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CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B20-PLG12-1-CC
Customer identification : Clove Bud
Type : Essential oil
Source : *Syzygium aromaticum*
Customer : Plant Guru

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 : Alexis St-Gelais, M. Sc., chimiste
Analysis date : February 23, 2018

Checked and approved by :

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

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow-brownish liquid
Refractive index: 1.5333 ± 0.0003 (20 ℃)

CONCLUSION

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

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ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetic acid	0.02	0.05*	Aliphatic acid
Isovaleral	0.01	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	0.01	Aliphatic aldehyde
Furfural	0.04	[0.05]*	Aliphatic alcohol
Benzaldehyde	0.02	0.02	Simple phenolic
5-Methylfurfural	0.02	0.03*	Furan
β-Pinene	0.01	0.01	Monoterpene
6-Methyl-5-hepten-2-one	tr	0.01	Aliphatic ketone
Limonene	0.05	0.05	Monoterpene
Benzyl alcohol	0.01	0.01	Simple phenolic
Linalool	0.02	[0.03]*	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	0.01	Terpene derivative
Methyl salicylate	0.09	0.08	Phenolic ester
Chavicol	0.14	0.17	Phenylpropanoid
Eugenol	79.74	80.08	Phenylpropanoid
α-Copaene	[79.74]	0.19	Sesquiterpene
β-Bourbonene	0.01	0.01	Sesquiterpene
β-Elemene	0.01	6.66*	Sesquiterpene
Vanillin	0.02	0.02	Simple phenolic
Isocaryophyllene	0.02	0.02	Sesquiterpene
Methyleugenol	0.05	0.05	Phenylpropanoid
β-Caryophyllene	6.66	[6.66]*	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.02	0.02	Sesquiterpene
9-epi-Isocaryophyllene	0.02	0.02	Sesquiterpene
α-Humulene	0.84	0.82	Sesquiterpene
allo-Aromadendrene	0.03	0.02	Sesquiterpene
trans-Cadina-1(6),4-diene	0.06	0.06	Sesquiterpene
γ-Muurolene	0.04	0.04	Sesquiterpene
Germacrene D	0.01	0.01	Sesquiterpene
β-Selinene	0.02	0.02	Sesquiterpene
epi-Cubebol	0.03*	0.01	Sesquiterpenic alcohol
α-Selinene	[0.03]*	0.02*	Sesquiterpene
α-Muurolene	0.02	[0.02]*	Sesquiterpene
γ-Cadinene	0.07*	0.29	Sesquiterpene
Cubebol	[0.07]*	0.01	Sesquiterpenic alcohol
trans-Calamenene	0.36*	0.09	Sesquiterpene
δ-Cadinene	[0.36]*	[0.29]	Sesquiterpene
Eugenyl acetate	9.13	8.96	Phenylpropanoid ester
α-Calacorene	0.03	0.03	Sesquiterpene
Unknown	0.07	0.06	Unknown
Unknown	0.02		Phenylpropanoid
(E)-Nerolidol	0.03	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.25	0.29	Sesquiterpenic ether
Unknown	0.02	0.02	Oxygenated sesquiterpene
Humulene epoxide I	0.01	0.01	Sesquiterpenic ether
Humulene epoxide II	0.03	0.04	Sesquiterpenic ether
(E)-Isoeugenyl acetate	0.02	0.03	Phenylpropanoid ester
Caryophylladienol II	0.06	0.06	Sesquiterpenic alcohol

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|			
Unknown	0.01	0.01	Sesquiterpenic alcohol
14-Hydroxy-(*Z*)-caryophyllene	0.07	0.07*	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.01	[0.07]*	Sesquiterpenic alcohol
14-Hydroxy-(*E*)-caryophyllene	0.06	0.06	Sesquiterpenic alcohol
Trimethoxypropylbenzene analog	0.11	0.12	Phenylpropanoid
(*E*)-Coniferyl alcohol	0.06	0.05	Phenylpropanoid
(*E*)-Coniferaldehyde	0.03		Phenylpropanoid
(*E*)-2-Methoxy-4-(3-oxo-1-propenyl)phenyl acetate	0.01		Phenylpropanoid ester
(*E*)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	0.05		Phenylpropanoid ester
Total identified	**98.45%**	**98.67%**	

