



CH01 - Hemp Dried Flower/Biomass Proficiency Testing Program

Blue Sample - Cannabinoids, Terpenes, Moisture, Water Activity, and Heavy Metals

PT Round # 5

Shipment Date: 09-22-2025

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Round ID: CH01-092225

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CERT # 1782.01
Proficiency Testing Provider

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This report has been authorized by
Shane Flynn, Senior Director
Proficiency Testing

Shane P Flynn

1.0 Introduction

Test materials for the Hemp Dried Flower/Biomass Proficiency Testing Programs were shipped to participants on September 22, 2025. Each laboratory was given a site identification number in order to maintain confidentiality. Instructions for Analysis and instructions on how to report results within the AOAC Proficiency Testing website were provided to the participants. Participants were instructed to analyze the test materials according to procedures routinely used in their laboratories. Labs had 28 days to analyze and report. Results were to be submitted to AOAC by October 21, 2025.

2.0 Test Design

The matrix selected for the Hemp round was a hybrid, outdoor grown hemp flower/biomass and an indoor grown, Sativa hemp flower strain. The dried hemp flower matrix was grown, and cured to the test material provider's specifications. The matrix was prepared according to SOPs, which included the use of a clean stainless-steel grinder and medium-sized screen to create an "oregano"-sized ground hemp flower. After grinding, the material was homogenized thoroughly by mixing. Samples were then packaged and stored until shipment.

Blue Sample contains naturally occurring components such as cannabinoids, terpenes, moisture, water activity, and heavy metals.

3.0 Homogeneity

Three samples of each sample type were randomly selected for homogeneity testing from the lot of prepared PT samples. Samples were extracted and analyzed for cannabinoids, terpenes, water activity, moisture, and heavy metals. Two separate aliquots from each of the three samples were originally analyzed by each analytical method to assess homogeneity across and within samples. Additionally, a single aliquot of three randomly selected samples were analyzed to reverify the homogeneity of the test items.

Homogeneity samples were extracted and analyzed at Signature Science's PT Laboratory in Austin, TX and at a third-party ISO 17025-accredited laboratory before PT sample distribution. See Appendix C for complete and detailed homogeneity and stability data for each group of analytes.

Samples were prepared and shipped by the following accredited Laboratory:



8501 North Mopac Expressway
Austin, TX 78759

4.0 Preparation of Test Materials

Blue Sample contains naturally occurring components and was evaluated for cannabinoids, terpenes, water activity, moisture and heavy metals. Samples were prepared to provide a naturally occurring set of compounds and contaminants within the matrix for analysis. No analytes were spiked into the hemp flower matrix for the blue sample. Samples were created and stored within a 5 x 8 x 2.5" silver barrier bag. Each barrier bag was labeled prior to filling. For the Blue Samples, 10 g +/- 0.1 g of homogenized ground hemp matrix was weighed into a tared weigh boat and added to the barrier bag before closing and heat sealing the bags with an impulse sealer. Once sealed, samples were kept in a secondary sealed plastic bag in the freezer until shipment.

5.0 Evaluations and Laboratory Performance

When an assigned value is available and a z-score or z'-score can be calculated the following labels have been applied to the Evaluation.

- In this report a z-score of $|z| \leq 2.00$ is labeled as **ACCEPTABLE**
- In this report a z-score of $2.00 < |z| < 3.00$ is labeled as **WARNING**
- In this report a z-score of $|z| \geq 3.00$ is labeled as **UNACCEPTABLE**

If an assigned value is unavailable and z-scores or z'-scores cannot be calculated for an analyte, participants are still evaluated on an acceptable range.

When all Reference Labs report a < LOQ or < LOD and a definitive assigned value for calculating z-scores cannot be determined, the participating laboratory is evaluated by comparing their reported result to an acceptable range. Evaluations against this acceptable range can include:

- Any result that is reported by a participant laboratory as detected, and a value is provided, is **ACCEPTABLE** if the reported value is within the acceptable range. If the reported value exceeds the acceptable range, this would be **UNACCEPTABLE**.
- Any result that is reported by a participant laboratory as detected, but <LOQ, is considered **ACCEPTABLE**, as long as the LOQ is within the acceptable range. If the LOQ value exceeds the acceptable range, this would be **UNACCEPTABLE**.
- Any result that is reported by a participant laboratory considered as a "Non-Detect" is considered **UNACCEPTABLE**, if that analyte was detected and reported for by the reference labs.

5.1 Calculation and Interpretation of z-scores:

For each individual result, a z-score was calculated, where appropriate, as follows:

$$Z_i = \frac{X_i - X_{pt}}{\delta_{pt}}$$

where:

Z_i = the z score (standard score)

X_i = the reported value of analyte

X_{pt} = the assigned value, the best estimate of the true concentration

δ_{pt} = the estimate of variation (standard deviation)

The robust procedure from ISO 13528:2022(E), Statistical methods for use in proficiency testing by interlaboratory comparisons is used in processing the result data. Robust statistics relies on medians rather than means and uses more information from the central than from the outlying observations.

The assigned values used were based on the medians of up to five data points by reference laboratories. If there was not enough data to determine an assigned value from reference laboratories, consensus from all participating labs was used (mean of all reported results).

This standard deviation value will decrease over time as participating laboratories improve performance. Measurement uncertainty (standard uncertainty of the assigned value) has also been provided.

$MU = (1.25 * (sd/\sqrt{n}))$ where n =sample size

The following interpretation of z-scores for each individual test result is provided in of ISO/ IEC 17043:2023(E) Conformity Assessment - General requirements for proficiency testing schemes common examples of application of z-scores:

- A result that gives $|z| \leq 2.0$ is considered to be acceptable.
 - A result that gives $2.0 < |z| < 3.0$ is considered to give a warning signal.
 - A result that gives $|z| \geq 3.0$ is considered to be unacceptable (or action signal).
- Calculations for z scores based on the data presented in the results sheet might be slightly different from the z-scores assigned by AOAC. The z-scores assigned by AOAC are based on calculations that may use more significant figures than is possible to display on the results sheet.

6.0 General Discussion of Results

Confidentiality of results will be maintained by issuing site identification codes to the participating laboratories. Results in the reports will only be identified by the site identification code if individual results from other specific laboratories are listed. Performance evaluations have been provided for the following groups of analytes in Blue Sample: cannabinoids, terpenes, water activity, moisture and heavy metals. Some tests had fewer participants submitting results because some laboratories do not routinely perform all analyses.

Appendix A is included in this report to show participating laboratories' reported results, methods used, z-scores and the programs assigned values, standard deviations, medians, acceptable ranges, evaluations, measurement uncertainty, and more. If a component was included in the analysis by the laboratory but it was reported as zero, < LOQ, or < LOD it is represented as "Reported as < (LOQ or LOD)" in the notes column of the result page. **Laboratories should not report a value of '0'.** If there was not enough statistical data (e.g. 0-1 data points) because there were not enough data points from reference labs, to determine the assigned value or calculate z-scores, there is the Note "Not Used for Evaluation" for that analyte. Each laboratory should use the information in Appendices A, B and C to determine areas of improvement.

7.0 Comments and Recommendations

Cannabinoids

Overall, participating laboratories performed well. One laboratory received an 'UNACCEPTABLE' evaluation for CBN as their reported result was below the acceptable range. Another laboratory received 'UNACCEPTABLE' evaluations for CBD, CBN and Delta 9 THC as their reported results were above the acceptable ranges for those analytes. Another laboratory received an UNACCEPTABLE evaluation for Delta 8 THC as their reported result was above the acceptable range.

Terpenes

Overall, participating laboratories performed well. One laboratory received an UNACCEPTABLE evaluation for Guaiol because their reported result was above the acceptable range. Another laboratory received an UNACCEPTABLE evaluation for Beta-ocimene for the same reason. A third laboratory received an UNACCEPTABLE evaluation for Valencene due to reporting a result above the acceptable range.

One laboratory received seven UNACCEPTABLE evaluations. Three of their reported results were above the acceptable range (Alpha-bisabolol, Guaiol, and Trans-nerolidol), while four were below the acceptable range (Alpha-pinene, Beta-myrcene, Eucalyptol, and Limonene).

Another laboratory received UNACCEPTABLE evaluations for Alpha-humulene and Guaiol because their reported results were above the acceptable range.

Moisture

All participating Laboratories performed well.

Water Activity

All participating Laboratories performed well.

Heavy Metals

Overall, participating laboratories performed well. One laboratory received an UNACCEPTABLE evaluation for Chromium because their reported result was above the acceptable range. Another laboratory received an UNACCEPTABLE evaluation for Cadmium for the same reason, and a separate laboratory received an UNACCEPTABLE evaluation for Mercury due to a result above the acceptable range.

One laboratory received UNACCEPTABLE evaluations for all reported heavy metals, most likely due to reporting in incorrect units (ppm instead of ppb).

Barium and Silver were classified as Not Used for Evaluation because only one participating laboratory reported a result for each.

Laboratories are encouraged to verify that all units are correctly reported prior to submission.

8.0 Distribution of Results Plots

The distribution of results plots provides information on the distribution of results for each compound. The plots illustrate the results of all the participant laboratories versus the reference laboratories versus the targeted value. Some of the plots include the statement "reference labs are indicated by squares", and there are no squares on the plot. If the reference laboratories did not test for a specific analyte, their representative squares are not indicated on the plots, even though they are mentioned in the legends. At the advice of an expert in statistical graphics and design of data visualization, changes have been made to improve the plots. Data from the Participating Laboratories is displayed as individual data points with no connecting line. The target value is displayed with a dashed horizontal reference line. Reference labs are indicated by squares. If a laboratory marked a compound as "not tested," it was not included on the graph. The key to the graph identifies each line. Only data that fell within a z- score value of + 5 have been included in the graphs. As AOAC continues to improve its reporting format, changes may occur.

