

Date : October 04, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

**Internal code** : 22I27-PTH03

**Customer identification** : Palmarosa ORGANIC - India - PK0105R

**Type** : Essential oil

**Source** : *Cymbopogon martini*

**Customer** : Plant Therapy

ANALYSIS

**Method**: PC-MAT-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** : Alexis St-Gelais, Ph. D., Chimiste 2013-174

**Analysis date** : October 03, 2022

Checked and approved by :

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Alexis St-Gelais, Ph. D., Chimiste 2013-174

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### PHYSICOCHEMICAL DATA

**Physical aspect:** Faintly yellow liquid

**Refractive index:**  $1.4726 \pm 0.0003$  (20 °C; method PC-MAT-016)

### 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	%	Class
Ethanol	0.01	Aliphatic alcohol
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
Isoamyl alcohol	0.01	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.04	Aliphatic ketone
Myrcene	0.12	Monoterpene
<i>trans</i> -Dehydroxylinalool oxide	0.01	Monoterpenic ether
<i>cis</i> -Dehydroxylinalool oxide	0.02	Monoterpenic ether
$\Delta^3$ -Carene	0.01	Monoterpene
Limonene	0.13	Monoterpene
( <i>Z</i> )- $\beta$ -Ocimene	0.25	Monoterpene
( <i>E</i> )- $\beta$ -Ocimene	1.09	Monoterpene
2,6-Dimethyl-5-heptenal (melonal)	0.01	Aliphatic aldehyde
$\gamma$ -Terpinene	0.02	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Octanol	0.02	Aliphatic alcohol
Terpinolene	0.02	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Rosefuran	0.01	Monoterpenic ether
Linalool	2.03	Monoterpenic alcohol
Nonanal	0.04	Aliphatic aldehyde
<i>cis</i> -para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
Unknown	0.01	Unknown
Camphor	0.01	Monoterpenic ketone
<i>trans</i> -para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
$\alpha$ -Phellandren-8-ol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.01	Monoterpenic alcohol
Menthol	0.01	Monoterpenic alcohol
Isogeranial	0.01	Monoterpenic aldehyde
$\alpha$ -Terpineol	0.02	Monoterpenic alcohol
Decanal	0.01	Aliphatic aldehyde
Nerol	0.19	Monoterpenic alcohol
2,3-Epoxygeranial?	0.01	Monoterpenic aldehyde
Citronellol	0.02	Monoterpenic alcohol
Neral	0.26	Monoterpenic aldehyde
Isoamyl hexanoate	0.02	Aliphatic ester
Geraniol	80.27	Monoterpenic alcohol
Geranial	0.55	Monoterpenic aldehyde
Geranyl formate	0.09	Monoterpenic ester
2,3-Epoxygeraniol?	0.06	Oxygenated monoterpene
Citronellyl acetate	0.03	Monoterpenic ester
Neryl acetate	0.02	Monoterpenic ester
Unknown	0.01	Unknown
Geranyl acetate	9.59	Monoterpenic ester

β-Elemene	0.08	Sesquiterpene
β-Caryophyllene	1.40	Sesquiterpene
α-Guaiene	0.01	Sesquiterpene
α-Humulene	0.10	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
Unknown	0.05	Sesquiterpene
β-Selinene	0.03	Sesquiterpene
Valencene	0.01	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
7-epi-α-Selinene	0.02	Sesquiterpene
δ-Cadinene	0.01	Sesquiterpene
α-Elemol	0.01	Sesquiterpenic alcohol
Unknown	0.02	Unknown
Geranyl butyrate	0.17	Monoterpenic ester
(E)-Nerolidol	0.11	Sesquiterpenic alcohol
Caryophyllene oxide	0.20	Sesquiterpenic ether
Caryophyllene oxide isomer	0.03	Sesquiterpenic ether
Geranyl isovalerate	0.01	Monoterpenic ester
Caryophylladienol II	0.02	Sesquiterpenic alcohol
Precocene II	0.03	Chromane
(2E,6Z)-Farnesol	0.03	Sesquiterpenic alcohol
(2E,6Z)-Farnesal	0.09	Sesquiterpenic aldehyde
(2E,6E)-Farnesol	0.77	Sesquiterpenic alcohol
Geranyl caproate	0.60	Monoterpenic ester
(2E,6E)-Farnesyl acetate	0.08	Sesquiterpenic ester
Phytone	0.03	Terpenic ketone
Geranyl caprylate	0.12	Monoterpenic ester
Unknown	0.01	Unknown
Unknown	0.01	Unknown
<b>Consolidated total</b>	<b>99.28%</b>	