*: Two or more compounds are coeluting on this column
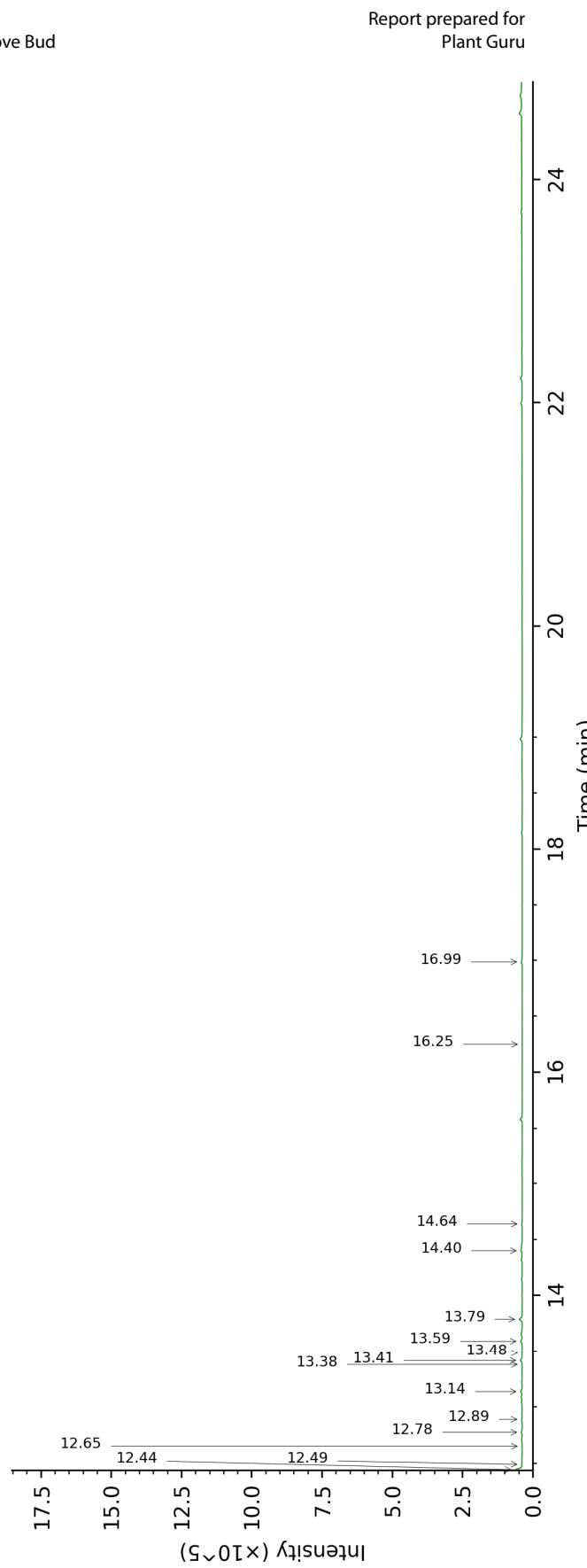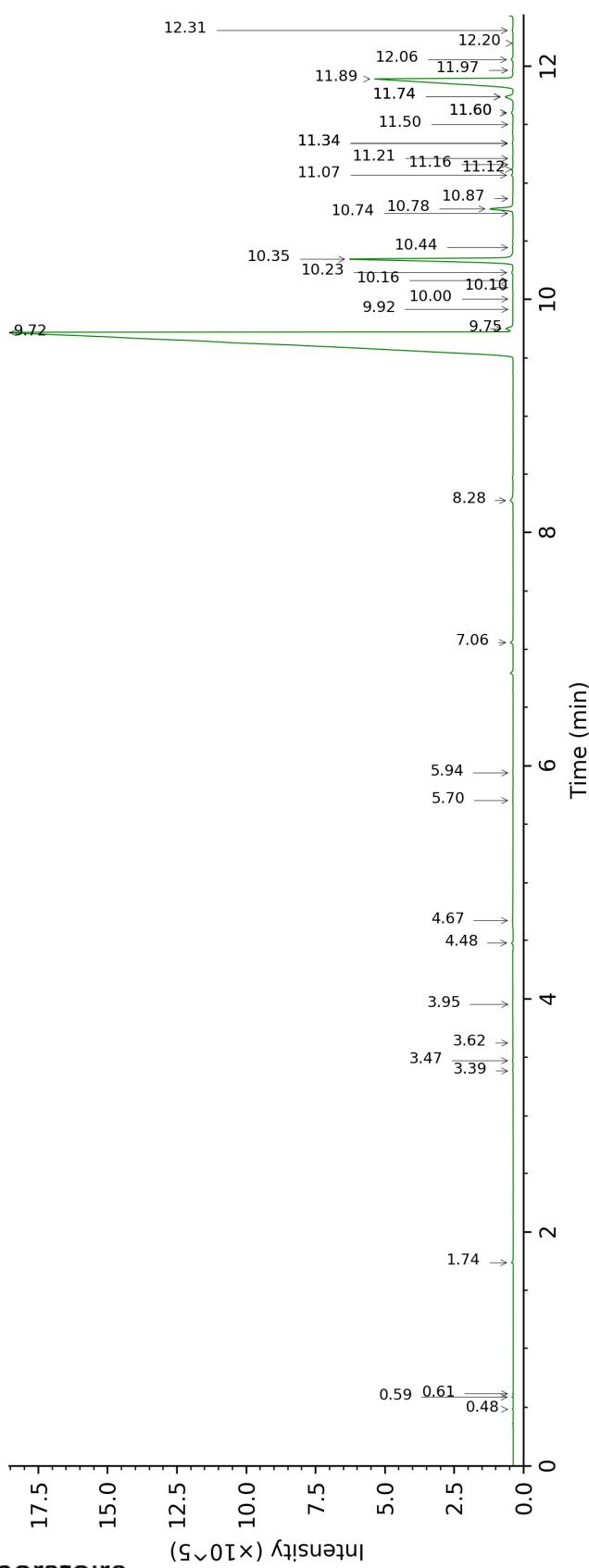
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

