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RJRT Project Team: Joy Bodnar

Characterization of Tobacco-Minor Alkaloids

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Characterization of Tobacco

Analytical Test Report



Prepared for *RAI Services Company*

Project Code: M273

Date: April 6, 2016

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2 USE OF LABSTAT'S¹ ANALYTICAL REPORTS

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3 ADMINISTRATIVE INFORMATION

3.1 QUOTATION IDENTIFICATION

Quotation Number: T5477

Date of Quotation: February 19, 2016

Recipient's Name: Dr. Joy Bodnar

3.2 CLIENT IDENTIFICATION

RAI Services Company

950 Reynolds Boulevard

Winston-Salem NC 27102

U.S.A.

4 SAMPLE HANDLING

4.1 CHAIN OF CUSTODY

The samples to be tested for project M273 were received on March 10, 2016 and on March 11, 2016 via UPS.

4.2 SAMPLE CHARACTERIZATION AND CODING

4.2.1 SAMPLE CHARACTERISTICS

The shipment received on March 10, 2016 consisted of 7 packs of one sample. The shipment received on March 11, 2016 consisted of one plastic bag for each of 14 samples. There was no physical damage to the bags.

4.2.2 SAMPLE IDENTIFICATION

The following sample codes have been used to identify the products associated with the results in each of the tables that are part of this report.

Sample ID	Sample Name	Product Description
1680360	Part H	CRP1 reference snus (24 gram pouches/tin)
1680361	Part A	General White Mint Snus (1.2 oz)
1680362	Part B	General Wintergreen Snus (1.2 oz)
1680363	Part C	Longhorn Wintergreen MS (1.2 oz)
1680364	Part D	Grizzly LC Wintergreen MS (1.2 oz)
1680365	Part E	Copenhagen LC MS (1.2 oz)
1680366	Part F	Navy Dry Snuff (1 oz can)

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Sample ID	Sample Name	Product Description
1680367	Part G	Railroad Mills Dry Snuff (1 oz can)
1680368	Part I	Camel Snus Frost (1.2 oz)
1680369	Part J	Camel Snus Frost Large (1.2 oz)
1680370	Part K	Camel Robust Large (1.2 oz)
1680371	Part L	Camel Winterchill Large (1.2 oz)
1680372	Part M	Camel Mint Snus (1.2 oz)
1680373	Part N	Camel Mellow Snus (1.2 oz)
1680374	Part O	W.E. Garrett & Sons Dry Snuff (1.1 oz can)

4.2.3 PHYSICAL MEASUREMENTS

Physical measurements were made on all tobacco products and no unusual findings were noted.

5 PROJECT-SPECIFIC INSTRUCTIONS

The samples were kept in the cryo freezer prior to testing.

6 EXPERIMENTAL DESIGN AND METHODS

The following is a summary of the instructions that have been received from the client in regard to the analysis of the tobacco products in this project.

6.1 PREPARATION OF LABORATORY COMPOSITE

A minimum sample size of 100g of tobacco is required for the testing of commercially available products. If this amount is not available, a smaller but adequate amount of sample is prepared for all analytical testing. Tobacco product is ground and sieved to ensure $\leq 4\text{mm}$ particle size, with analyses such as moisture, pH, nitrate, nitrite, eugenol and menthol being initiated as soon as possible following the preparation of the laboratory composite.

6.2 ANALYTICAL METHODS²

6.2.1 CONSTITUENT ANALYSIS

Test methods for the analysis of processed tobacco are referenced in the table(s) below and were practiced as written unless otherwise indicated (see "Method Modifications").

² The most current version available at the time of testing was used for all test methods listed.

OFFICIAL METHODS FOR THE COLLECTION OF DATA ON CONSTITUENTS³

Item	Constituent	Official Method	Method Description
1.	(a) Nicotine	T-301	<i>Determination of Alkaloids in Whole Tobacco</i>
	(b) Nornicotine		
	(c) Anabasine		
	(d) Myosmine		
	(e) Anatabine		
2.	Moisture	AOAC 966.02	<i>Loss on Drying (Moisture) in Tobacco, Gravimetric Method</i>

6.3 METHOD MODIFICATIONS

Methods were followed as written (see Section 6).