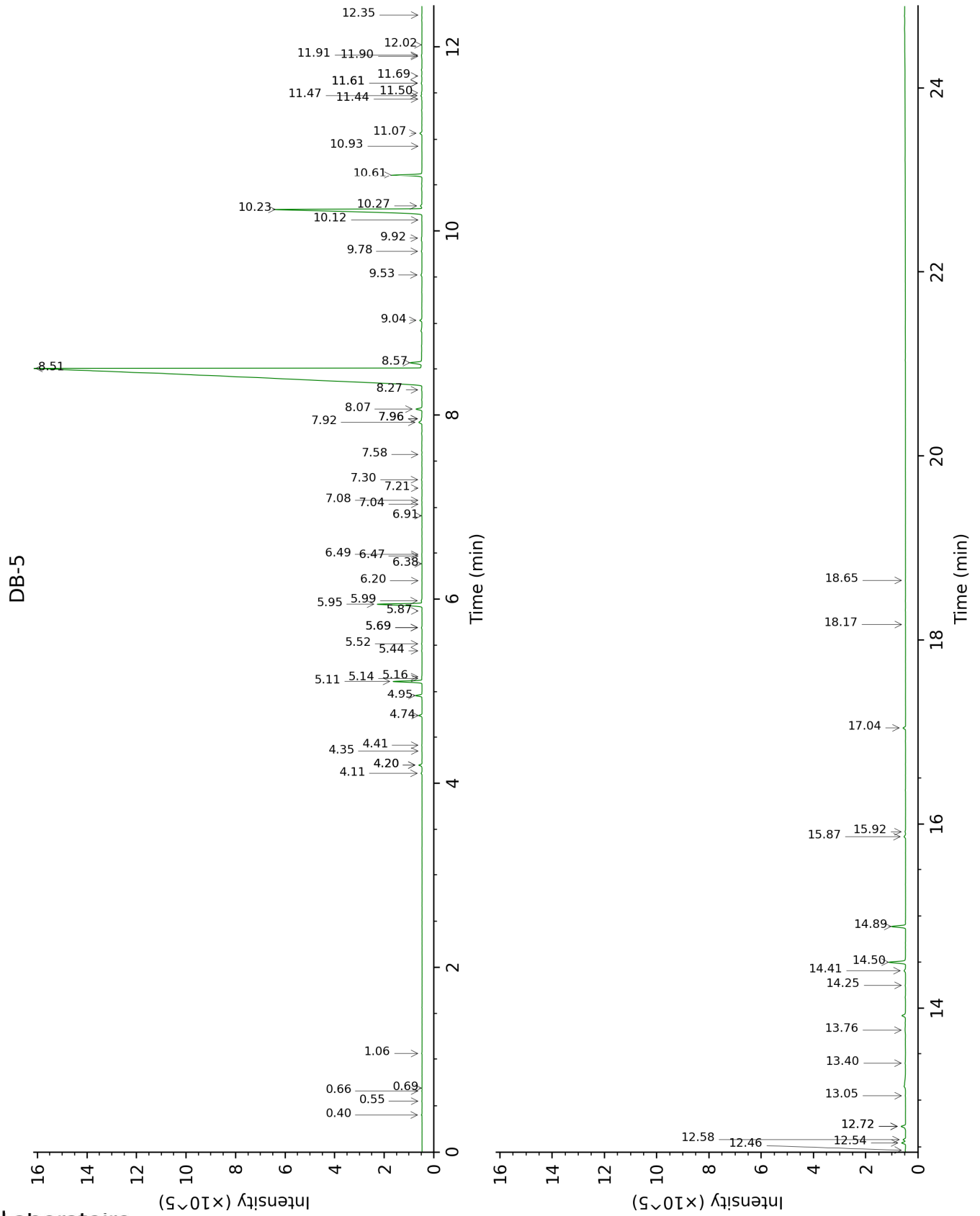
tr: The compound has been detected below 0.005% of total signal.