If a participant would like to appeal against the assessment of their performance in this proficiency testing scheme please contact staff at Cannabis_PT@AOAC.org

Appendix A
CH01/CH02 Hemp Proficiency Testing Program
-- Blue Sample --
Site=193123 Lab Reporting Details

Site	Program	Metric	Value
193123	CH01	Lab Name	XXX XXXXXXXXX
		Analyst Name	XXXX XXXXX
		Laboratory Address	XXXXXX XXXXXXX
		Laboratory Address2	
		City	XXXX XXX
		State	XX
		Postal Code	XXXXXX
		Country	XXXXXX XXXXX
		License #	
		Test Initiation Date	09/22/2025
		Test Close Date	10/21/2025
		Submission Date	10/17/2025
		Final Results Processed Date	11/26/2025

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INTERNATIONAL



PROFICIENCY TESTING

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Report Authorized by:
Shane Flynn, Senior Director of Proficiency Testing

Appendix A
CH01/CH02 Hemp Testing Results and Z-scores
Site=193123 Blue Sample Analyte Group = Cannabinoids (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% Cannabindiol (CBD)	HPLC-PDA	3.79500	(1.1648 - 5.8132)	16	3.652	3.527	1.030	3.48900	0.69780	0.395	ACCEPTABLE	0.337	
% Cannabidiolic acid (CBDA)	HPLC-PDA	3.29300	(1.2109 - 5.3071)	15	3.063	3.121	0.465	3.25900	0.65180	0.050	ACCEPTABLE	0.203	
% Cannabinol (CBN)	HPLC-PDA	0.06300	(0.0206 - 0.0823)	16	0.066	0.054	0.054	0.05023	0.01029	1.121	ACCEPTABLE	0.006	
% Cannabinolic acid (CBNA)	HPLC-PDA	0.00900	(0 - 0.0363)	5	0.023	0.020	0.012	0.02550	0.00300	-0.847	ACCEPTABLE	0.006	
% Cannabigerol (CBG)	HPLC-PDA	0.10200	(0.0356 - 0.1424)	15	0.091	0.078	0.062	0.08900	0.01780	0.730	ACCEPTABLE	0.010	
% Cannabichromene (CBC)	HPLC-PDA	0.15900	(0.0524 - 0.2096)	15	0.131	0.134	0.019	0.13100	0.02620	1.069	ACCEPTABLE	0.015	
% Cannabichromenic acid (CBCA)	HPLC-PDA	0.12600	(0.0463 - 0.1853)	10	0.108	0.113	0.015	0.11580	0.02316	0.440	ACCEPTABLE	0.013	
% Cannabidivarinic acid (CBDVA)	HPLC-PDA	0.06900	(0.0146 - 0.1026)	9	0.057	0.050	0.013	0.05861	0.01172	0.709	ACCEPTABLE	0.009	
% Cannabigerolic acid (CBGA)	HPLC-PDA	0.10200	(0.0352 - 0.1408)	12	0.095	0.087	0.043	0.08800	0.01760	0.795	ACCEPTABLE	0.010	
% Cannabidivarin (CBDV)	HPLC-PDA	0.02900	(0 - 0.0816)	12	0.070	0.025	0.125	< 0.05100	0.01020		ACCEPTABLE	0.008	
% Δ8-tetrahydrocannabinol (Δ8-THC)	HPLC-PDA	< 0.00100	(0 - 0.0016)	16	0.022	0.006	0.056	< 0.00100	0.00020		ACCEPTABLE		Reported as <LOQ or <LOD
% Δ9-tetrahydrocannabinol (Δ9-THC)	HPLC-PDA	0.10800	(0.0412 - 0.1646)	16	0.107	0.098	0.046	0.10290	0.02058	0.248	ACCEPTABLE	0.012	
% Tetrahydrocannabinolic acid (THCA)	HPLC-PDA	0.06000	(0.0134 - 0.1066)	15	0.067	0.060	0.036	0.05507	0.01200	0.000	ACCEPTABLE	0.010	
% Tetrahydrocannabivarin (THCV)	HPLC-PDA	< 0.00100	(0 - 0.0016)	14	0.007	0.001	0.011	< 0.00100	0.00020		ACCEPTABLE		Reported as <LOQ or <LOD
% Tetrahydrocannabivarinic acid (THCVA)	HPLC-PDA	< 0.00100	(0 - 0.0016)	10	0.009	0.003	0.013	< 0.00100	0.00020		ACCEPTABLE		Reported as <LOQ or <LOD
% Total CBD = (CBDA * 0.877) + CBD	HPLC-PDA	6.68200	(1.7451 - 10.2689)	13	6.059	6.302	0.965	6.00700	1.20140	0.475	ACCEPTABLE	0.758	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**

A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 Blue Sample Analyte Group = Cannabinoids (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% Total CBG = (CBGA * 0.878) + CBG	HPLC-PDA	0.19100	(0.0714 - 0.2856)	7	0.166	0.162	0.020	0.17850	0.03570	0.350	ACCEPTABLE	0.022	
% Total THC = (THCA * 0.877) + Δ9-THC	HPLC-PDA	0.16100	(0.0478 - 0.2582)	12	0.168	0.148	0.079	0.15300	0.03060	0.228	ACCEPTABLE	0.017	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be ACCEPTABLE

A result that gives $2.0 < |z| < 3.0$ is considered to give a Warning signal

A result that gives $|z| \geq 3.0$ is considered to be UNACCEPTABLE (or action signal)

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 Blue Sample Analyte Group = Terpenes (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% 3-carene	GC-MS	< 0.00200	(0 - 0.0026)	11	0.004	0.002	0.010	< 0.00160	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Alpha-bisabolol	GC-MS	0.06300	(0.0222 - 0.0886)	11	0.056	0.056	0.021	0.05540	0.01108	0.686	ACCEPTABLE	0.007	
% Alpha-cedrene	GC-MS	< 0.00200	(0 - 0.0025)	5	0.002	0.002	0.002	< 0.00159	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Alpha-humulene	GC-MS	0.02100	(0.012 - 0.0482)	13	0.034	0.030	0.011	0.03010	0.00602	-1.505	ACCEPTABLE	0.001	
% Alpha-phellandrene	GC-MS	< 0.00200	(0 - 0.0025)	5	0.002	0.002	0.002	< 0.00159	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Alpha-pinene	GC-MS	< 0.01000	(0.0033 - 0.0141)	13	0.012	0.010	0.009	0.00840	0.00174		ACCEPTABLE		Reported as < (LOD or LOQ)
% Alpha-terpinene	GC-MS	< 0.00200	(0 - 0.0026)	12	0.008	0.002	0.014	< 0.00160	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Beta-caryophyllene	GC-MS	0.05900	(0.0296 - 0.1198)	13	0.078	0.075	0.016	0.07470	0.01494	-1.044	ACCEPTABLE	0.002	
% Beta-myrcene	GC-MS	< 0.01000	(0.0011 - 0.0065)	12	0.010	0.004	0.012	0.00350	0.00076		ACCEPTABLE		Reported as < (LOD or LOQ)
% Beta-ocimene	GC-MS	< 0.00200	(0 - 0.0101)	11	0.008	0.002	0.013	< 0.00630	0.00126		ACCEPTABLE		Reported as <LOQ or <LOD
% Beta-pinene	GC-MS	< 0.00200	(0 - 0.0047)	13	0.005	0.003	0.008	< 0.00292	0.00058		ACCEPTABLE		Reported as <LOQ or <LOD
% Borneol	GC-MS	< 0.00200	(0 - 0.0318)	6	0.010	0.004	0.014	< 0.01985	0.00397		ACCEPTABLE		Reported as <LOQ or <LOD
% Camphene	GC-MS	< 0.00200	(0 - 0.0034)	12	0.005	0.002	0.010	< 0.00215	0.00043		ACCEPTABLE		Reported as <LOQ or <LOD
% Camphor	GC-MS	< 0.00400	(0 - 0.0070)	4	0.005	0.005	0.001	< 0.00436	0.00087		ACCEPTABLE		Reported as <LOQ or <LOD
% Cedrol	GC-MS	< 0.00200	(0 - 0.0025)	5	0.002	0.002	0.002	< 0.00159	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Cis-nerolidol	GC-MS	< 0.00200	(0 - 0.0029)	11	0.003	0.002	0.004	< 0.00180	0.00036		ACCEPTABLE		Reported as <LOQ or <LOD

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**

A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 Blue Sample Analyte Group = Terpenes (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% Eucalyptol	GC-MS	< 0.00200	(0.0011 - 0.0042)	10	0.007	0.003	0.012	0.00265	0.00053		ACCEPTABLE		Reported as <LOQ or <LOD
% Fenchone	GC-MS	< 0.00400	(0 - 0.0051)	4	0.004	0.004	0.001	< 0.00319	0.00064		ACCEPTABLE		Reported as <LOQ or <LOD
% Fenchyl alcohol	GC-MS	< 0.01000	(0.0032 - 0.0127)	5	0.006	0.005	0.003	0.00445	0.00159		ACCEPTABLE		Reported as <LOQ or <LOD
% Gamma-terpinene	GC-MS	< 0.00200	(0 - 0.0027)	11	0.008	0.002	0.014	< 0.00170	0.00034		ACCEPTABLE		Reported as <LOQ or <LOD
% Geraniol	GC-MS	< 0.00200	(0 - 0.0069)	12	0.018	0.003	0.030	< 0.00430	0.00086		ACCEPTABLE		Reported as <LOQ or <LOD
% Guaiol	GC-MS	0.01700	(0.0068 - 0.0282)	11	0.022	0.018	0.013	0.01750	0.00350	-0.140	ACCEPTABLE	0.001	
% Isoborneol	GC-MS	< 0.00200	(0 - 0.0054)	5	0.003	0.002	0.002	< 0.00336	0.00067		ACCEPTABLE		Reported as <LOQ or <LOD
% (-)-Isopulegol	GC-MS	< 0.00200	(0 - 0.0032)	12	0.008	0.002	0.014	< 0.00200	0.00040		ACCEPTABLE		Reported as <LOQ or <LOD
% Limonene	GC-MS	< 0.00200	(0.0008 - 0.0056)	13	0.006	0.004	0.009	0.00350	0.00064		ACCEPTABLE		Reported as < (LOD or LOQ)
% Linalool	GC-MS	< 0.01000	(0.0011 - 0.0085)	11	0.007	0.005	0.008	0.00460	0.00096		ACCEPTABLE		Reported as < (LOD or LOQ)
% Menthol	GC-MS	< 0.00200	(0 - 0.0032)	6	0.002	0.002	0.002	< 0.00200	0.00040		ACCEPTABLE		Reported as <LOQ or <LOD
% O-cymene	GC-MS	Not Tested	(0 - 0.0005)	2	0.000	0.000	0.000	< 0.00030	0.00006		NOT TESTED	0.000	
% Pulegone	GC-MS	< 0.00200	(0 - 0.0025)	4	0.003	0.002	0.002	< 0.00159	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD
% Terpineol	GC-MS	< 0.00500	(0.0021 - 0.0085)	6	0.006	0.005	0.001	0.00590	0.00106		ACCEPTABLE		Reported as <LOQ or <LOD
% Terpinolene	GC-MS	< 0.01000	(0 - 0.0058)	11	0.005	0.002	0.007	0.00185	0.00055		ACCEPTABLE		Reported as < (LOD or LOQ)
% Trans-nerolidol	GC-MS	< 0.01000	(0.0027 - 0.0109)	11	0.009	0.007	0.007	0.00670	0.00136		ACCEPTABLE		Reported as <LOQ or <LOD

