

Date : 2023-09-01

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 23H24-NPA02

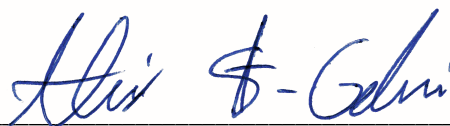
Customer Identification : Sage - Salvia lavandulifolia - Spain - NPS00102 - Lot # NP0214

Type : Essential Oil

Source : Salvia lavandulifolia

Customer : Nature Packaged

Checked and approved by:



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

Notes: This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.

This report is an update from the first version issued on 2023-08-31 to format it for online publication.



GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

✖ISO

Results : See analysis summary (next page)

Analyst : Sylvain Mercier, M. Sc., Chimiste 2014-005

Date : 2023-08-28

PHYSICOCHEMICAL DATA

Refractive index : 1.4676 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Dany Massé B. Sc. Chimiste

Date : 2023-08-24

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
β -Isoamylene	0.04	Alkene
Ethanol	0.01	Aliphatic alcohol
Isobutyral	tr	Aliphatic aldehyde
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
Isovaleral	0.02	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
Hashishene	0.10	Monoterpene
Tricyclene	0.24	Monoterpene
α -Thujene	0.15	Monoterpene
α -Pinene	4.91	Monoterpene
β -Fenchene ?	tr	Monoterpene
Camphene	6.53	Monoterpene
α -Fenchene	0.03	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
β -Pinene	4.73	Monoterpene
Sabinene	1.44	Monoterpene
Octen-3-ol	0.04	Aliphatic alcohol
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Octan-3-one	0.02	Aliphatic ketone
Dehydro-1,8-cineole	0.01	Monoterpenic ether
Myrcene	2.41	Monoterpene
Pseudolimonene	0.02	Monoterpene
α -Phellandrene	0.04	Monoterpene
Δ^3 -Carene	0.03	Monoterpene
α -Terpinene	0.17	Monoterpene
Unknown	0.03	Unknown
<i>para</i> -Cymene	0.35	Monoterpene
Limonene	4.55	Monoterpene
1,8-Cineole	27.54	Monoterpenic ether
(Z)- β -Ocimene	0.14	Monoterpene
(E)- β -Ocimene	0.10	Monoterpene
γ -Terpinene	0.35	Monoterpene
<i>cis</i> -Sabinene hydrate	0.11	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
<i>trans</i> -Linalool oxide (fur.)	0.05	Monoterpenic alcohol

Terpinolene	0.27	Monoterpene
<i>para</i> -Cymenene	0.06	Monoterpene
α -Pinene oxide	0.01	Monoterpenic ether
<i>trans</i> -Sabinene hydrate	0.05	Monoterpenic alcohol
Unknown	0.04	Unknown
Linalool	1.72	Monoterpenic alcohol
α -Thujone	0.02	Monoterpenic ketone
β -Thujone	0.01	Monoterpenic ketone
Hotrienol	0.06	Monoterpenic alcohol
Octen-3-yl acetate	0.02	Aliphatic ester
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
α -Campholenal	0.13	Monoterpenic aldehyde
Camphor	25.49	Monoterpenic ketone
<i>trans</i> -Sabinol	1.06	Monoterpenic alcohol
β -Pinene oxide	0.02	Monoterpenic ether
Isoborneol	0.04	Monoterpenic alcohol
Pinocarvone	0.03	Monoterpenic ketone
Borneol	2.54	Monoterpenic alcohol
δ -Terpineol	0.27	Monoterpenic alcohol
Terpinen-4-ol	0.53	Monoterpenic alcohol
Thuj-3-en-10-al	0.02	Monoterpenic aldehyde
<i>para</i> -Cymen-8-ol	0.06	Monoterpenic alcohol
<i>trans</i> -Isocarveol	0.02	Monoterpenic alcohol
α -Terpineol	0.69	Monoterpenic alcohol
Myrtenal	0.01	Monoterpenic aldehyde
Myrtenol	0.05	Monoterpenic alcohol
<i>trans</i> -Isopiperitenol	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
Verbenone	0.02	Monoterpenic ketone
<i>trans</i> -Carveol	0.03	Monoterpenic alcohol
<i>cis</i> -Isocarveol	0.02	Monoterpenic alcohol
Nerol	0.06	Monoterpenic alcohol
(3Z)-Hexenyl isovalerate	0.02	Aliphatic ester
Neral	0.01	Monoterpenic aldehyde
Carvone	0.08	Monoterpenic ketone
Linalyl acetate	3.48	Monoterpenic ester
Geraniol	0.48	Monoterpenic alcohol
Unknown	0.02	Unknown
Geranial	0.06	Monoterpenic aldehyde
Bornyl acetate	0.77	Monoterpenic ester
<i>trans</i> -Sabinyl acetate	1.74	Monoterpenic ester
Thymol	0.01	Monoterpenic alcohol
δ -Terpinyl acetate	0.05	Monoterpenic ester
Hodiendiol derivative	0.02	Oxygenated monoterpene
α -Terpinyl acetate	0.79	Monoterpenic ester