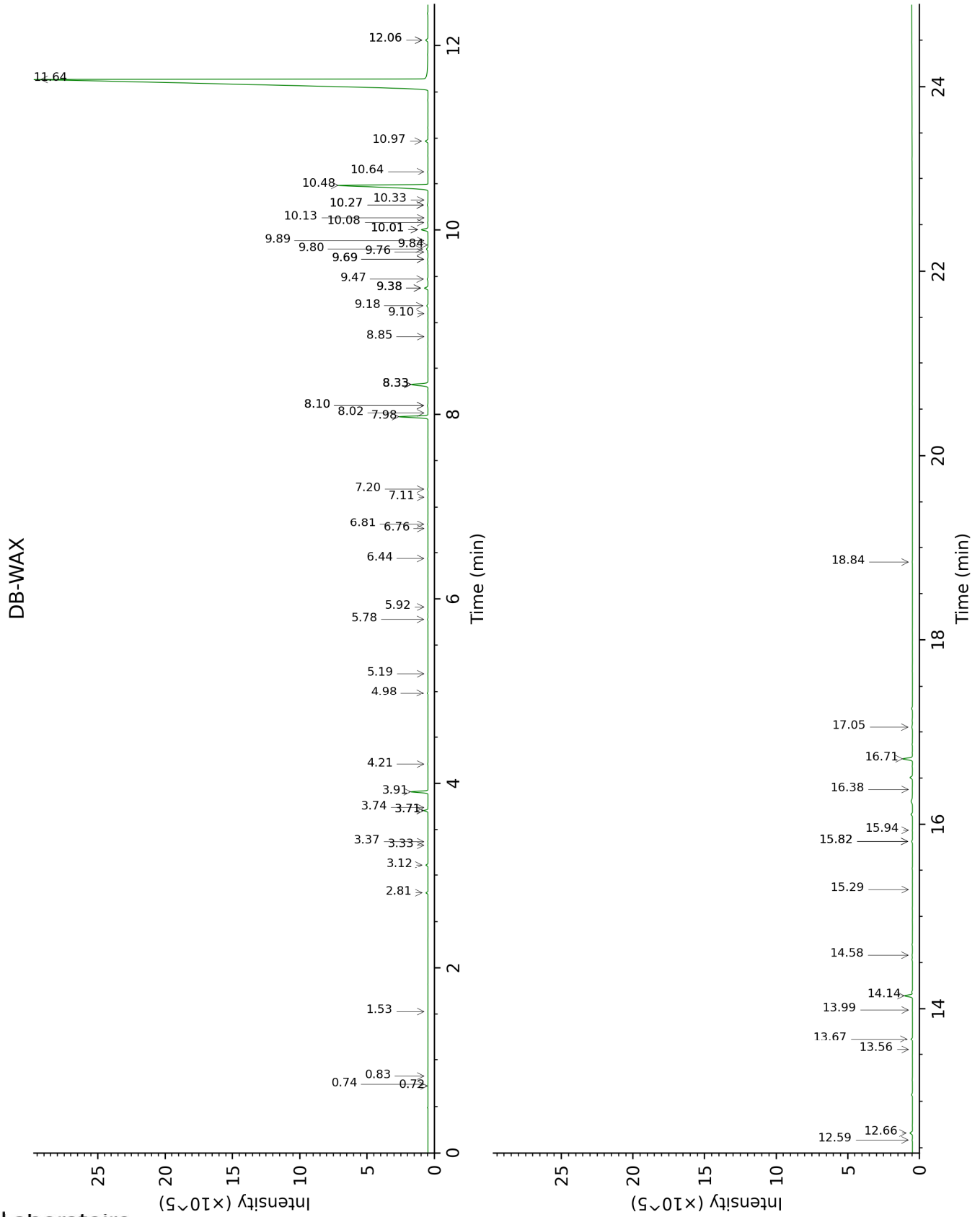
Note: no correction factor was applied

**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	%
Ethanol	0.40	495	0.01	0.83	907	tr
2-Methyl-3-buten-2-ol	0.55	608	tr	1.53	1014	tr
Isovaleral	0.66	642	tr	0.74	887	tr
2-Methylbutyral	0.69	652	tr	0.72	880	tr
Isoamyl alcohol	1.06	731	0.01	3.37	1177	0.01
6-Methyl-5-hepten-2-one	4.11	987	0.04	4.98	1295	0.04
Myrcene	4.20*	993	0.13	2.81	1133	0.12
<i>trans</i> -Dehydroxylinalool oxide	4.20*	993	[0.13]	3.33	1174	0.01
<i>cis</i> -Dehydroxylinalool oxide	4.35	1003	0.02	3.74	1205	0.01
Δ <sup>3</sup> -Carene	4.41	1007	0.01			
Limonene	4.74	1027	0.13	3.12	1157	0.13
( <i>Z</i> )-β-Ocimene	4.95	1041	0.25	3.71*	1203	0.25
( <i>E</i> )-β-Ocimene	5.11	1051	1.09	3.91	1217	1.10
2,6-Dimethyl-5-heptenal (melonal)	5.14	1053	0.01	5.19	1310	0.01
γ-Terpinene	5.16	1054	0.02	3.71*	1203	[0.25]