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**

A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 Blue Sample Analyte Group = Terpenes (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% Valencene	GC-MS	< 0.00200	(0 - 0.0025)	5	0.005	0.002	0.005	< 0.00159	0.00032		ACCEPTABLE		Reported as <LOQ or <LOD

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**

A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 Blue Sample Analyte Group = Moisture (%)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
% Moisture	Commercial Moisture Meter	9.61000	(3.6640 - 14.6560)	14	8.936	9.035	1.089	9.16000	1.83200	0.246	ACCEPTABLE	1.024	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):
A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**
A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**
A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A
CH01/CH02 Hemp Testing Results and Z-scores
Site=193123 **Blue Sample** Analyte Group = Heavy Metals (ug/kg ppb)

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
ug/kg Total Arsenic	ICPMS	259.00000	(82.8000 - 331.2000)	14	183.217	203.818	69.324	207.00000	41.40000	1.256	ACCEPTABLE	23.143	
ug/kg Total Cadmium	ICPMS	184.00000	(68.8000 - 275.2000)	14	184.952	168.000	114.316	172.00000	34.40000	0.349	ACCEPTABLE	19.230	
ug/kg Total Lead	ICPMS	723.00000	(283.2000 - 1132.8000)	14	634.657	684.500	228.578	708.00000	141.60000	0.106	ACCEPTABLE	79.157	
ug/kg Total Mercury	ICPMS	< 12.00000	(2.7303 - 16.1697)	14	30.193	13.000	40.560	8.00000	1.89000		ACCEPTABLE		Reported as < (LOD or LOQ)
ug/kg Antimony	ICPMS	Not Tested	(0 - 25.7600)	4	15.556	16.100	13.886	< 16.10000	3.22000		NOT TESTED	2.013	
ug/kg Barium	ICPMS	Not Tested		1							NO EVALUATION		Not Used for Evaluation
ug/kg Chromium	ICPMS	Not Tested	(397.2000 - 1588.8000)	5	3029.800	999.000	3933.069	993.00000	198.60000		NOT TESTED	124.125	
ug/kg Copper	ICPMS	Not Tested	(4536.6000 - 18146.400)	5	12301.200	11500.000	1403.589	11341.500	2268.30000		NOT TESTED	1417.688	
ug/kg Nickel	ICPMS	Not Tested	(660.4000 - 2641.6000)	5	3382.000	1652.000	3702.182	1651.0000	330.20000		NOT TESTED	206.375	
ug/kg Silver	ICPMS	Not Tested		1							NO EVALUATION		Not Used for Evaluation
ug/kg Selenium	ICPMS	Not Tested	(74.8000 - 299.2000)	5	171.400	175.000	28.606	187.00000	37.40000		NOT TESTED	23.375	
ug/kg Zinc	ICPMS	Not Tested	(32440.0000 - 129760.0)	4	91430.000	81760.000	20400.382	81100.000	16220.00000		NOT TESTED	11705.777	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):
A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**
A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**
A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

Appendix A

CH01/CH02 Hemp Testing Results and Z-scores

Site=193123 **Blue Sample** Analyte Group = Water Activity

Test	Method	Reported Result	Acceptable Range	Number of Reported Results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Z-Score	Evaluation	Standard Uncertainty of the Assigned Value	Note
Water Activity (a _w)	Chilled mirror dew point meter	0.60800	(0.2080 - 0.8320)	14	0.499	0.494	0.048	0.52000	0.10400	0.846	ACCEPTABLE	0.058	

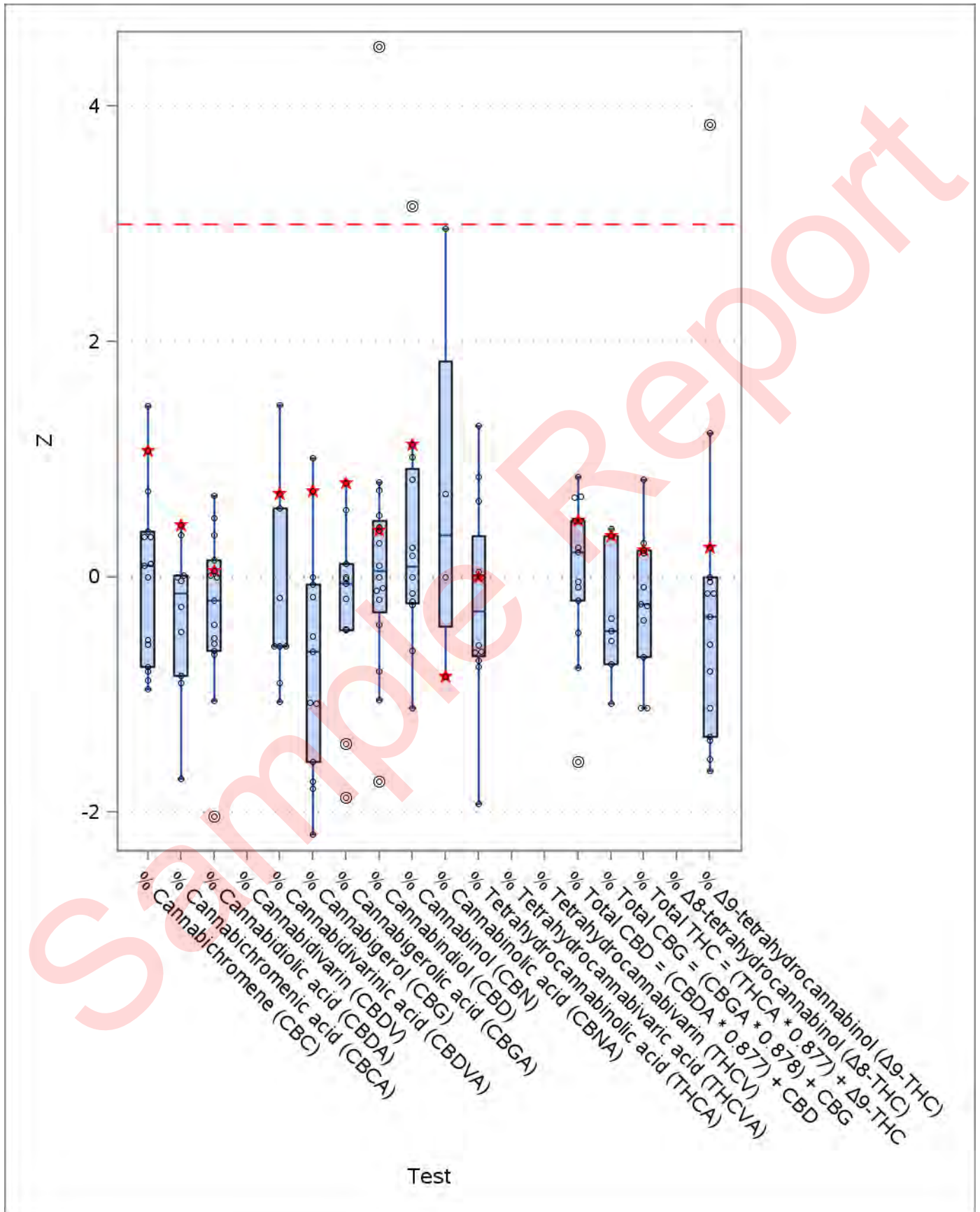
The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **ACCEPTABLE**

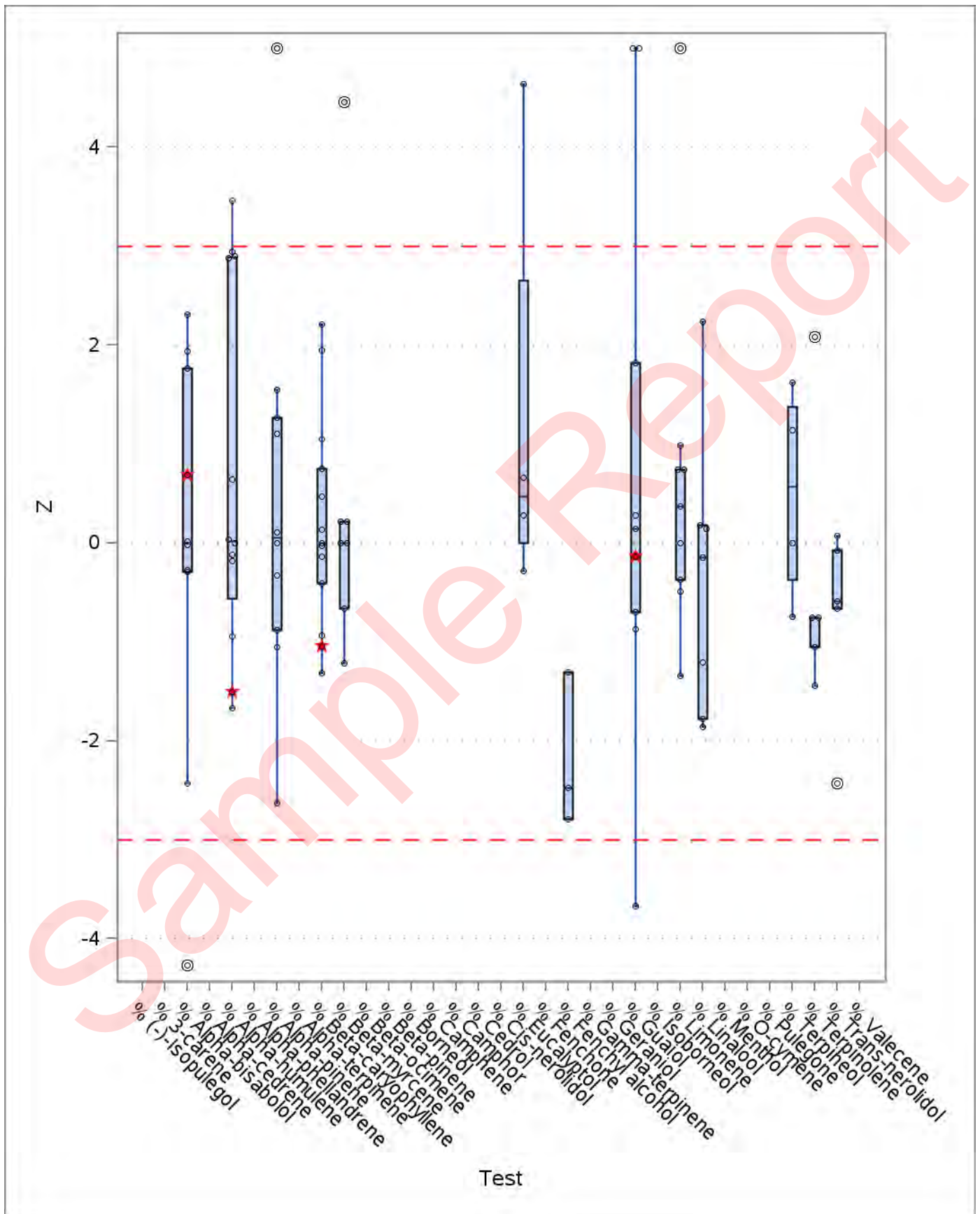
A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **UNACCEPTABLE (or action signal)**