Neryl acetate	0.06	Monoterpenic ester
Bornyl propionate	0.12	Monoterpenic ester
<i>trans</i> -Sabinyl propionate	0.03	Monoterpenic ester
Geranyl acetate	0.24	Monoterpenic ester
β -Elemene	0.03	Sesquiterpene
Unknown	0.01	Unknown
α -Gurjunene	0.08	Sesquiterpene
β -Caryophyllene	0.93	Sesquiterpene
Aromadendrene	0.03	Sesquiterpene
α -Humulene	0.49	Sesquiterpene
allo-Aromadendrene	0.04	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.02	Sesquiterpene
γ -Muurolene	0.03	Sesquiterpene
Geranyl propionate	0.49	Monoterpenic ester
Germacrene D	0.02	Sesquiterpene
<i>ar</i> -Curcumene	0.04	Sesquiterpene
Bicyclogermacrene	0.26	Sesquiterpene
α -Muurolene	0.05	Sesquiterpene
γ -Cadinene	0.07	Sesquiterpene
β -Curcumene	0.01	Sesquiterpene
Geranyl isobutyrate	0.06	Monoterpenic ester
δ -Cadinene	0.15	Sesquiterpene
α -Cadinene	0.01	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.03	Sesquiterpene
Geranyl butyrate	0.03	Monoterpenic ester
Germacrene D-4-ol	0.03	Sesquiterpenic alcohol
Spathulenol	0.14	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.15	Sesquiterpenic ether
Viridiflorol	0.10	Sesquiterpenic alcohol
Humulene epoxide II	0.05	Sesquiterpenic ether
Geranyl isovalerate	0.03	Monoterpenic ester
Unknown	0.01	Oxygenated sesquiterpene
Caryophylladienol I	0.01	Sesquiterpenic alcohol
τ -Cadinol	0.02	Sesquiterpenic alcohol
τ -Muurolol	0.02	Sesquiterpenic alcohol
α -Cadinol	0.03	Sesquiterpenic alcohol
Shyobunol	0.08	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
Consolidated total	99.21	