7 ACCEPTANCE OF DATA

7.1 EVALUATION OF RESULTS FROM CONTROL MATERIALS

Data obtained using control materials are deemed acceptable if the data are in keeping with Labstat's database for the control material and the specific method of analysis⁴. This is not a simple problem since there is no "yes" or "no" answer but rather one which is phrased in terms of probabilities. In the approach taken by Labstat, the measure of random variation in the procedure is taken to be the sample standard deviation (S.D. or "s").

To evaluate control data accuracy, a "Z score" statistic is determined as follows:

$$Z - score = \frac{\text{Sample Average} - \text{Historical Average}}{\text{Historical Standard Deviation}}$$

To evaluate control data precision, a "Chi-square" statistic is determined as follows:

$$Chi - square = (\text{Sample Size} - 1) \times \frac{(\text{Sample Standard Deviation})^2}{(\text{Historical Standard Deviation})^2}$$

P values are generated and the cut-off point (α) chosen in such a way as to minimize the chance of rejecting data which are legitimate members of the set (i.e. type 1 error). Thus, in most cases where the number of observed

³ Canadian Tobacco Reporting Regulations: 2000-07-19 Canada Gazette Part II, Vol. 134, No. 15 Part 3: Emissions from Designated Tobacco Products. Test method numbers refer to Health Canada methodologies which have been posted by Health Canada on the internet at site http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/legislation/reg/indust/index_e.html

⁴ A minimum of 30 results is normally required for the purpose of this comparison.

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control samples is greater than or equal to 5, z-score p-values are generated from the Standard Normal distribution.

The standard deviation rather than the standard error for the mean has been chosen when determining the 'Z score'. This allows for both project-to-project variation, which is inherent in the historical data, and the 'normal' run-to-run variability, which is present in the data set. The cut-off point for P values is a matter of judgment and has been set at 0.005 assuming the probability of falsely rejecting a data point is 0.5% (i.e. $\alpha=0.01$) or less for a two tailed test.

In instances where expected values are not known, a decision to accept the data is made based on observed levels of precision in comparison with that determined for similar analyses. Also, there are circumstances where the expected value may be "Below Detection Limits". In this case the decision to accept or reject the data is made upon the ability of the method to recover the analyte of interest either in the form of a laboratory fortified blank (LFB) or laboratory fortified matrix (LFM). Acceptable recoveries are close to 100%, but vary depending on the analyte.

7.2 IDENTIFICATION OF OUTLIERS⁵

7.2.1 OUTLIER DEFINITION

An outlying observation, or "outlier," is one that appears to deviate markedly from other members of the sample in which it occurs. In this case, there are two alternatives:

1. An outlying observation may be merely an extreme manifestation of the random variability inherent in the data. If this is true, the value is retained and processed in the same manner as the other observations in the sample.
2. The observation may be the result of gross deviation from prescribed experimental procedure or an error in calculating or recording the numerical value. In such cases, an investigation must be carried out. When the experimenter is clearly aware that a gross deviation from prescribed experimental procedure has taken place, the resultant observation is discarded (assignable cause) without recourse to a statistical test. A statistical test may always be used to support a judgment that a physical reason does actually exist for an outlier, or the statistical criterion may be used routinely as a basis to initiate action to find a physical cause.

7.2.2 STATISTICAL CRITERIA

There are a number of criteria for testing outliers. In all of these, the doubtful observation is included in the calculation of the numerical value of a sample criterion (or statistic) that is then compared with a critical value. The critical value is that which would be exceeded by chance with some specified (small) probability on the assumption that all the observations did indeed constitute a random sample from a single parent population, distribution or universe. The specified small probability is called the "significance level" and can be thought of as the risk of

⁵ The term "outlier" has been defined in International Standard ISO 3534-1:2006 entitled "Statistics - Vocabulary and symbols - Part 1: General statistical terms and terms used in probability"

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erroneously rejecting a good observation. A level of significance of 0.02 has been chosen in conjunction with the statistical test and tables described in ASTM E178-08⁶.