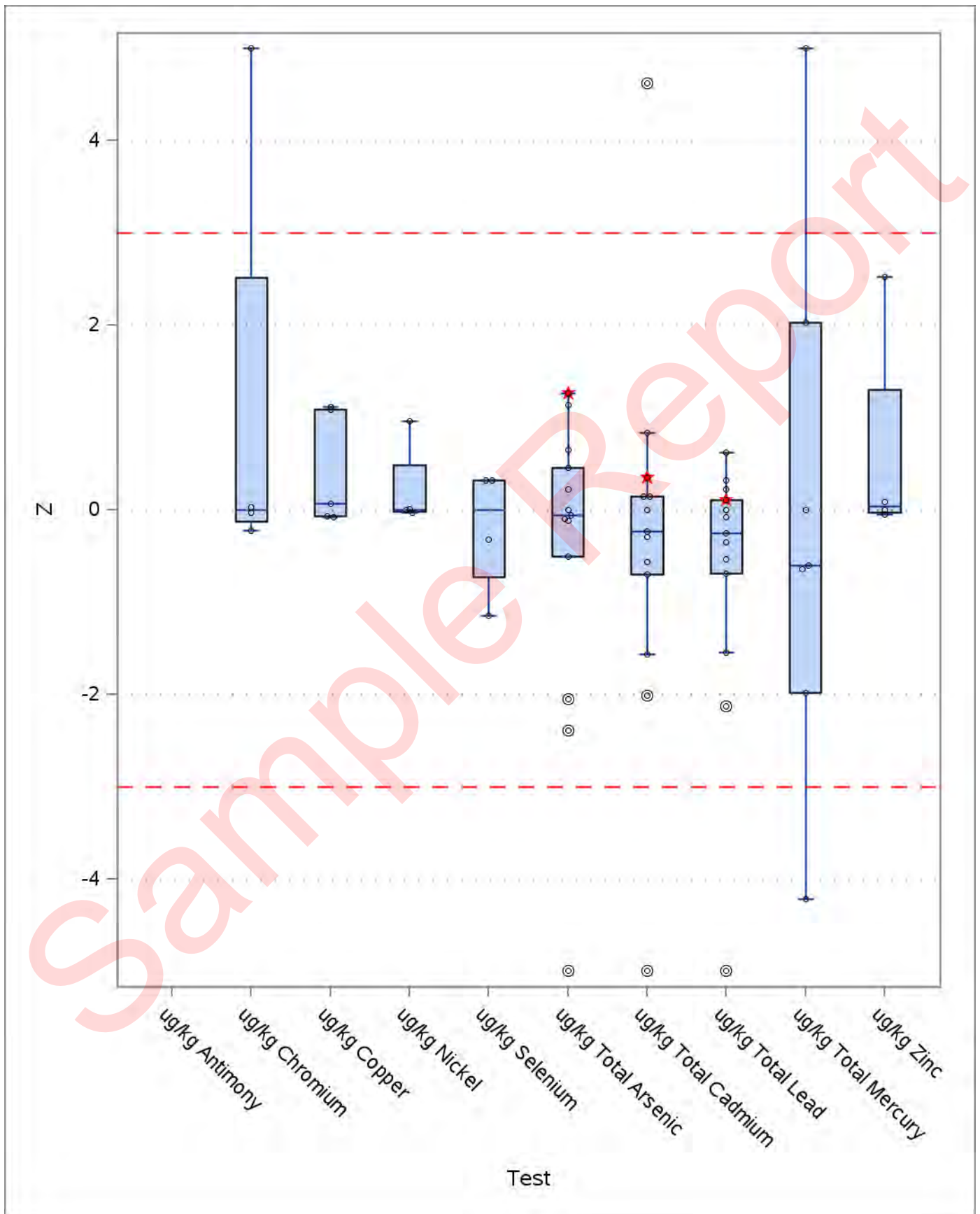
Appendix B
CH01/CH02 Hemp Z-Score Distributions
Blue Sample - Cannabinoids
Site = 193123



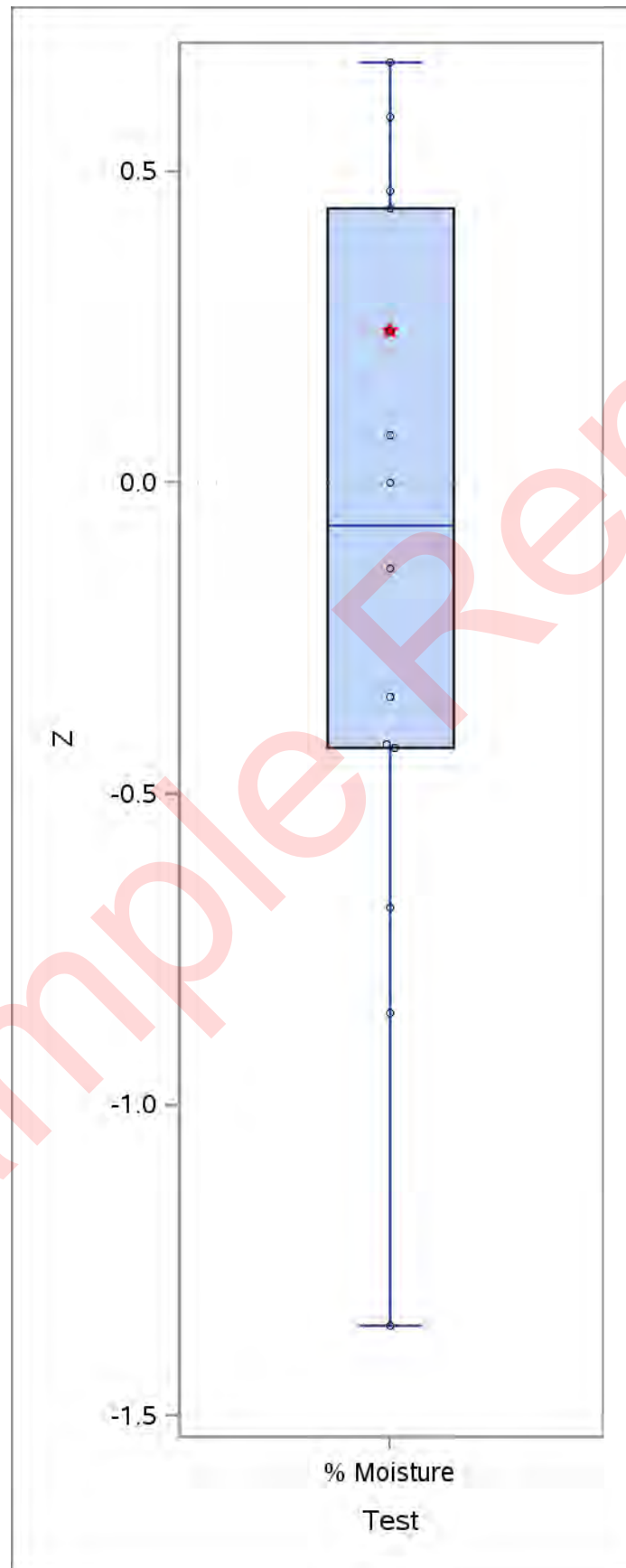
Appendix B
CH01/CH02 Hemp Z-Score Distributions
Blue Sample - Terpenes
Site = 193123



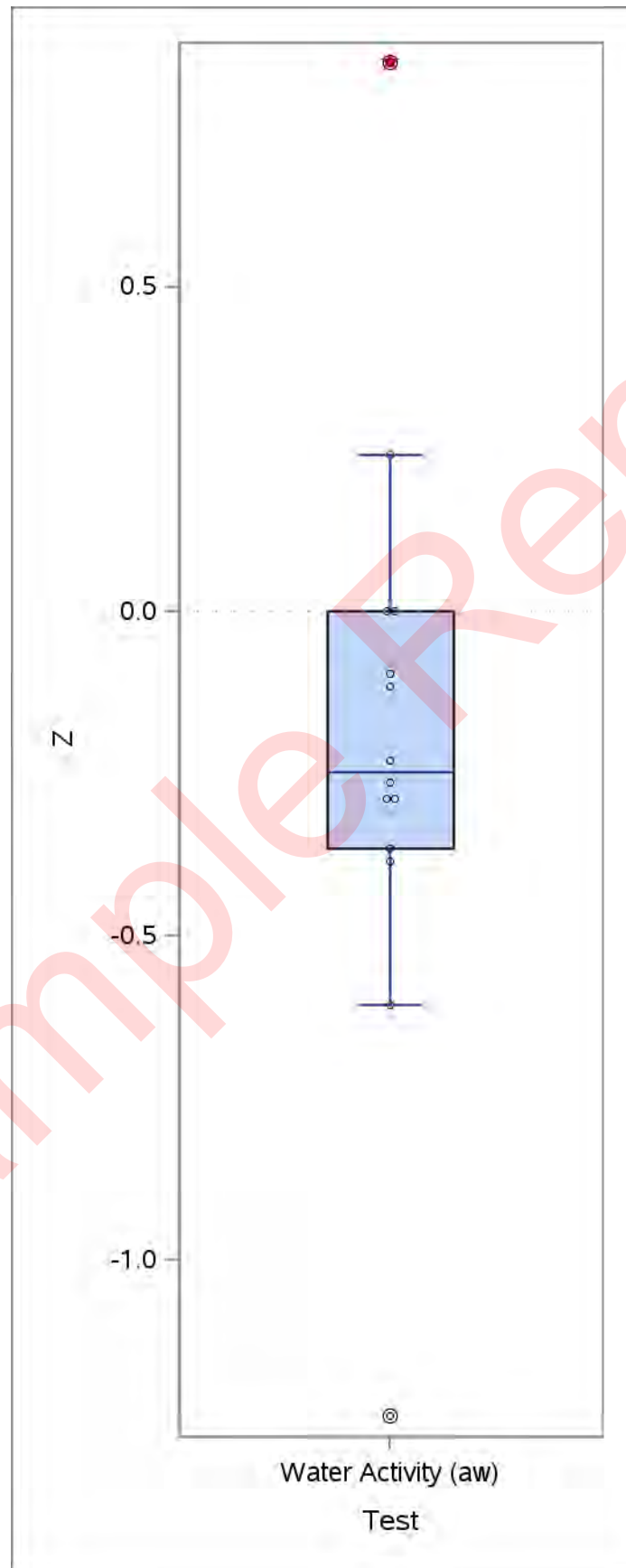
Appendix B
CH01/CH02 Hemp Z-Score Distributions
Blue Sample - Heavy Metals
Site = 193123