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

Note: no correction factor was applied

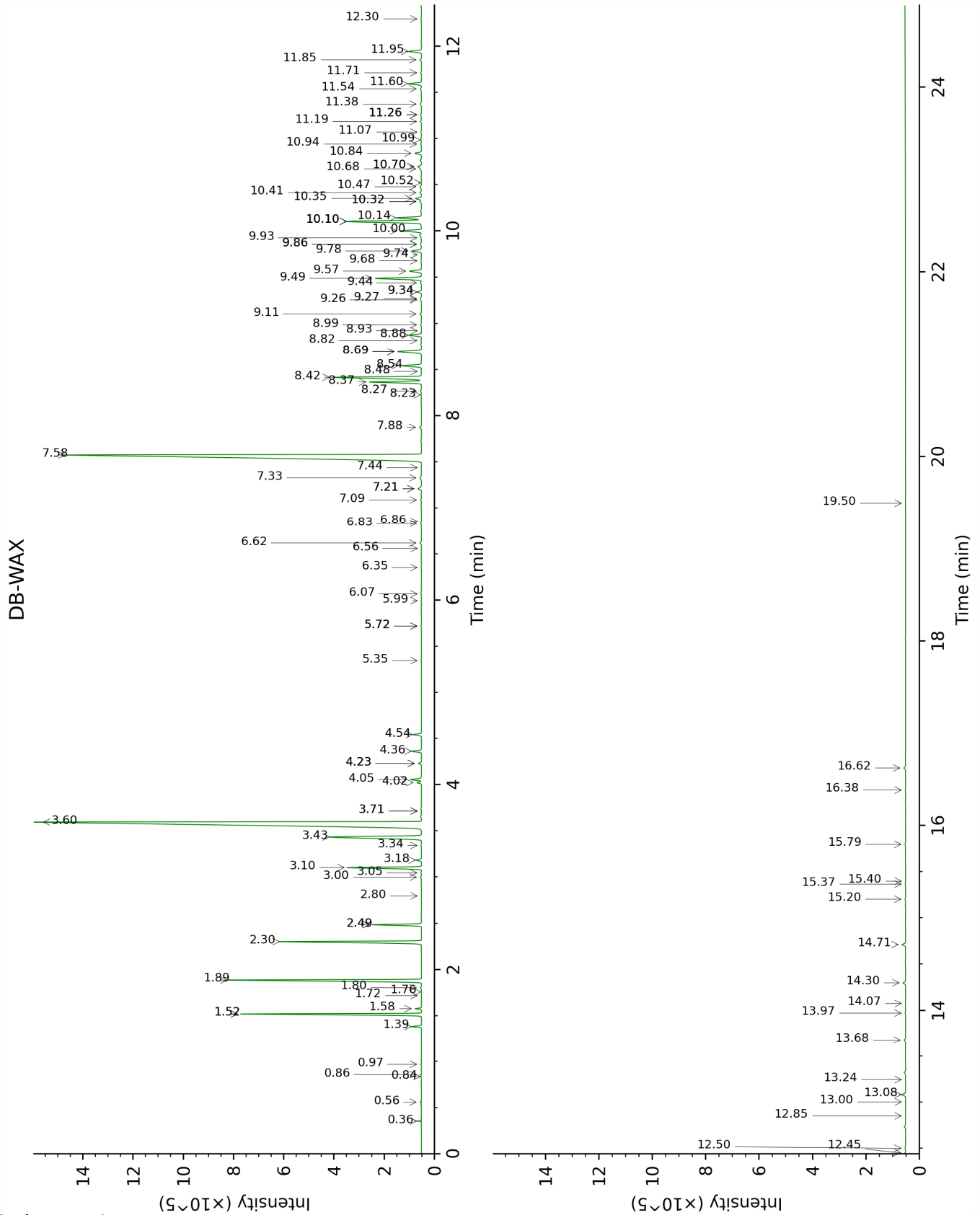
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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