Significant departures from the expected results (i.e. "outliers") are viewed seriously, requiring an investigation for an assignable cause. This is a documented procedure that, at a minimum, consists of the following steps:

1. Review of all associated calculations to ensure that arithmetic errors have not been made
2. Review of linearity range for any standards
3. Assessment of instrument status
4. Review of reagents, columns, standards etc. to ensure that contamination or decomposition has not occurred
5. Review of sample preparation and handling procedures as they relate to the result in question

If the outlier is present in the analyte data and an assignable cause is found, the test result is removed from the data set but recorded in the quality control section of the laboratory's record of test results for that project. The analysis must then be repeated. If the outlier is present in the ancillary⁷ data and an assignable cause is found, the test result is not removed, but rather the outlying observation is replaced by the designation "AC" (Assignable Cause). If this investigation fails to determine an assignable cause, the test result is assumed to be a legitimate member of the data set and is included in all subsequent calculations.

8 RESULTS

8.1 QUALITY CONTROL

The control results for the variables of interest were acceptable as defined in section 7.1. Consequently it is reasonable to assume that the values determined for the test samples are reflective of the characteristics of the products as received and tested as described in the Analytical Methods section.

8.2 ANALYTICAL DATA

Individual results and the corresponding sample statistics (consisting of means, standard deviations, and 95% confidence limits) may be found in the data file, labeled *M273_wt_dataCF.xls*, which accompanies this report.

⁶ ASTM Designation: E178-08. Standard Practice for Dealing with Outlying Observations

⁷ Data, which are related, but not normally required as part of the reporting process (e.g. cigarette weights). Outliers in the analyte data that have an assignable cause are always repeated.

8.2.1 SAMPLE STATISTIC CALCULATIONS

In cases where a sample result is below the limit of detection (LOD), the average of the value zero (0) and the LOD is used in the sample statistic calculation. In cases where a sample result is between the LOD and the limit of quantification (LOQ), the average of the LOD and the LOQ is used in the sample statistic calculation.

9 ACCREDITATION

Labstat International ULC has been accredited by the Standards Council of Canada to International Standard ISO/IEC 17025:2005 "*General requirements for the competence of testing and calibration laboratories*" with a scope⁸ that includes all of the mandated tobacco-related Health Canada methods (see Tobacco Reporting Regulations dated 26 June 2000, Canada Gazette Part II, Vol. 134, No. 15 Schedules 1, 2 and 3 pages 1780 – 1785). The testing included in this report is within the scope of this accreditation, unless otherwise noted.



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10 AUTHORIZATION

This report has been reviewed by me and is certified, to the best of my knowledge, to be a true and accurate description of the procedures, protocols and test methods used to arrive at the data and/or findings that accompany this report.

Dated: April 6, 2016

Peter Joza,
Director, Science & Technology
Labstat International ULC

⁸ Labstat's accreditation scope is available on Standards Council of Canada website at:
http://palcan.scc.ca/specs/pdf/180_e.pdf

11 APPENDIX A: "RAW" DATA AND SUMMARY STATISTICS

See Accompanying Data Files or Enclosed CD

Use of Labstat's¹ Analytical Reports

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Sample ID	Sample Name	Product Description
1680360	Part H	CRP1 reference snus (24 gram pouches/tin)
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1680372	Part M	Camel Mint Snus (1.2 oz)
1680373	Part N	Camel Mellow Snus (1.2 oz)
1680374	Part O	W.E. Garrett & Sons Dry Snuff (1.1 oz can)



Limits of Detection (LOD) and Limits of Quantification (LOQ) Determined for Selected Constituents in Processed Tobacco

Health Canada Method	Analyte	Units	Processed Tobacco		
			LOD	LOQ	
Alkaloids					
T-301	Nicotine	µg/g (dry wt)	75.0	250	
T-301	Normicotine	µg/g (dry wt)	15.0	50.0	
T-301	Anabasine	µg/g (dry wt)	15.0	50.0	
T-301	Myosmine	µg/g (dry wt)	15.0	50.0	
T-301	Anatabine	µg/g (dry wt)	15.0	50.0	

Abbreviations: BDL, below detection limit; NQ, below quantitation limit; N/A, not applicable
Date of last review: May 30, 2012

NOTE: The above limits referred to samples processed as required by the referenced Health Canada Method (ie. either "as received" or "dried"). Corrections for the moisture content, determined independently, must be applied where applicable in order to convert the "as received" limits to limits expressed on a "dry weight" basis.

*NOTE: The LOD and LOQ are based on the lowest standard concentration used for calibration of the instruments as referenced in the Health Canada Method.

LOD Definition: The limit of detection (LOD) for a particular analyte is a statistically defined decision point that, with a specified probability, measured results falling at or above this point are interpreted to indicate an analyte concentration greater than zero within the sample.