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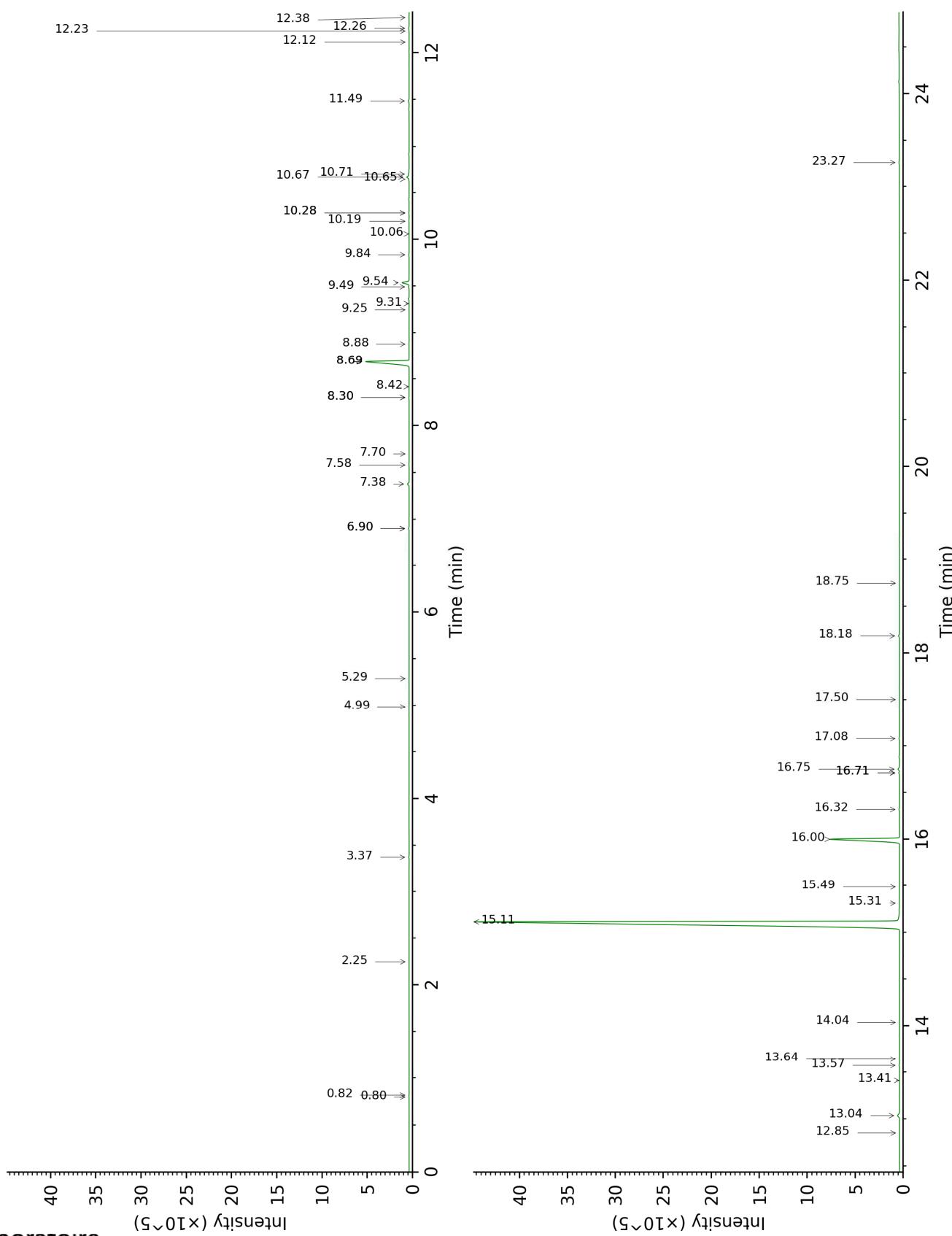
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DB-5

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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DB-WAX