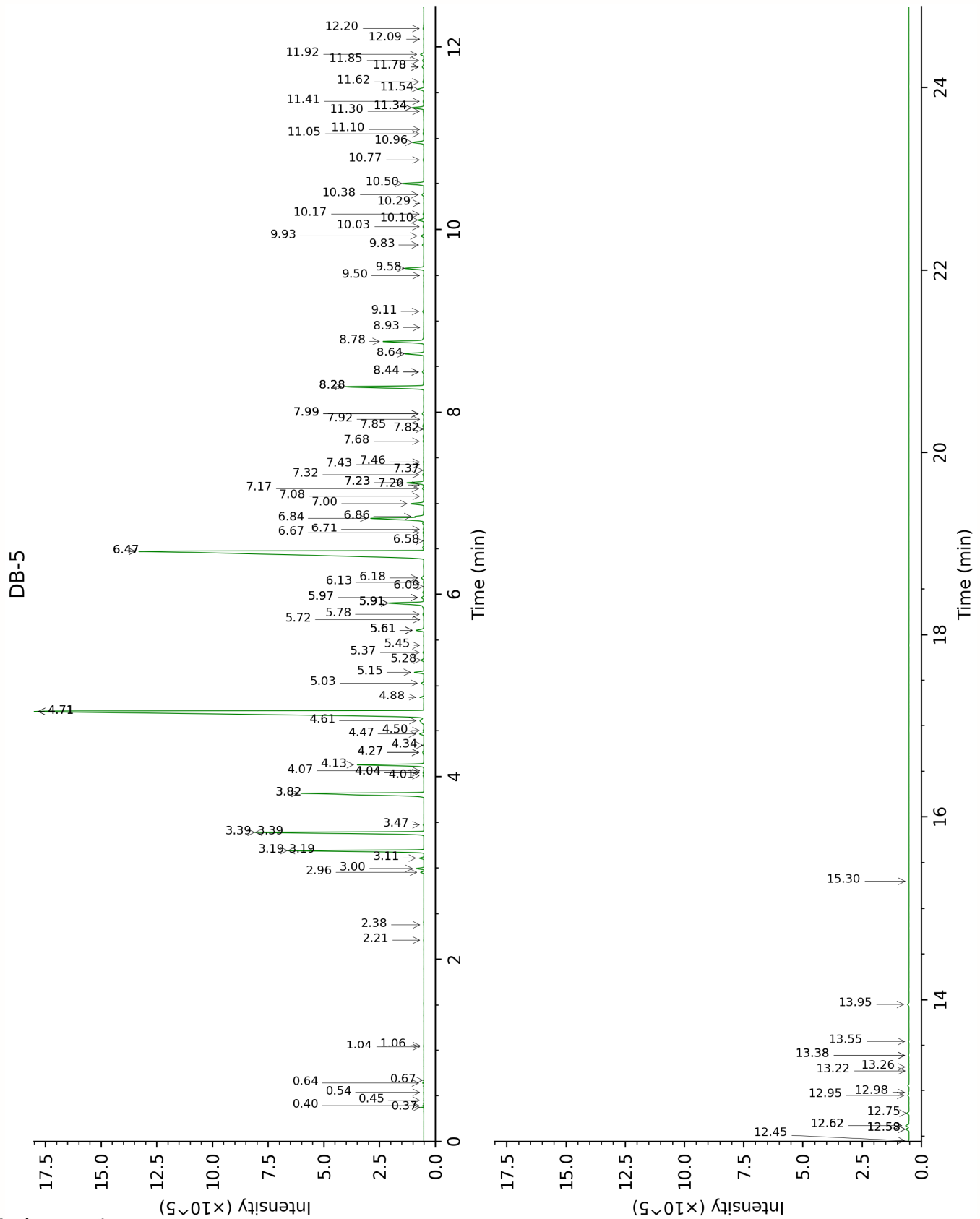
chromatograms in this report to access the full untreated data and perform their own calculations if needed.

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.

Bracketed value (xx): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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