LOQ Definition: The limit of quantification for a particular analyte is another statistically defined decision point that results falling at or above this point can be assigned a statistically significant numerical value with an associated level of precision. Values falling between the LOD and LOQ are interpreted as a positive but not quantifiable result for the analyte in question.

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Matrix Code	Sample ID	Nicotine [µg/g]				Nornicotine [µg/g]			
		Average	St Dev	L. Limit (95%)	U. Limit (95%)	Average	St Dev	L. Limit (95%)	U. Limit (95%)
WT	1680360	19471	324	18666	20277	183	18	138	229
WT	1680361	16715	177	16275	17155	169	7	151	187
WT	1680362	16329	673	14657	18001	186	13	154	219
WT	1680363	25985	296	25249	26721	263	2	259	267
WT	1680364	22239	579	20800	23678	213	21	162	264
WT	1680365	27046	204	26538	27553	250	17	207	292
WT	1680366	17496	446	16389	18603	367	62	213	521
WT	1680367	25018	208	24502	25534	587	74	404	769
WT	1680368	16732	263	16078	17387	237	17	194	279
WT	1680369	18232	561	16838	19626	261	49	138	384
WT	1680370	16057	541	14713	17401	228	22	173	283
WT	1680371	15665	49	15543	15787	212	7	195	229
WT	1680372	15207	185	14746	15667	204	13	173	235
WT	1680373	16322	324	15518	17126	207	24	147	267
WT	1680374	15025	285	14317	15732	231	28	161	300

Glossary of Abbreviations

NQ: Below the Limit of Quantification

N/A: Not Applicable

L. Limit (95%): lower limit of the 95% confidence interval

U. Limit (95%): upper limit of the 95% confidence interval

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Matrix Code	Sample ID	Anabasine [µg/g]				Myosmine [µg/g]			
		Average	St Dev	L. Limit (95%)	U. Limit (95%)	Average	St Dev	L. Limit (95%)	U. Limit (95%)
WT	1680360	71.2	1.8	66.7	75.8	NQ	NQ	N/A	N/A
WT	1680361	52.8	1.6	48.8	56.8	NQ	NQ	N/A	N/A
WT	1680362	53.5	2.1	48.2	58.8	NQ	NQ	N/A	N/A
WT	1680363	91.3	1.8	86.9	95.8	NQ	NQ	N/A	N/A
WT	1680364	93.5	3.3	85.2	102	NQ	NQ	N/A	N/A
WT	1680365	91.1	1.2	88.2	93.9	NQ	NQ	N/A	N/A
WT	1680366	69.2	2.0	64.1	74.3	NQ	NQ	N/A	N/A
WT	1680367	113	6	98.7	128	NQ	NQ	N/A	N/A
WT	1680368	77.0	3.4	68.5	85.5	56.3	4.4	45.3	67.3
WT	1680369	84.1	3.2	76.2	92.0	59.9	4.7	48.3	71.5
WT	1680370	77.6	3.7	68.5	86.7	NQ	NQ	N/A	N/A
WT	1680371	75.8	1.3	72.5	79.0	57.0	2.3	51.3	62.7
WT	1680372	73.4	3.6	64.6	82.3	54.7	5.1	42.0	67.5
WT	1680373	73.8	2.1	68.6	78.9	54.9	3.2	46.9	62.9
WT	1680374	56.7	2.5	50.6	62.8	NQ	NQ	N/A	N/A

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Matrix Code	Sample ID	Anatabine [µg/g]				Dry Matter (%)			
		Average	St Dev	L. Limit (95%)	U. Limit (95%)	Average	St Dev	L. Limit (95%)	U. Limit (95%)
WT	1680360	161	5	149	172	50.2	0.2	49.7	50.6
WT	1680361	153	1	151	155	47.6	1.0	45.0	50.2
WT	1680362	151	3	144	159	46.3	0.5	45.2	47.5
WT	1680363	340	5	327	353	46.0	0.1	45.8	46.2
WT	1680364	239	11	213	265	46.9	0.1	46.7	47.0
WT	1680365	306	4	297	315	43.4	0.1	43.1	43.7
WT	1680366	332	15	294	370	92.5	0.0	92.3	92.6
WT	1680367	538	13	507	570	91.7	0.0	91.7	91.7
WT	1680368	128	3	121	135	68.5	0.1	68.4	68.7
WT	1680369	148	7	130	166	69.0	0.2	68.4	69.5
WT	1680370	117	1	114	120	67.3	0.1	67.0	67.6
WT	1680371	118	0	117	119	68.9	0.1	68.7	69.1
WT	1680372	102	3	95.7	109	69.0	0.3	68.4	69.7
WT	1680373	112	3	104	121	68.1	0.4	67.3	69.0
WT	1680374	224	5	212	236	93.9	0.0	93.8	93.9