<i>cis</i> -Linalool oxide (fur.)	5.44	1072	0.02	6.44	1401	0.02
Octanol	5.52	1076	0.02	8.10*	1526	0.04
Terpinolene	5.69*	1087	0.03	4.21	1239	0.02
<i>trans</i> -Linalool oxide (fur.)	5.69*	1087	[0.03]	6.81	1428	0.02
Rosefuran	5.87	1098	0.01	5.92	1362	0.01
Linalool	5.95	1103	2.03	7.98	1516	2.00
Nonanal	5.98	1106	0.04	5.78	1353	0.03
<i>cis</i> -para-Menth-2-en-1-ol	6.20	1119	0.01	8.02	1519	0.01
Unknown [m/z 95, 123 (73), 67 (64), 82 (54), 41 (47), 55 (27)...]	6.38	1131	0.01			
Camphor	6.47	1136	0.01	7.11	1451	0.01
<i>trans</i> -para-Menth-2-en-1-ol	6.49	1138	0.01	8.85	1584	0.01
α-Phellandren-8-ol	6.91	1165	0.01	10.08	1684	0.02
Terpinen-4-ol	7.04	1173	0.01			
Menthol	7.08	1175	0.01	9.10	1604	0.01
Isogeranial	7.21	1184	0.01	8.10*	1526	[0.04]
α-Terpineol	7.30	1190	0.02	9.69*	1651	0.04
Decanal	7.58	1207	0.01	7.20	1457	0.02