FULL ANALYSIS DATA

β-Isoamylene	Column DB-WAX			Column DB-5		
	0.36	516.8	0.04	0.37	501.8	0.04
Ethanol	0.97	910.4	0.01	0.40	501.9	0.01
Isobutyral	0.56	785.8	0.02	0.45	538.4	tr
2-Methyl-3-buten-2-ol	1.76	1015.6	tr	0.54	607.7	tr
Isovaleral	0.86	890.3	0.02	0.64	642.0	0.02
2-Methylbutyral	0.84	883.5	0.01	0.67	652.3	0.01
Isoamyl alcohol	3.71*	1180.4	[0.01]	1.04	734.1	tr
2-Methylbutanol	3.71*	1180.4	[0.01]	1.06	737.0	tr
(3Z)-Hexenol	5.99	1343.6	0.01	2.21	858.8	0.01
Hexanol	5.72*	1324.1	[0.02]	2.38	872.5	tr
Hashishene	1.52*	992.5	[5.00]	2.96	916.7	0.10
Tricyclene	1.38	972.1	0.25	3.00	919.4	0.24
α-Thujene	1.58	998.7	0.15	3.11	926.8	0.15
α-Pinene	1.52*	992.5	[5.00]	3.19*	932.2	[4.91]
β-Fenchene ?	1.72	1011.9	tr	3.19*	932.2	[4.91]
Camphene	1.89	1027.7	6.53	3.39*	945.3	[6.59]
α-Fenchene	1.80	1019.9	0.03	3.39*	945.3	[6.59]
Thuja-2,4(10)-diene	2.49*	1084.3	[1.44]	3.47	950.7	0.02
β-Pinene	2.30	1066.9	4.73	3.82*	973.3	[6.16]
Sabinene	2.49*	1084.3	[1.44]	3.82*	973.3	[6.16]
Octen-3-ol	7.09	1422.8	0.04	4.01	985.9	0.04
6-Methyl-5-hepten-2-one	5.35	1297.4	0.01	4.04*	988.1	[0.03]
Octan-3-one	4.23*	1218.7	[0.10]	4.04*	988.1	[0.03]
Dehydro-1,8-cineole	3.34	1151.7	0.02	4.07	989.5	0.01
Myrcene	3.10	1133.4	2.39	4.13	993.8	2.41
Pseudolimonene	3.05	1129.0	0.02	4.27*	1002.6	[0.07]
α-Phellandrene	3.00	1125.4	0.04	4.27*	1002.6	[0.07]
Δ ³ -Carene	2.80	1109.9	0.01	4.34	1007.6	0.03
α-Terpinene	3.18	1139.6	0.18	4.47	1015.3	0.17
Unknown THVU XXI [m/z 96, 55 (91), 81 (84), 83 (82), 152 (77), 95 (68), 109 (57), 137 (52)]				4.50	1017.7	0.03
para-Cymene	4.36	1228.3	0.33	4.61	1024.4	0.35
Limonene	3.43	1158.8	4.55	4.71*	1030.6	[32.13]
1,8-Cineole	3.60	1171.2	27.54	4.71*	1030.6	[32.13]
(Z)-β-Ocimene	4.02	1203.7	0.14	4.88	1040.7	0.14