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Matrix Code	Sample ID	Moisture (%)			
		Average	St Dev	L. Limit (95%)	U. Limit (95%)
WT	1680360	49.8	0.2	49.4	50.3
WT	1680361	52.4	1.0	49.8	55.0
WT	1680362	53.7	0.5	52.5	54.8
WT	1680363	54.0	0.1	53.8	54.2
WT	1680364	53.1	0.1	53.0	53.3
WT	1680365	56.6	0.1	56.3	56.9
WT	1680366	7.55	0.05	7.43	7.67
WT	1680367	8.31	0.01	8.27	8.34
WT	1680368	31.5	0.1	31.3	31.6
WT	1680369	31.0	0.2	30.5	31.6
WT	1680370	32.7	0.1	32.4	33.0
WT	1680371	31.1	0.1	30.9	31.3
WT	1680372	31.0	0.3	30.3	31.6
WT	1680373	31.9	0.4	31.0	32.7
WT	1680374	6.15	0.04	6.05	6.24

**Table 1: Nicotine and Nicotine Related Contents of Processed Tobacco
(per gram 'Dry Weight' Basis)**

Sample ID	Nicotine [µg/g]	Nornicotine [µg/g]	Anabasine [µg/g]	Myosmine [µg/g]	Anatabine [µg/g]
1680360	19097	203	69.9	< 50.0 but ≥ 15.0	155
1680360	19660	179	70.6	< 50.0 but ≥ 15.0	163
1680360	19657	167	73.3	< 50.0 but ≥ 15.0	163
Average	19471	183	71.2	NQ	161
Std. Dev.	324	18	1.8	NQ	5
L. Limit (95%)	18666	138	66.7	N/A	149
U. Limit (95%)	20277	229	75.8	N/A	172
1680361	16511	161	51.2	< 50.0 but ≥ 15.0	152
1680361	16807	173	54.5	< 50.0 but ≥ 15.0	153
1680361	16827	174	52.7	< 50.0 but ≥ 15.0	154
Average	16715	169	52.8	NQ	153
Std. Dev.	177	7	1.6	NQ	1
L. Limit (95%)	16275	151	48.8	N/A	151
U. Limit (95%)	17155	187	56.8	N/A	155
1680362	17098	171	55.9	< 50.0 but ≥ 15.0	154
1680362	16043	194	52.0	< 50.0 but ≥ 15.0	150
1680362	15846	194	52.5	< 50.0 but ≥ 15.0	149
Average	16329	186	53.5	NQ	151
Std. Dev.	673	13	2.1	NQ	3
L. Limit (95%)	14657	154	48.2	N/A	144
U. Limit (95%)	18001	219	58.8	N/A	159
1680363	26244	262	90.5	< 50.0 but ≥ 15.0	342
1680363	25662	264	90.1	< 50.0 but ≥ 15.0	334
1680363	26050	261	93.4	< 50.0 but ≥ 15.0	344
Average	25985	263	91.3	NQ	340
Std. Dev.	296	2	1.8	NQ	5
L. Limit (95%)	25249	259	86.9	N/A	327
U. Limit (95%)	26721	267	95.8	N/A	353
1680364	21583	236	89.7	< 50.0 but ≥ 15.0	228
1680364	22679	209	94.8	< 50.0 but ≥ 15.0	250
1680364	22455	195	95.9	< 50.0 but ≥ 15.0	239
Average	22239	213	93.5	NQ	239
Std. Dev.	579	21	3.3	NQ	11
L. Limit (95%)	20800	162	85.2	N/A	213
U. Limit (95%)	23678	264	101.7	N/A	265

