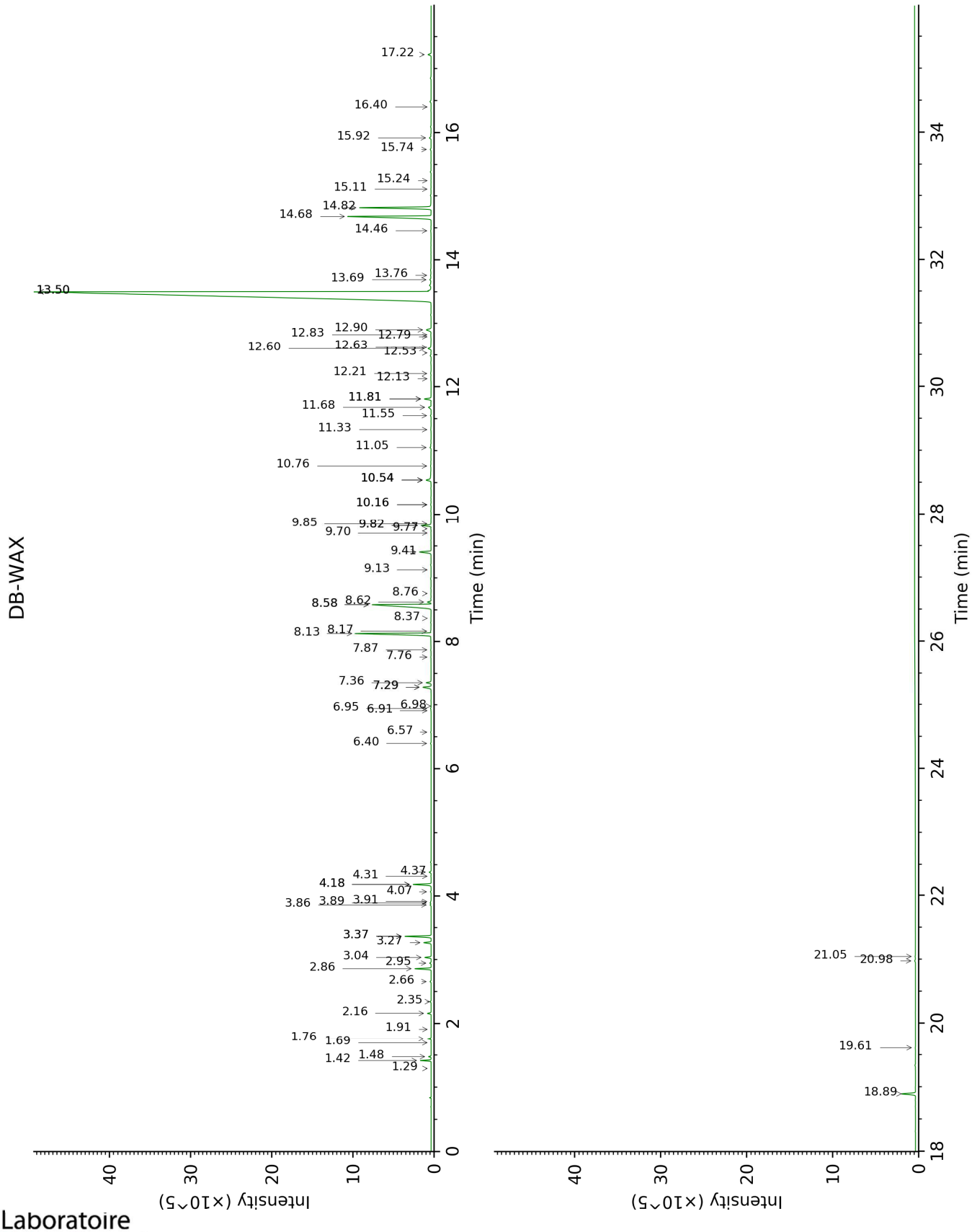
9.90
9.83
9.72
9.56
9.36
8.81
8.54
8.49
7.74
7.63
7.39
7.17
7.03
6.96
6.78
6.60
6.53
6.19
5.93
5.81
5.71
5.39
5.37
5.15
5.07
4.93
4.82
4.66
4.61
4.44
4.38
4.35
4.26
4.14
4.06
3.92
3.60
3.34
3.18
2.98
2.91
2.80
2.39
1.94
1.39
18.37
Time (min)
Intensity (×10^5)