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetic acid	0.48	602	0.02	6.90*	1412	0.05
Isovaleral	0.59	638	0.01	0.82	885	0.01
2-Methylbutyral	0.62	648	0.01	0.80	878	0.01
Furfural	1.74	825	0.04	6.90*	1412	[0.05]
Benzaldehyde	3.39	950	0.02	7.58	1462	0.02
5-Methylfurfural	3.47	956	0.02	8.30*	1517	0.03
β-Pinene	3.62	966	0.01	2.25	1069	0.01
6-Methyl-5-hepten-2-one	3.95	988	tr	5.29	1297	0.01
Limonene	4.48	1022	0.05	3.37	1159	0.05
Benzyl alcohol	4.67	1034	0.01	12.12	1828	0.01
Linalool	5.70	1098	0.02	8.30*	1517	[0.03]
(*E*)-4,8-Dimethylnona-1,3,7-triene	5.94	1113	0.01	4.99	1276	0.01
Methyl salicylate	7.06	1185	0.09	10.70	1708	0.08
Chavicol	8.28	1265	0.14	16.75	2272	0.17
Eugenol	9.72†	1365	79.74	15.11	2106	80.08
α-Copaene	9.75†	1367	[79.74]	7.38	1448	0.19
β-Bourbonene	9.92	1379	0.01	7.70	1471	0.01
β-Elemene	10.00	1385	0.01	8.68*	1546	6.66
Vanillin	10.10	1392	0.02	18.75	2490	0.02
Isocaryophyllene	10.16	1396	0.02	8.42	1526	0.02
Methyleugenol	10.23	1401	0.05	13.57	1959	0.05
β-Caryophyllene	10.34	1410	6.66	8.68*	1546	[6.66]
Caryophylla-4(12),8(13)-diene	10.44	1417	0.02	8.88	1561	0.02
9-epi-Isocaryophyllene	10.74	1439	0.02	9.31	1595	0.02
α-Humulene	10.78	1442	0.84	9.54	1613	0.82
allo-Aromadendrene	10.87	1448	0.03	9.25	1589	0.02
trans-Cadina-1(6),4-diene	11.07	1463	0.06	9.49	1609	0.06
γ-Muurolene	11.12	1467	0.04	9.84	1637	0.04
Germacrene D	11.16	1470	0.01	10.06	1655	0.01
β-Selinene	11.21	1474	0.02	10.19	1666	0.02
epi-Cubebol	11.34*	1484	0.03	12.23	1838	0.01
α-Selinene	11.34*	1484	[0.03]	10.28*	1673	0.02
α-Muurolene	11.50	1495	0.02	10.28*	1673	[0.02]
γ-Cadinene	11.60*	1503	0.07	10.65†	1703	0.29
Cubebol	11.60*	1503	[0.07]	12.85	1893	0.01
trans-Calamenene	11.74*	1514	0.36	11.49	1773	0.09
δ-Cadinene	11.74*	1514	[0.36]	10.67†	1705	[0.29]
Eugenyl acetate	11.89	1526	9.13	16.00	2195	8.96
α-Calacorene	11.97	1531	0.03	12.38	1851	0.03
Unknown [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.06	1539	0.07	12.26	1841	0.06
Unknown [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]	12.20	1550	0.02			
(*E*)-Nerolidol	12.31	1558	0.03	14.04	2002	0.04

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	R.T.	R.I.	%	R.T.	R.I.	%
Caryophyllene oxide	12.44	1569	0.25	13.04	1910	0.29
Unknown [m/z 161, 187 (32), 105 (30), 205 (24)... 222 (3)]	12.49	1573	0.02	15.31	2126	0.02
Humulene epoxide I	12.65	1585	0.01	13.41	1944	0.01
Humulene epoxide II	12.78	1595	0.03	13.64	1965	0.04
(*E*)-Isoeugenyl acetate	12.89	1604	0.02	17.50	2353	0.03
Caryophylladienol II	13.14	1624	0.06	16.32	2228	0.06
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109)40)... 204 (35), 222 (2)]	13.38	1644	0.01	15.49	2143	0.01
14-Hydroxy-(*Z*)-caryophyllene	13.42	1647	0.07	16.71*	2268	0.07
14-Hydroxy-9-epi-(*E*)-caryophyllene	13.48	1653	0.01	16.71*	2268	[0.07]
14-Hydroxy-(*E*)-caryophyllene	13.59	1662	0.06	17.08	2307	0.06
Trimethoxypropylbenzene analog	13.79	1678	0.11	18.18	2427	0.12
(*E*)-Coniferyl alcohol	14.40	1730	0.06	23.26	3054	0.05
(*E*)-Coniferaldehyde	14.64	1750	0.03			
(*E*)-2-Methoxy-4-(3-oxo-1-propenyl)phenyl acetate	16.25	1894	0.01			
(*E*)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	16.99	1963	0.05			
Total identified		**98.45%**			**98.67%**	
Total reported		**98.57%**			**98.76%**	

*: 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

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