**Table 1: Nicotine and Nicotine Related Contents of Processed Tobacco
(per gram 'Dry Weight' Basis)**

Sample ID	Nicotine [µg/g]	Nornicotine [µg/g]	Anabasine [µg/g]	Myosmine [µg/g]	Anatabine [µg/g]
1680365	26857	268	92.4	< 50.0 but ≥ 15.0	303
1680365	27017	234	90.6	< 50.0 but ≥ 15.0	310
1680365	27263	247	90.2	< 50.0 but ≥ 15.0	305
Average	27046	250	91.1	NQ	306
Std. Dev.	204	17	1.2	NQ	4
L. Limit (95%)	26538	207	88.2	N/A	297
U. Limit (95%)	27553	292	93.9	N/A	315
1680366	17421	304	67.2	< 50.0 but ≥ 15.0	315
1680366	17974	370	69.0	< 50.0 but ≥ 15.0	345
1680366	17093	428	71.3	< 50.0 but ≥ 15.0	335
Average	17496	367	69.2	NQ	332
Std. Dev.	446	62	2.0	NQ	15
L. Limit (95%)	16389	213	64.1	N/A	294
U. Limit (95%)	18603	521	74.3	N/A	370
1680367	24976	510	107	< 50.0 but ≥ 15.0	525
1680367	24835	656	115	< 50.0 but ≥ 15.0	540
1680367	25244	594	118	< 50.0 but ≥ 15.0	550
Average	25018	587	113	NQ	538
Std. Dev.	208	74	6	NQ	13
L. Limit (95%)	24502	404	99	N/A	507
U. Limit (95%)	25534	769	128	N/A	570
1680368	16927	237	80.7	61.4	128
1680368	16432	253	73.9	53.2	131
1680368	16837	219	76.5	54.4	125
Average	16732	237	77.0	56.3	128
Std. Dev.	263	17	3.4	4.4	3
L. Limit (95%)	16078	194	68.5	45.3	121
U. Limit (95%)	17387	279	85.5	67.3	135
1680369	18840	218	86.5	62.8	151
1680369	18121	315	85.2	62.5	153
1680369	17734	249	80.5	54.5	140
Average	18232	261	84.1	59.9	148
Std. Dev.	561	49	3.2	4.7	7
L. Limit (95%)	16838	138	76.2	48.3	130
U. Limit (95%)	19626	384	92.0	71.5	166

**Table 1: Nicotine and Nicotine Related Contents of Processed Tobacco
(per gram 'Dry Weight' Basis)**

Sample ID	Nicotine [µg/g]	Nornicotine [µg/g]	Anabasine [µg/g]	Myosmine [µg/g]	Anatabine [µg/g]
1680370	16657	207	80.5	56.8	116
1680370	15606	251	78.8	50.6	117
1680370	15909	226	73.5	< 50.0 but ≥ 15.0	119
Average	16057	228	77.6	NQ	117
Std. Dev.	541	22	3.7	NQ	1
L. Limit (95%)	14713	173	68.5	N/A	114
U. Limit (95%)	17401	283	86.7	N/A	120
1680371	15608	205	74.3	54.3	118
1680371	15696	219	76.0	57.9	118
1680371	15690	211	76.9	58.6	118
Average	15665	212	75.8	57.0	118
Std. Dev.	49	7	1.3	2.3	0
L. Limit (95%)	15543	195	72.5	51.3	117
U. Limit (95%)	15787	229	79.0	62.7	119
1680372	15409	216	77.5	60.7	101
1680372	15165	205	71.2	51.6	105
1680372	15046	191	71.5	52.0	100
Average	15207	204	73.4	54.7	102
Std. Dev.	185	13	3.6	5.1	3
L. Limit (95%)	14746	173	64.6	42.0	96
U. Limit (95%)	15667	235	82.3	67.5	109
1680373	16696	221	76.0	58.4	116
1680373	16138	179	71.9	52.1	111
1680373	16133	221	73.4	54.3	110
Average	16322	207	73.8	54.9	112
Std. Dev.	324	24	2.1	3.2	3
L. Limit (95%)	15518	147	68.6	46.9	104
U. Limit (95%)	17126	267	78.9	62.9	121
1680374	15311	201	54.5	< 50.0 but ≥ 15.0	229
1680374	14741	257	59.3	< 50.0 but ≥ 15.0	220
1680374	15022	235	56.3	< 50.0 but ≥ 15.0	222
Average	15025	231	56.7	NQ	224
Std. Dev.	285	28	2.5	NQ	5
L. Limit (95%)	14317	161	50.6	N/A	212
U. Limit (95%)	15732	300	62.8	N/A	236