DB-WAX
Time (min)
Intensity (×10^5)
17.22
16.40
15.92
15.74
15.24
15.11
14.82
14.68
14.46
13.76
13.69
13.50
12.90
12.83
12.79
12.63
12.60
12.53
12.21
12.13
11.81
11.68
11.55
11.33
11.05
10.76
10.54
10.16
9.85
9.82
9.77
9.70
9.41
9.13
8.76
8.62
8.58
8.37
8.17
8.13
7.87
7.76
7.36
7.29
6.98
6.95
6.91
6.57
6.40
4.37
4.31
4.18
4.07
3.91
3.89
3.86
3.37
3.27
3.04
2.95
2.86
2.66
2.35
2.16
1.91
1.76
1.69
1.48
1.42
1.29
21.05
20.98
19.61
18.89

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Hexanal	1.39	797	tr	1.91	1045	tr
Ethyl 2-methylbutyrate	1.94	846	tr	1.69	1024	0.01
Styrene	2.39	885	0.01	3.91	1211	0.02
Tricyclene	2.80	916	tr	1.29	976	tr
α-Thujene	2.91	923	0.08	1.48	1002	0.08
α-Pinene	2.98	928	0.37	1.42	996	0.46
Camphene	3.18	941	0.15	1.76	1030	0.15
Benzaldehyde	3.34	952	0.22	7.36	1459	0.23
β-Pinene	3.60*	969	0.19	2.16	1070	0.15
Sabinene	3.60*	969	[0.19]	2.35	1088	0.05
Myrcene	3.92	991	0.06	2.95	1138	0.06
α-Phellandrene	4.06	1000	0.67	2.86	1132	0.68
Δ3-Carene	4.14	1006	0.06	2.66	1116	0.05
α-Terpinene	4.26	1013	0.26	3.04	1145	0.26
ortho-Cymene	4.35	1019	0.01	4.18*	1230	0.80
para-Cymene	4.38	1021	0.76	4.18*	1230	[0.80]
Limonene	4.44*	1025	1.52	3.27	1163	0.33
1,8-Cineole	4.44*	1025	[1.52]	3.37*	1171	1.16
β-Phellandrene	4.44*	1025	[1.52]	3.37*	1171	[1.16]
Benzyl alcohol	4.61	1035	0.02	11.81*	1817	0.35
(*Z*)-β-Ocimene	4.66	1038	0.04	3.86	1208	0.05
(*E*)-β-Ocimene	4.82	1048	0.03	4.07	1222	0.03
γ-Terpinene	4.93	1056	0.04	3.89	1210	0.05
cis-Sabinene hydrate	5.07	1064	tr	6.98	1431	0.01
cis-Linalool oxide (fur.)	5.15	1069	0.02	6.57	1401	0.02
Isoterpinolene	5.37	1083	0.01	4.31	1239	0.01
para-Cymenene	5.39*	1085	0.14	6.40	1388	0.03
Terpinolene	5.39*	1085	[0.14]	4.37	1244	0.09
trans-Linalool oxide (fur.)	5.39*	1085	[0.14]	6.94	1428	0.03
Linalool	5.70	1104	4.18	8.13	1517	4.18
Phenylethyl alcohol	5.81	1111	0.01	12.13	1845	0.01
cis-para-Menth-2-en-1-ol	5.93	1119	0.02	8.17	1519	0.01
Camphor	6.19	1136	0.02	7.29*	1454	0.45
Hydrocinnamal	6.53	1157	0.31	10.54*	1709	0.29
Borneol	6.60	1162	0.07	9.82*	1650	0.47
Terpinen-4-ol	6.78	1174	0.17	8.62	1555	0.17
para-Cymen-8-ol	6.96	1185	0.03	11.55	1794	0.03
α-Terpineol	7.03	1189	0.42	9.82*	1650	[0.47]
α-Phellandrene epoxide	7.17	1198	0.04	11.05	1752	0.06
(*Z*)-Cinnamal	7.39	1213	0.39	11.81*	1817	[0.35]
Hydrocinnamyl	7.63	1229	0.03	13.69	1987	0.05