Appendix B
CH01/CH02 Hemp Z-Score Distributions
Blue Sample - Moisture
Site = 193123

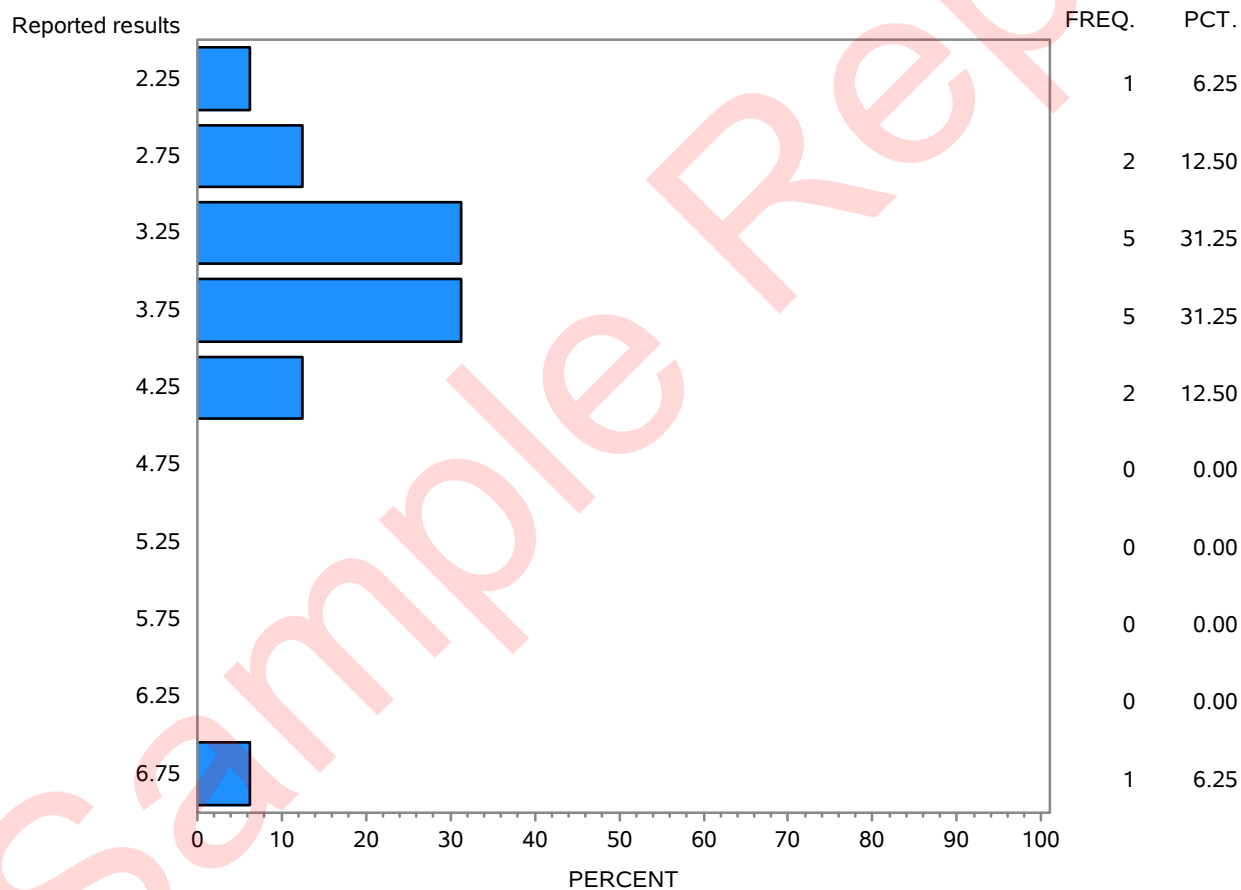


Appendix B
CH01/CH02 Hemp Z-Score Distributions
Blue Sample - Water Activity
Site = 193123



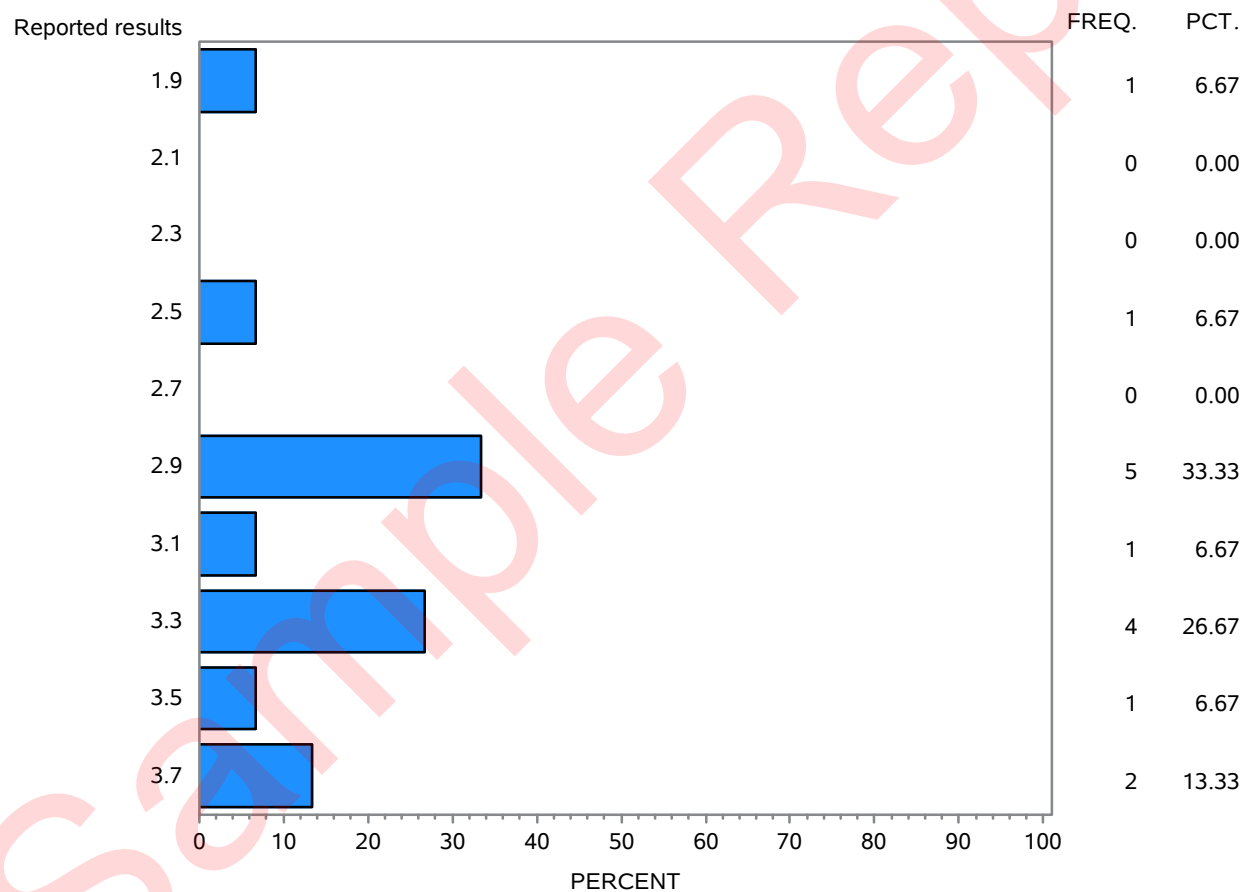
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabindiol (CBD)