Glossary of Abbreviations

**Table 1: Nicotine and Nicotine Related Contents of Processed Tobacco
(per gram 'Dry Weight' Basis)**

Sample ID	Nicotine [µg/g]	Nornicotine [µg/g]	Anabasine [µg/g]	Myosmine [µg/g]	Anatabine [µg/g]
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NQ: Below the Limit of Quantification

N/A: Not Applicable

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
1680360	50.1	49.9
1680360	50.0	50.0
1680360	50.4	49.6
Average	50.2	49.8
Std. Dev.	0.2	0.2
L. Limit (95%)	49.7	49.4
U. Limit (95%)	50.6	50.3
1680361	46.5	53.5
1680361	48.6	51.4
1680361	47.7	52.3
Average	47.6	52.4
Std. Dev.	1.0	1.0
L. Limit (95%)	45.0	49.8
U. Limit (95%)	50.2	55.0
1680362	46.0	54.0
1680362	46.1	53.9
1680362	46.9	53.1
Average	46.3	53.7
Std. Dev.	0.5	0.5
L. Limit (95%)	45.2	52.5
U. Limit (95%)	47.5	54.8
1680363	46.1	53.9
1680363	45.9	54.1
1680363	46.0	54.0
Average	46.0	54.0
Std. Dev.	0.1	0.1
L. Limit (95%)	45.8	53.8
U. Limit (95%)	46.2	54.2
1680364	46.8	53.2
1680364	46.9	53.1
1680364	46.9	53.1
Average	46.9	53.1
Std. Dev.	0.1	0.1

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
L. Limit (95%)	46.7	53.0
U. Limit (95%)	47.0	53.3

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
1680365	43.3	56.7
1680365	43.4	56.6
1680365	43.5	56.5
Average	43.4	56.6
Std. Dev.	0.1	0.1
L. Limit (95%)	43.1	56.3
U. Limit (95%)	43.7	56.9
1680366	92.4	7.61
1680366	92.5	7.52
1680366	92.5	7.52
Average	92.5	7.55
Std. Dev.	0.0	0.05
L. Limit (95%)	92.3	7.43
U. Limit (95%)	92.6	7.67
1680367	91.7	8.29
1680367	91.7	8.31
1680367	91.7	8.32
Average	91.7	8.31
Std. Dev.	0.0	0.01
L. Limit (95%)	91.7	8.27
U. Limit (95%)	91.7	8.34
1680368	68.6	31.4
1680368	68.5	31.5
1680368	68.5	31.5
Average	68.5	31.5
Std. Dev.	0.1	0.1
L. Limit (95%)	68.4	31.3
U. Limit (95%)	68.7	31.6
1680369	69.1	30.9
1680369	69.0	31.0
1680369	68.7	31.3
Average	69.0	31.0
Std. Dev.	0.2	0.2

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
L. Limit (95%)	68.4	30.5
U. Limit (95%)	69.5	31.6

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
1680370	67.4	32.6
1680370	67.4	32.6
1680370	67.2	32.8
Average	67.3	32.7
Std. Dev.	0.1	0.1
L. Limit (95%)	67.0	32.4
U. Limit (95%)	67.6	33.0
1680371	69.0	31.0
1680371	68.9	31.1
1680371	68.8	31.2
Average	68.9	31.1
Std. Dev.	0.1	0.1
L. Limit (95%)	68.7	30.9
U. Limit (95%)	69.1	31.3
1680372	69.3	30.7
1680372	68.9	31.1
1680372	68.9	31.1
Average	69.0	31.0
Std. Dev.	0.3	0.3
L. Limit (95%)	68.4	30.3
U. Limit (95%)	69.7	31.6
1680373	67.8	32.2
1680373	68.2	31.8
1680373	68.4	31.6
Average	68.1	31.9
Std. Dev.	0.4	0.4
L. Limit (95%)	67.3	31.0
U. Limit (95%)	69.0	32.7
1680374	93.9	6.11
1680374	93.8	6.19
1680374	93.9	6.15
Average	93.9	6.15
Std. Dev.	0.0	0.04

Table 13: Moisture Content of Processed Tobacco

Sample ID	Dry Matter (%)	Moisture (%)
L. Limit (95%)	93.8	6.05
U. Limit (95%)	93.9	6.24