alcohol						
ortho-Anisaldehyde	7.74	1236	0.01	12.53	1881	0.01
(*E*)-Cinnamal	8.49	1287	70.58	13.50*	1969	70.81
Safrole	8.54	1290	0.14	11.68	1805	0.17
(*E*)-Cinnamyl alcohol	8.81	1308	0.09	15.92	2206	0.10
α-Cubebene	9.36	1347	0.01	6.91	1426	0.01
Eugenol	9.56	1361	3.70	14.82	2095	3.66
α-Copaene	9.72	1372	0.44	7.29*	1454	[0.45]
cis-β-Elemene	9.83	1381	0.01	8.37	1535	0.01
β-Cubebene	9.90	1385	0.02	7.87	1497	0.01
β-Elemene	9.96	1390	0.04	8.58*	1552	5.04
α-Gurjunene	10.12	1401	0.02	7.76	1488	0.02
β-Caryophyllene	10.32	1416	5.05	8.58*	1552	[5.04]
Caryophylla-4(12),8(13)-diene	10.41	1422	0.01	8.76	1565	0.01
(*E*)-Cinnamyl acetate	10.76*	1448	5.99	14.68	2082	5.30
α-Humulene	10.76*	1448	[5.99]	9.41	1616	0.63
(*E*)-Cinnamic acid	10.76*	1448	[5.99]	21.05	2790	0.02
allo-Aromadendrene	10.84	1454	0.02	9.13	1594	0.01
γ-Muurolene	11.05	1470	0.01	9.70	1640	0.01
Germacrene D	11.09	1473	0.01	9.85	1652	0.01
Bicyclogermacrene	11.32*	1490	0.04	10.16*	1677	0.03
Viridiflorene	11.32*	1490	[0.04]	9.77	1646	0.02
α-Muurolene	11.38	1495	tr	10.16*	1677	[0.03]
2,3-Epoxycinnamyl acetate I?	11.48	1502	0.01	16.40	2257	0.01
γ-Cadinene	11.55	1508	0.01	10.54*	1709	[0.29]
Cubebol	11.60	1511	0.04	12.63	1889	0.04
δ-Cadinene	11.71*	1520	0.08	10.54*	1709	[0.29]
trans-Calamenene	11.71*	1520	[0.08]	11.33	1775	0.02
trans-Cadina-1,4-diene	11.78*	1525	0.20	10.76	1727	0.02
Eugenyl acetate	11.78*	1525	[0.20]	15.74	2188	0.05
(*E*)-ortho-Methoxycinnamal	11.78*	1525	[0.20]	17.22	2344	0.16
α-Calacorene	11.93	1538	0.02	12.21	1852	0.03
Caryophyllenyl alcohol	12.27*	1564	0.07	13.76	1993	0.02
β-Calacorene	12.27*	1564	[0.07]	12.80	1904	0.02
Spathulenol	12.31	1568	0.02	14.46	2060	0.02
Caryophyllene oxide	12.41*	1575	0.37	12.90	1914	0.33
Caryophyllene oxide isomer	12.41*	1575	[0.37]	12.83	1907	0.02
Humulene epoxide II	12.74	1601	0.07	13.50*	1969	[70.81]
Tetradecanal	12.89	1614	0.22	12.60	1887	0.17
τ-Muurolol	13.14	1634	0.01	15.11	2124	0.01

Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109)40)... 204 (35), 222 (2)]	13.25	1643	0.01	15.24	2138	tr
Benzyl benzoate	14.61	1758	0.71	18.89	2530	0.71
Phenylethyl benzoate	15.59	1846	0.01	19.61	2614	0.01
Unknown [m/z 93, 92 (57), 136 (34), 91 (23), 77 (13), 134 (11)...]	16.88	1966	0.02			
Unknown [m/z 69, 91 (57), 41 (49), 181 (32), 169 (25), 167 (22)...]	18.37	2112	0.07	20.98	2781	0.05
Total identified		**98.38%**			**98.34%**	
Total reported		**98.48%**			**98.39%**	

*: 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