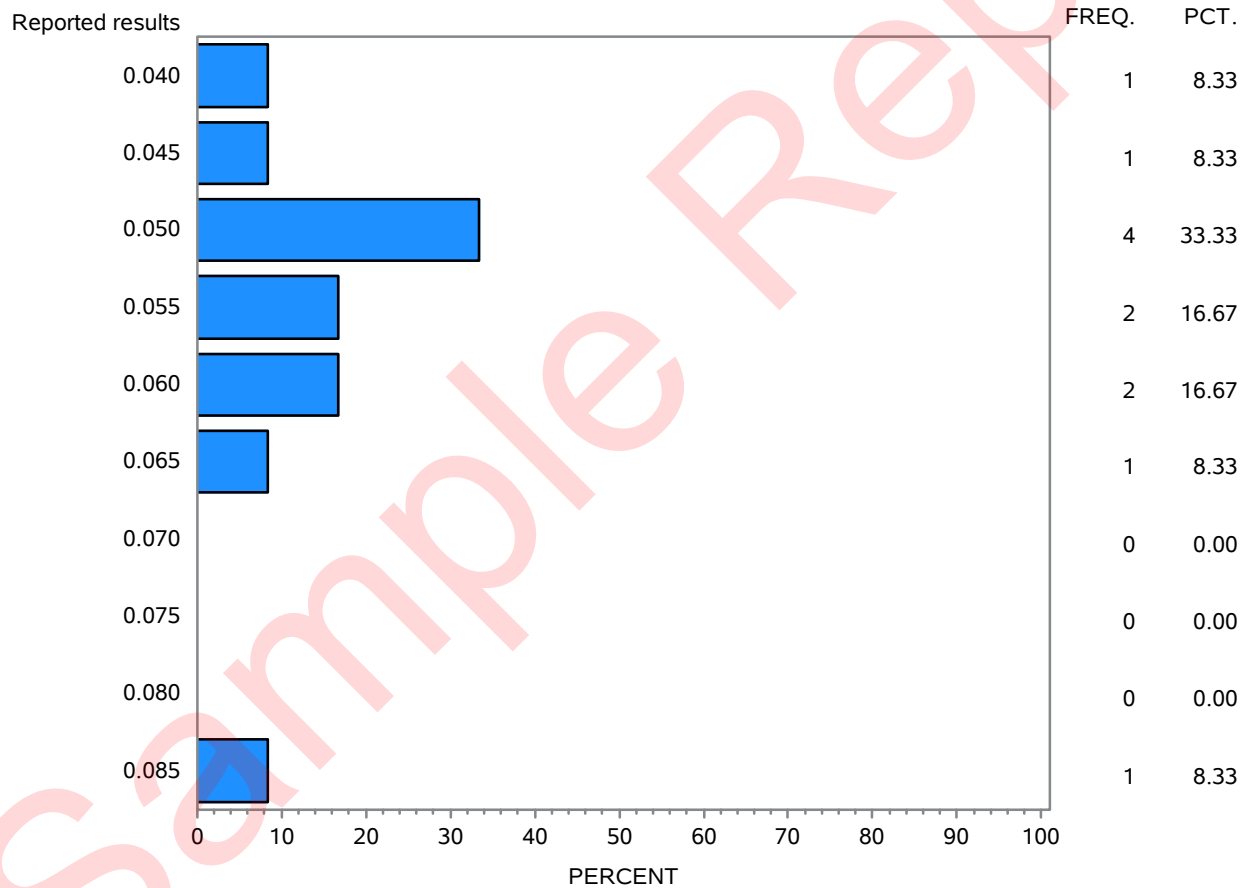
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabidiolic acid (CBDA)



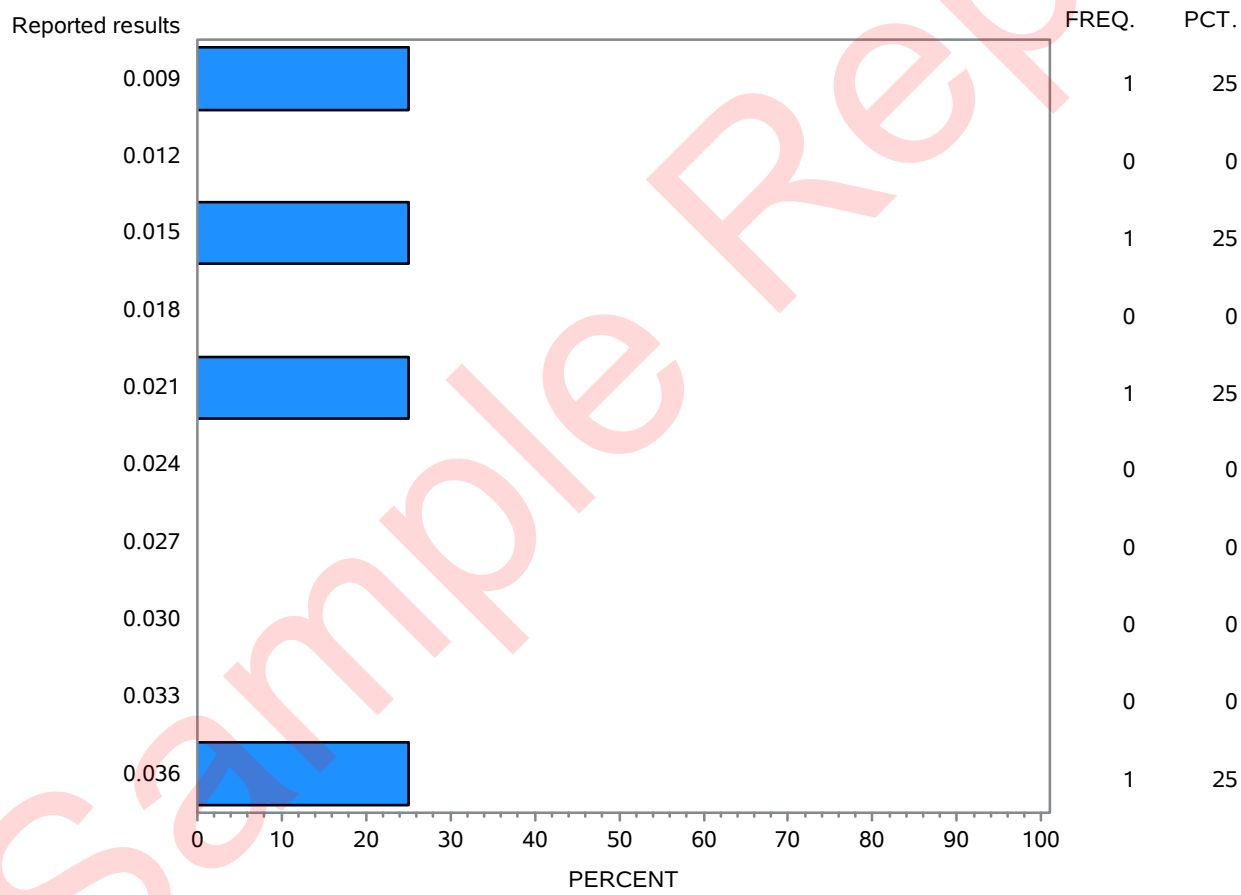
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabinol (CBN)



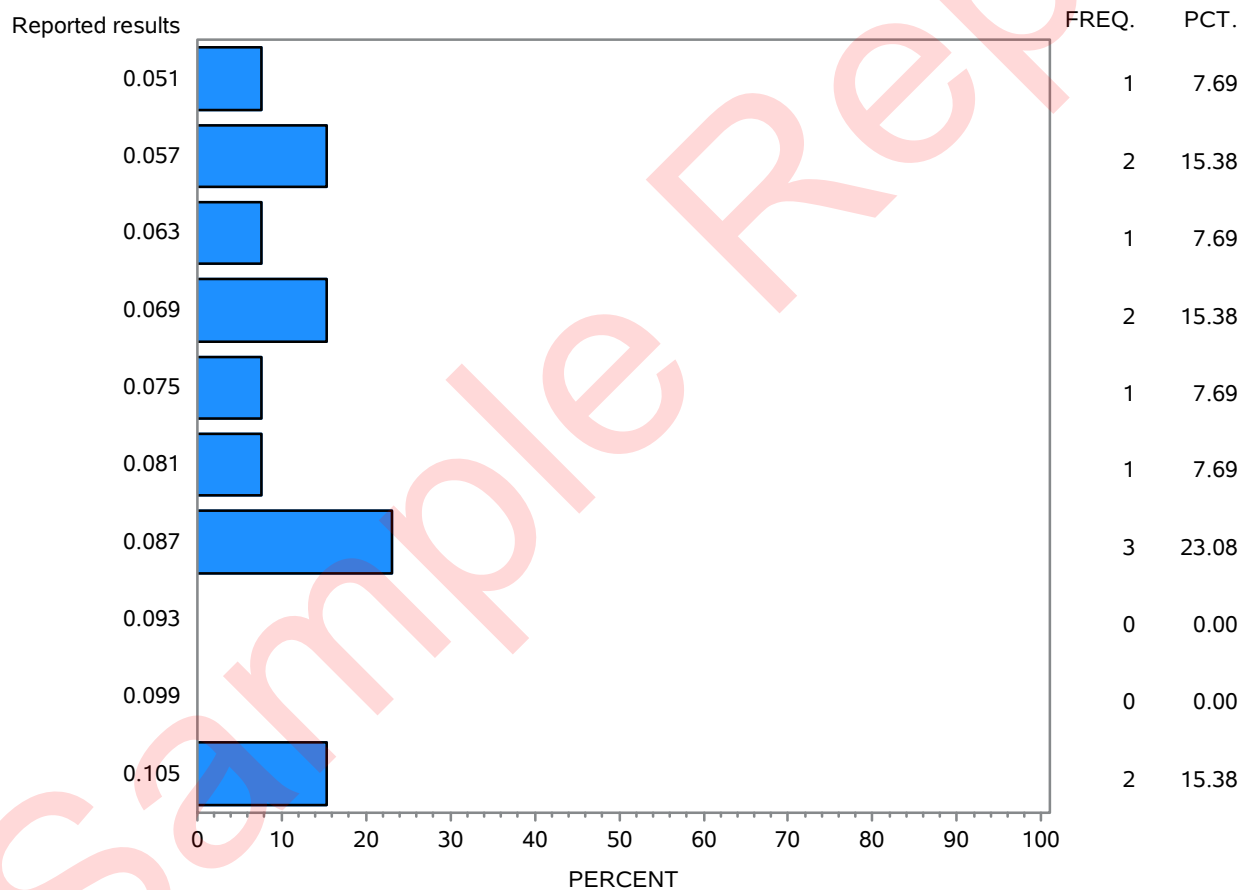
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabinolic acid (CBNA)