Nerol	7.92	1230	0.19	10.97	1758	0.20
2,3-Epoxygeranial?	7.96*	1233	0.04			
Citronellol	7.96*	1233	[0.04]	10.64	1730	0.02
Neral	8.07	1240	0.26	9.38*	1626	0.28
Isoamyl hexanoate	8.27	1254	0.02	6.76	1425	0.01
Geraniol	8.51	1269	80.27	11.64	1816	79.85
Geranial	8.57	1273	0.55	10.01*	1677	0.52
Geranyl formate	9.04	1302	0.09	9.80	1660	0.12
2,3-Epoxygeraniol?	9.53	1337	0.06			
Citronellyl acetate	9.78	1355	0.03	9.38*	1626	[0.28]
Neryl acetate	9.92	1365	0.02	10.13	1688	0.01
Unknown [m/z 43, 41 (25), 67 (24), 109 (23), 93 (20), 69 (19)...]	10.12	1379	0.01	13.56	1990	0.01
Geranyl acetate	10.24	1387	9.59	10.48	1717	9.47
β-Elemene	10.27	1390	0.08	8.33*	1543	1.43
β-Caryophyllene	10.61	1414	1.40	8.33*	1543	[1.43]
α-Guaiene	10.93	1438	0.01	8.33*	1543	[1.43]
α-Humulene	11.07	1448	0.10	9.18	1611	0.09
Germacrene D	11.44	1476	0.02	9.69*	1651	[0.04]
Unknown [m/z 189, 133 (75), 91 (71), 105 (69), 93 (44)... 204 (33)]	11.47	1479	0.05	9.47	1634	0.06
β-Selinene	11.50	1481	0.03	9.76	1658	0.03
Valencene	11.61*	1489	0.04	9.84	1664	0.01
α-Selinene	11.61*	1489	[0.04]	9.89	1668	0.02
α-Muurolene	11.69	1494	0.02	10.01*	1677	[0.52]
γ-Cadinene	11.90	1511	0.01	10.27*	1699	0.07
7-epi-α-Selinene	11.91	1512	0.02	10.27*	1699	[0.07]
δ-Cadinene	12.02	1520	0.01	10.33	1704	0.01
α-Elemol	12.35	1546	0.01	13.99	2031	0.02
Unknown [m/z 59, 68 (63), 43 (31), 67 (27), 81 (27), 94 (25), 69 (23), 41 (22), 84 (20)...]	12.46	1555	0.02			
Geranyl butyrate	12.54	1561	0.17	12.06*	1854	0.17
(E)-Nerolidol	12.58	1564	0.11	13.67	2001	0.11
Caryophyllene oxide	12.72*	1575	0.22	12.66	1909	0.20
Caryophyllene oxide isomer	12.72*	1575	[0.22]	12.58	1902	0.03
Geranyl isovalerate	13.05	1601	0.01	12.06*	1854	[0.17]
Caryophylladienol II	13.40	1630	0.02	15.94	2223	0.02
Precocene II	13.76	1660	0.03	17.05	2340	0.08

(2E,6Z)-Farnesol	14.25	1700	0.03	16.38	2268	0.02
(2E,6Z)-Farnesal	14.41	1713	0.09	15.29	2157	0.01
(2E,6E)-Farnesol	14.50	1721	0.77	16.71	2303	0.75
Geranyl caproate	14.89	1754	0.60	14.14	2046	0.60
(2E,6E)-Farnesyl acetate	15.87	1841	0.08	15.82*	2210	0.07
Phytone	15.92	1845	0.03	14.58	2087	0.05
Geranyl caprylate	17.04	1949	0.12	15.82*	2210	[0.07]
Unknown [m/z 69, 41 (49), 81 (47), 93 (21), 95 (30), 43 (26)...]	18.17	2058	0.01			
Unknown [m/z 69, 41 (37), 81 (23), 95 (19), 109 (18)...]	18.65	2105	0.01	18.84	2540	0.02
<b>Total identified</b>		<b>99.16%</b>			<b>98.22%</b>	
<b>Total reported</b>		<b>99.28%</b>			<b>98.31%</b>	

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

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