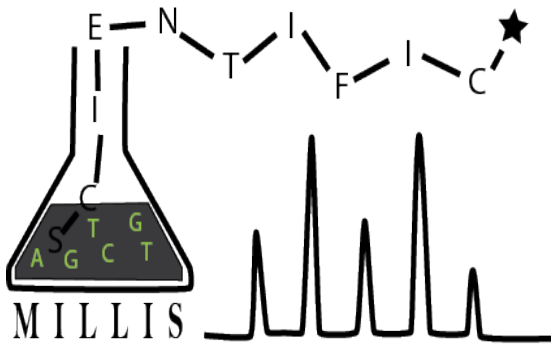

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Analytical Report

Title	Nicotine purity by GC-MS
Report No.	010217-03
Issue Date	January 02, 2017
Notebook reference	18-7-03
Contributors:	Alexei Gapeev
Quote No.	
Requester	Ben McCalla Om Vapor, LLC

Specific Aims

1. Confirm the identity of nicotine by GC-MS
2. Determine purity by GC-MS
3. Determine levels of tobacco specific nitrosamines, NNN[1] and NNK[2] with 10 ppm cut-off.

Samples

The sample as off-yellow color liquid.

Experimental

1. Prior to analysis the sample was dissolved in methanol to concentration of 20 mg/ml.
2. GC-MS analysis. Waters/Micromass Quatro GC mass spectrometer

1 N'-nitrosonornicotine
2 (4-methylnitrosamino)-1-(3-pyridyl)-1-butanone

interfaced to a Thermo Electron Trace gas chromatograph was utilized for the analysis. 30 M 0.25 mm ID DB-624 column was used to separate components. Carrier gas was helium at 2.0 ml/min at split ratio of 10.

3. MS system. Waters/Micromass Quattro Micro was used to obtain the MS data.

GC conditions:

Injector temperature:	250 C
Initial oven temperature:	80 C
Initial hold	2 min
Ramp I	10 C/min
Final temperature I	280 C

MS parameters

Ionization and ion polarity	EI+
Scan rate	2 scans/sec
Mass range	35-300 Da
Ion source temperature	150
Transfer line temperature	280C

4. Data treatment. For each sample, a set of target components was identified with the aid of the AMDIS software[3].The components were identified using the NIST mass spectral library[4].

Deliverables

1. GC-MS chromatogram. Shown in Appendix I is the GC-MS chromatogram acquired at the conditions described above.

2. Identity and levels of compounds in the samples:

3 http://chemdata.nist.gov/mass-spc/amdis/
4 http://www.nist.gov/srd/nist1a.cfm

RT (min)	Compound	Area, AU	% Relative Area
14.2	Nicotine	>112531304	>88.6[5]
15.52	Myosmine	625180	<0.55
16.2	Nicotyrine	135839	<0.12
19.6	Cotinine	848163	<0.74

Table 1: Compounds identified and their relative levels

RT (min)	Compound	Level
23.6	NNN	N/D
25.5	NNK	N/D

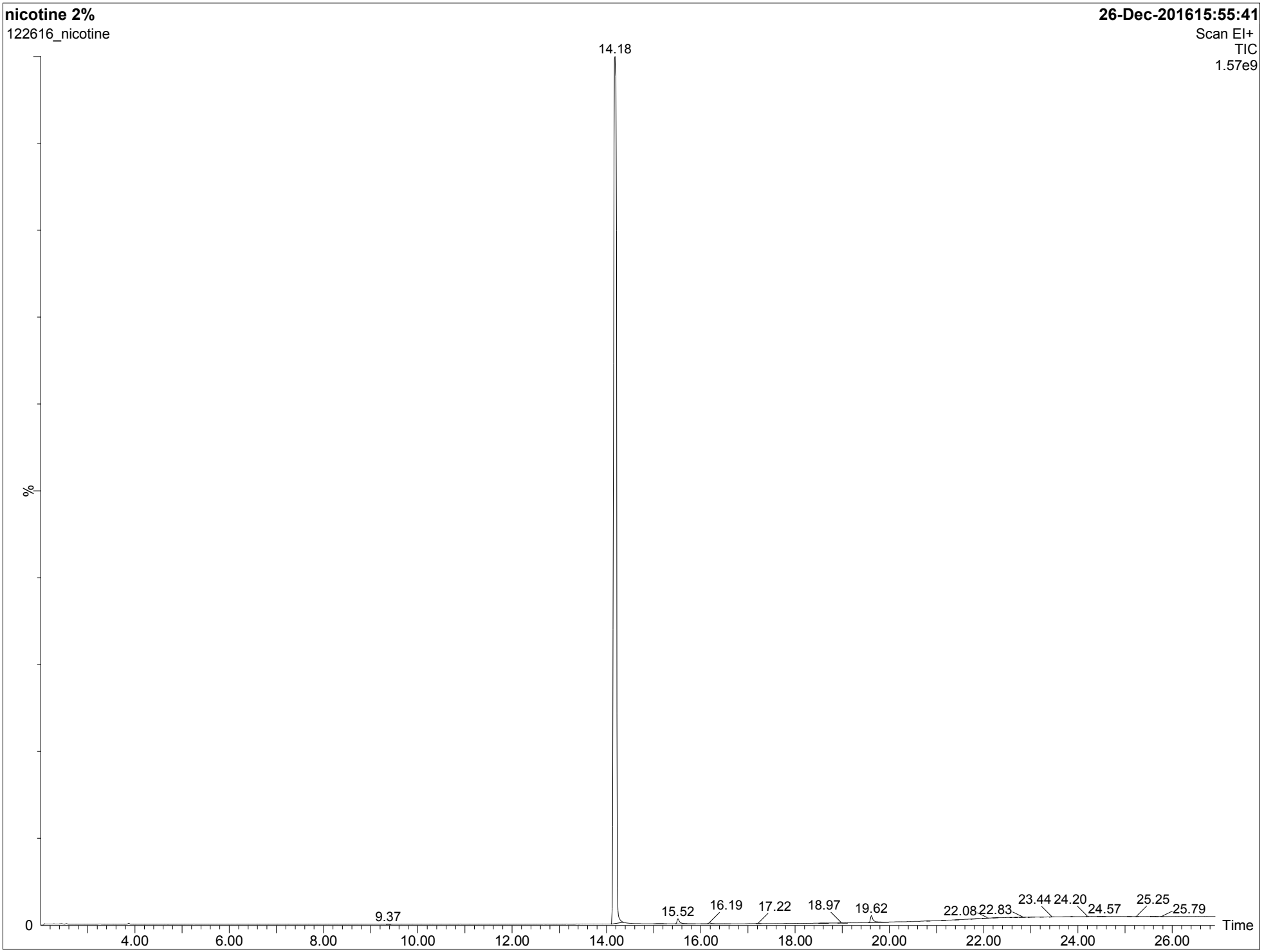
Table 2: Target compound levels. Concentration units are ppm or N/D, not detected.

Conclusion

The submitted material is nicotine with impurity identities and levels as stated above.

5 Nicotine peak resulted in detector overload. Actual ion count is higher. Consequently reported purity is the lower limit. Actual purity is higher.

APPENDIX I


nicotine 2%
122616_nicotine
26-Dec-201615:55:41
Scan EI+
TIC
1.57e9
14.18
%
0
9.37
15.52
16.19
17.22
18.97
19.62
22.08
22.83
23.44
24.20
24.57
25.25
25.79
Time
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00