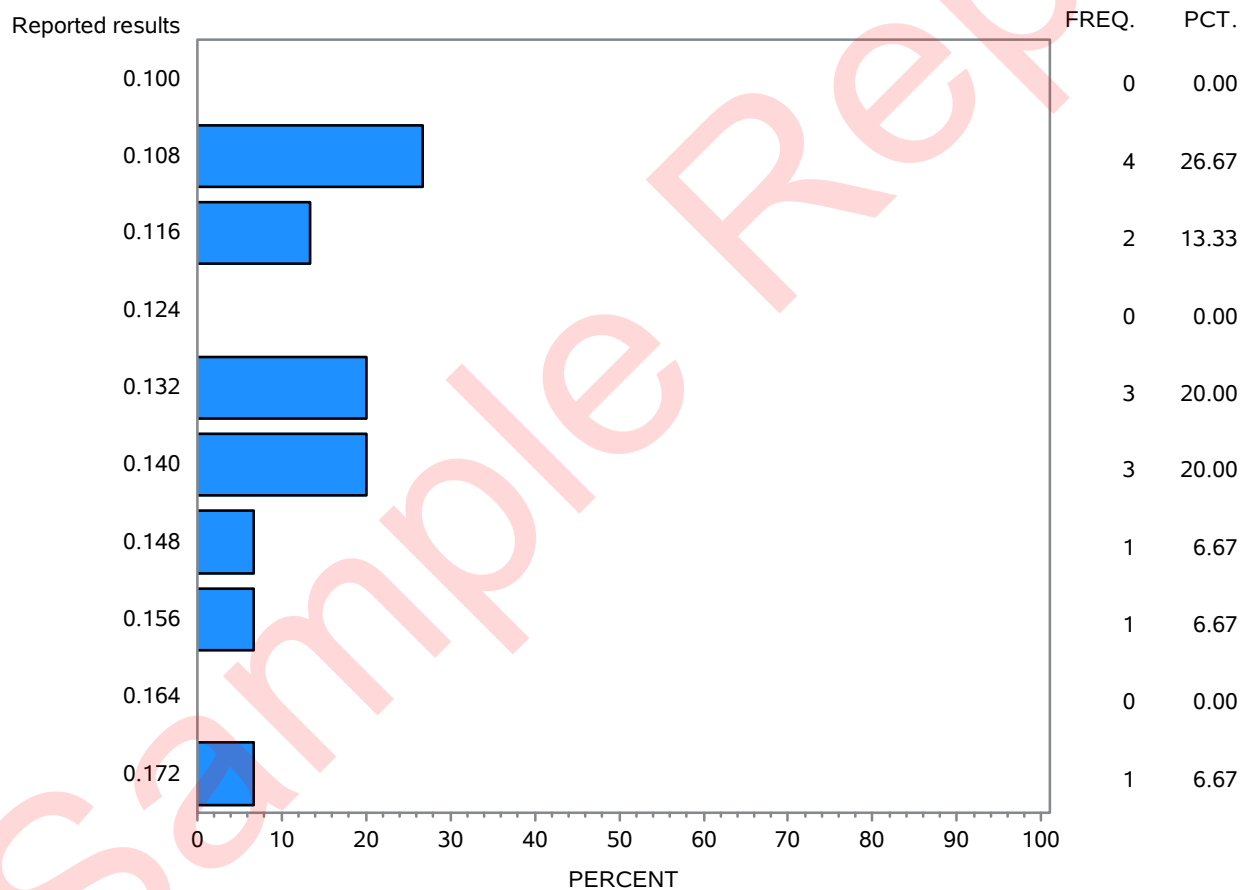
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabigerol (CBG)



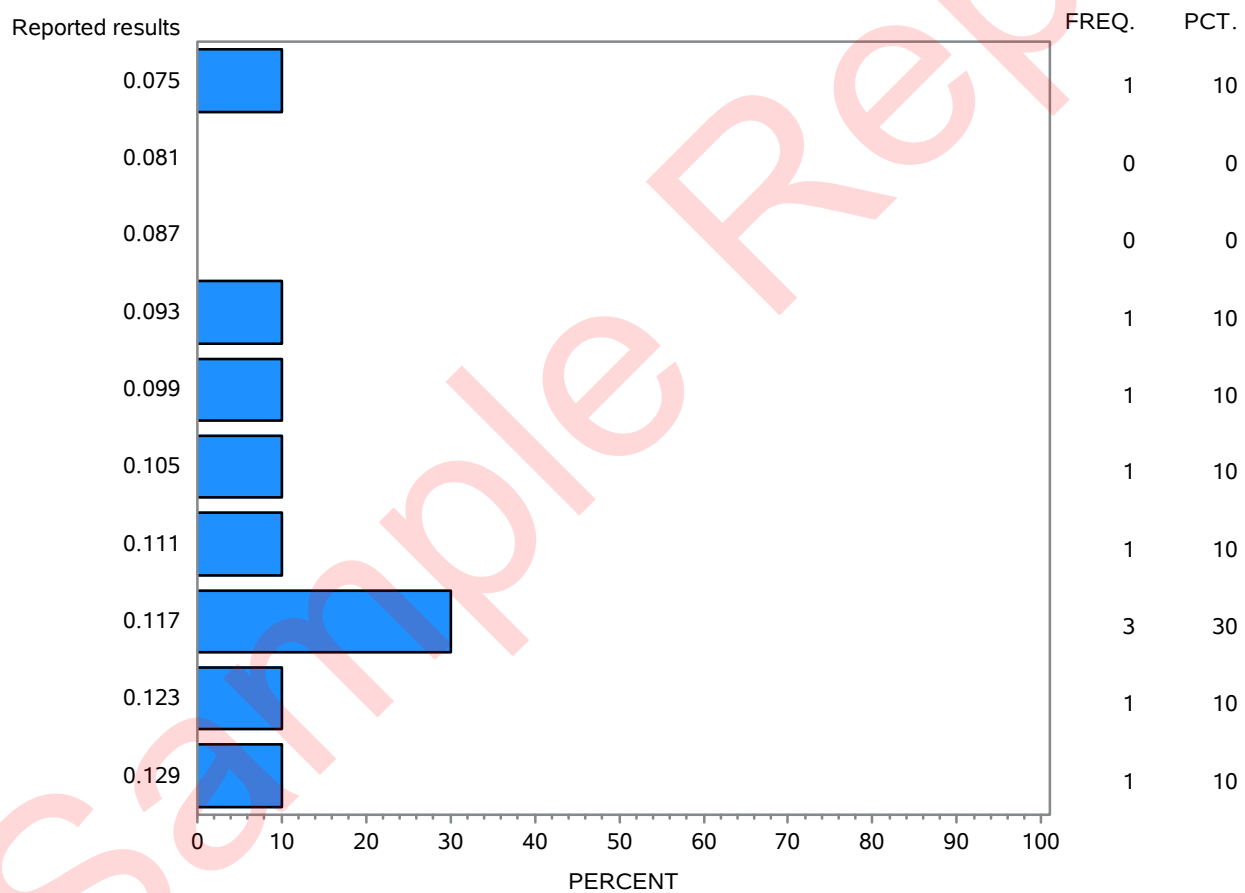
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabichromene (CBC)



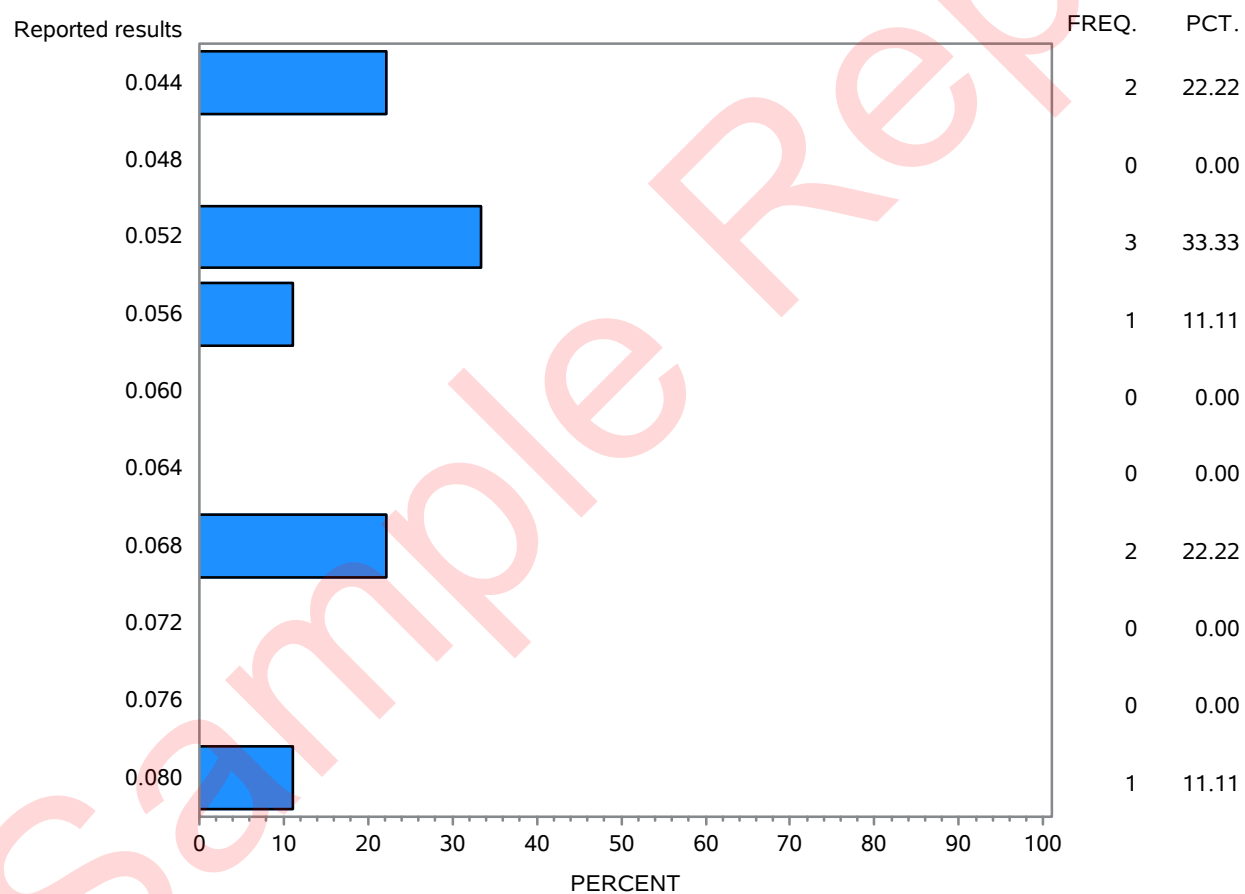
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabichromenic acid (CBCA)