(E)-β-Ocimene	4.23*	1218.7	[0.10]	5.03	1050.4	0.10
γ-Terpinene	4.05	1206.0	0.37	5.15	1057.8	0.35
cis-Sabinene hydrate	7.21*	1431.8	[0.16]	5.28	1066.1	0.11
cis-Linalool oxide (fur.)	6.83	1403.8	0.04	5.37	1071.3	0.03
Octanol	8.48	1526.6	0.02	5.44	1076.3	0.01
trans-Linalool oxide (fur.)	7.21*	1431.8	[0.16]	5.61*	1086.4	[0.33]
Terpinolene	4.54	1241.4	0.27	5.61*	1086.4	[0.33]
para-Cymenene	6.62	1388.2	0.06	5.61*	1086.4	[0.33]
α-Pinene oxide	5.72*	1324.1	[0.02]	5.72	1093.7	0.01
trans-Sabinene hydrate	8.27	1510.4	0.04	5.78	1097.3	0.05
Unknown CASA I [m/z 43, 59 (37), 79 (33), 91 (32), 119 (31)...]	9.34*	1593.0	[0.16]	5.91*	1105.1	[1.74]
Linalool	8.36	1517.9	1.72	5.91*	1105.1	[1.74]
α-Thujone	6.35	1369.2	0.02	5.91*	1105.1	[1.74]
β-Thujone	6.56	1384.0	0.01	5.97*	1108.9	[0.11]
Hotrienol	9.11	1574.8	0.06	5.97*	1108.9	[0.11]
Octen-3-yl acetate	6.07	1348.9	0.01	6.09	1116.6	0.02
trans-para-Mentha-2,8-dien-1-ol	9.26	1586.4	0.02	6.13	1119.5	0.02
α-Campholenal	7.33	1440.5	0.09	6.18	1122.5	0.13
Camphor	7.58	1458.7	25.49	6.47*	1140.9	[26.55]
trans-Sabinol	10.10*†	1654.1	[3.16]	6.47*	1140.9	[26.55]
β-Pinene oxide	6.86	1405.6	0.01	6.58	1148.2	0.02
Isoborneol	9.68	1620.0	0.03	6.68	1153.9	0.04
Pinocarvone	8.23	1507.3	0.03	6.71	1156.3	0.03
Borneol	10.10*†	1654.1	[3.16]	6.84	1164.5	2.54
δ-Terpineol	9.78	1628.5	0.37	6.86	1165.7	0.27
Terpinen-4-ol	8.88	1557.3	0.47	7.00	1174.7	0.53
Thuj-3-en-10-al	8.99	1565.8	0.04	7.08	1179.9	0.02
para-Cymen-8-ol	11.85	1799.9	0.06	7.17	1185.2	0.06
trans-Isocarveol	11.26*	1749.6	[0.05]	7.20	1187.6	0.02
α-Terpineol	10.10*†	1654.1	[3.16]	7.23*	1189.2	[0.70]
Myrtenal	8.92	1560.9	0.01	7.23*	1189.2	[0.70]
Myrtenol	11.19	1743.5	0.04	7.32	1194.9	0.05
trans-Isopiperitenol	10.70*	1702.6	[0.17]	7.37	1197.9	0.02
Unknown PIMA 7 [m/z 95, 93 (32),	11.26*	1749.6	[0.05]	7.43	1201.9	0.01

121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]						
Verbenone	9.93	1639.9	0.02	7.46	1203.6	0.02
<i>trans</i> -Carveol	11.71	1787.6	0.03	7.68	1218.7	0.03
<i>cis</i> -Isocarveol	12.30	1838.6	0.03	7.82	1227.6	0.02
Nerol	11.38	1759.3	0.07	7.85	1229.9	0.06
(3 <i>Z</i>)-Hexenyl isovalerate	7.44	1448.6	0.01	7.92	1234.7	0.02
Neral	9.74	1625.3	0.01	7.98*	1238.9	[0.09]
Carvone	10.32*	1671.3	[0.07]	7.98*	1238.9	[0.09]
Linalyl acetate	8.42	1521.8	3.48	8.28*	1258.6	[3.88]
Geraniol	11.94	1807.9	0.48	8.28*	1258.6	[3.88]
Unknown THVU XV [m/z 82, 109 (35), 135 (22), 127 (19), 54 (16), 43 (14)...]				8.44*	1269.3	[0.08]
Geranial	10.41	1679.0	0.06	8.44*	1269.3	[0.08]
Bornyl acetate	8.54	1531.5	0.76	8.64	1282.6	0.77
<i>trans</i> -Sabinyl acetate	9.49	1604.9	1.74	8.78	1292.0	1.74
Thymol	15.40	2126.4	0.01	8.93	1302.2	0.01
δ -Terpinyl acetate	9.44	1600.9	0.04	9.11	1314.4	0.05
Hodiendiol derivative	13.24	1923.1	0.01	9.50	1341.9	0.02
α -Terpinyl acetate	10.00	1646.0	0.79	9.58	1347.4	0.79
Neryl acetate	10.48	1684.0	0.07	9.83	1365.3	0.06
Bornyl propionate	9.34*	1593.0	[0.16]	9.93	1372.2	0.12
<i>trans</i> -Sabinyl propionate				10.03	1379.3	0.03
Geranyl acetate	10.84	1714.7	0.26	10.10	1384.4	0.24
β -Elemene	8.69*	1543.2	[0.96]	10.17	1388.9	0.03
Unknown THAR II [m/z 69, 43 (95), 41 (53), 71 (47), 81 (26), 135 (26)...]	12.85	1887.3	0.01	10.29	1397.2	0.01
α -Gurjunene	7.88	1480.7	0.07	10.38	1403.8	0.08
β -Caryophyllene	8.69*	1543.2	[0.96]	10.50	1412.9	0.93
Aromadendrene	8.82	1552.8	0.02	10.77	1432.6	0.03
α -Humulene	9.57	1611.1	0.49	10.96	1446.9	0.49
allo- Aromadendrene	9.27	1587.5	0.05	11.05	1453.8	0.04
(<i>E</i>)- β -Farnesene	9.86*	1634.3	[0.06]	11.10	1457.3	0.02
γ -Murolene	9.86*	1634.3	[0.06]	11.30	1472.0	0.03

Geranyl propionate	11.60	1777.8	0.49	11.34*	1474.9	[0.51]
Germacrene D	10.14*†	1657.2	[0.93]	11.34*	1474.9	[0.51]
ar-Curcumene	10.94	1723.1	0.04	11.41	1480.1	0.04
Bicyclogermacrene	10.35	1673.9	0.24	11.54	1490.1	0.26
α-Muurolene	10.32*	1671.3	[0.07]	11.62	1495.9	0.05
γ-Cadinene	10.68	1700.6	0.07	11.78*	1508.2	[0.09]
β-Curcumene	10.52	1687.5	0.01	11.78*	1508.2	[0.09]
Geranyl isobutyrate	11.54	1773.1	0.06	11.85	1513.8	0.06
δ-Cadinene	10.70*	1702.6	[0.17]	11.92	1519.1	0.15
α-Cadinene	11.07	1733.9	0.03	12.09	1532.1	0.01
(E)-α-Bisabolene	10.99	1726.8	0.03	12.20	1541.2	0.03
Geranyl butyrate	12.45	1851.8	0.04	12.45	1560.4	0.03
Germacrene D-4-ol	13.97	1989.5	0.03	12.58*	1570.4	[0.15]
Spathulenol	14.71	2059.8	0.14	12.58*	1570.4	[0.15]
Caryophyllene oxide isomer	13.00	1901.0	0.01	12.62*	1573.5	[0.15]
Caryophyllene oxide	13.08	1908.3	0.15	12.62*	1573.5	[0.15]
Viridiflorol	14.30	2020.6	0.11	12.75	1584.1	0.10
Humulene epoxide II	13.68	1962.7	0.06	12.95	1599.4	0.05
Geranyl isovalerate	12.50	1856.6	0.03	12.98	1602.0	0.03
Unknown SAOF VI [m/z 41, 91 (78), 67 (76), 119 (70), 55 (61)... 220 (7)]	14.08	1999.3	0.01	13.22	1621.3	0.01
Caryophylladienol I	16.38	2225.1	0.02	13.26	1624.9	0.01
τ-Cadinol	15.20	2107.2	0.02	13.38*	1635.2	[0.04]
τ-Muurolol	15.36	2123.2	0.02	13.38*	1635.2	[0.04]
α-Cadinol	15.79	2165.7	0.03	13.55	1648.5	0.03
Shyobunol	16.62	2249.5	0.07	13.95	1681.9	0.08
Unknown SCMO VIII [m/z 43, 41 (72), 95 (69), 81 (66), 67 (55), 55 (52), 79 (52), 69 (50)... 238 (1)]	19.50	2562.8	0.01	15.30	1797.5	0.01
Total reported		98.84%			99.14%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is taken into account in the consolidated total

Essential Oil, *Salvia lavandulifolia*

Internal code: 23H24-NPA02

Sage - *Salvia lavandulifolia* - Spain - NPS00102 - Lot # NP0214

Report prepared for:

Nature Packaged

†: 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