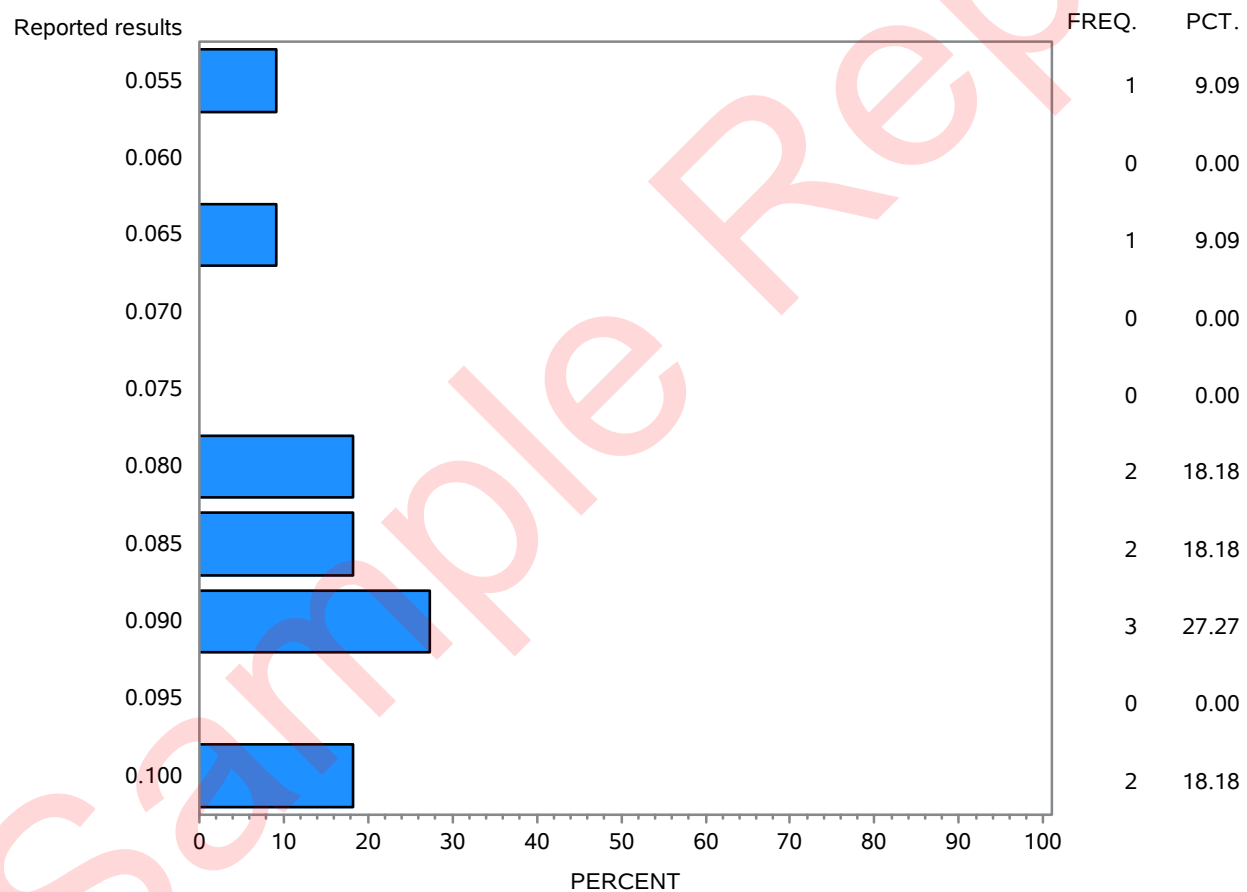
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabidivarinic acid (CBDVA)



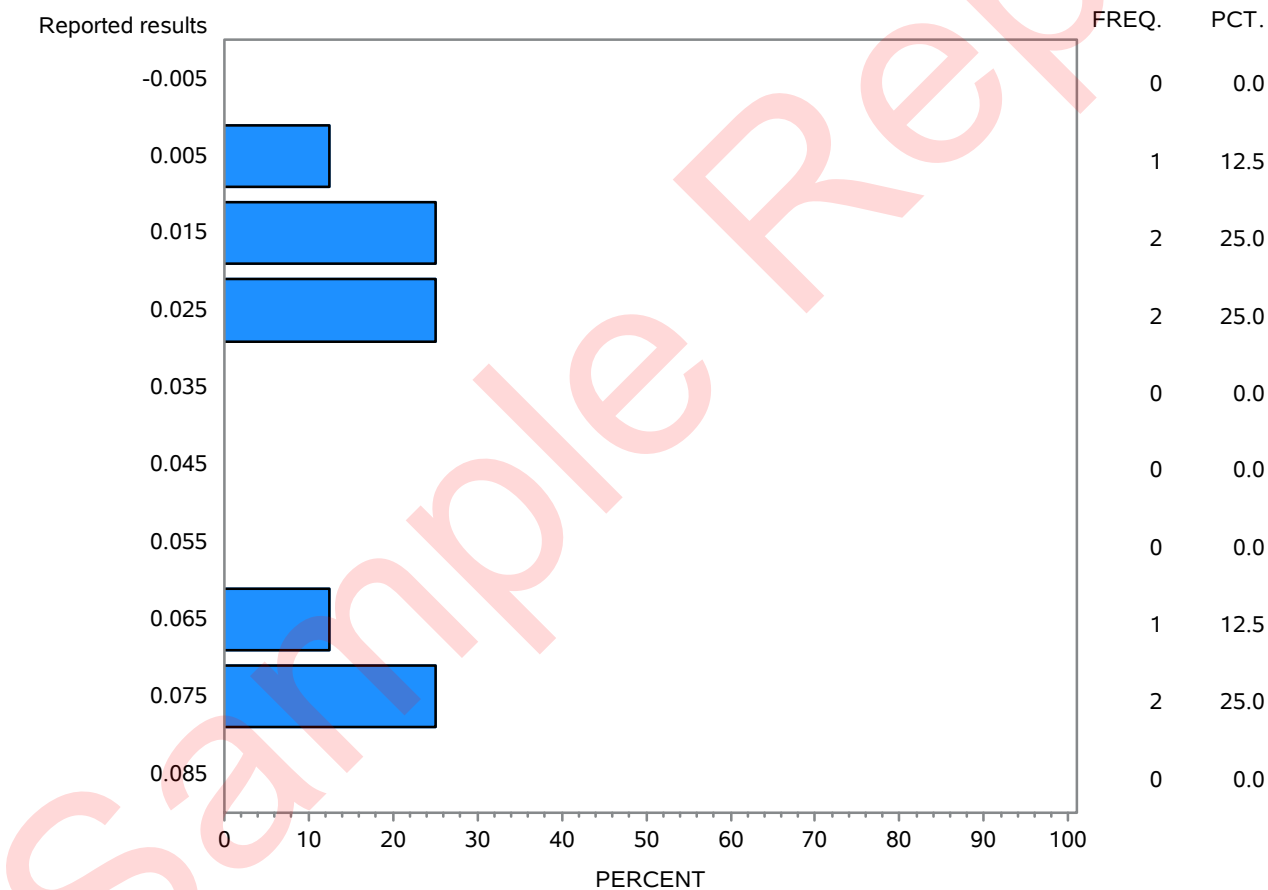
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabigerolic acid (CBGA)



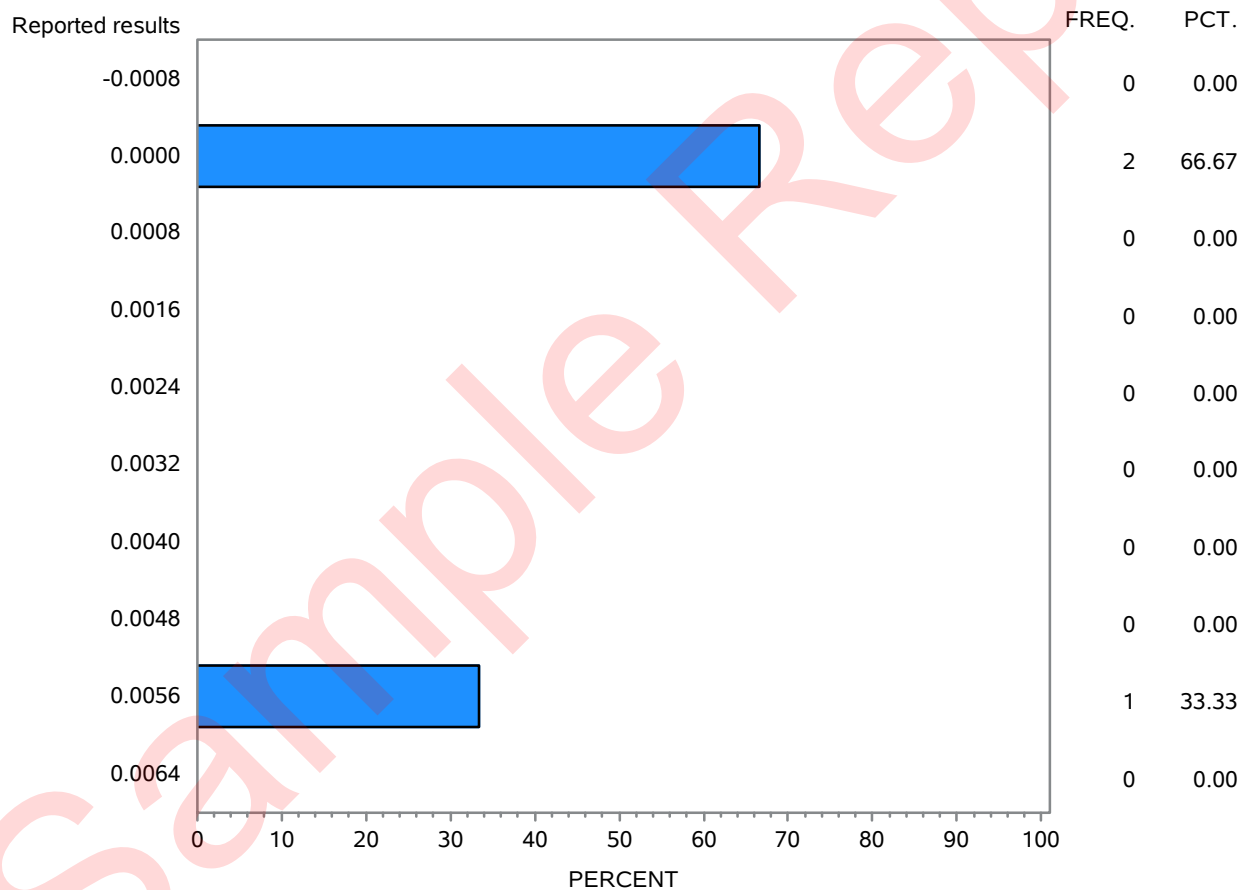
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Cannabidivarin (CBDV)



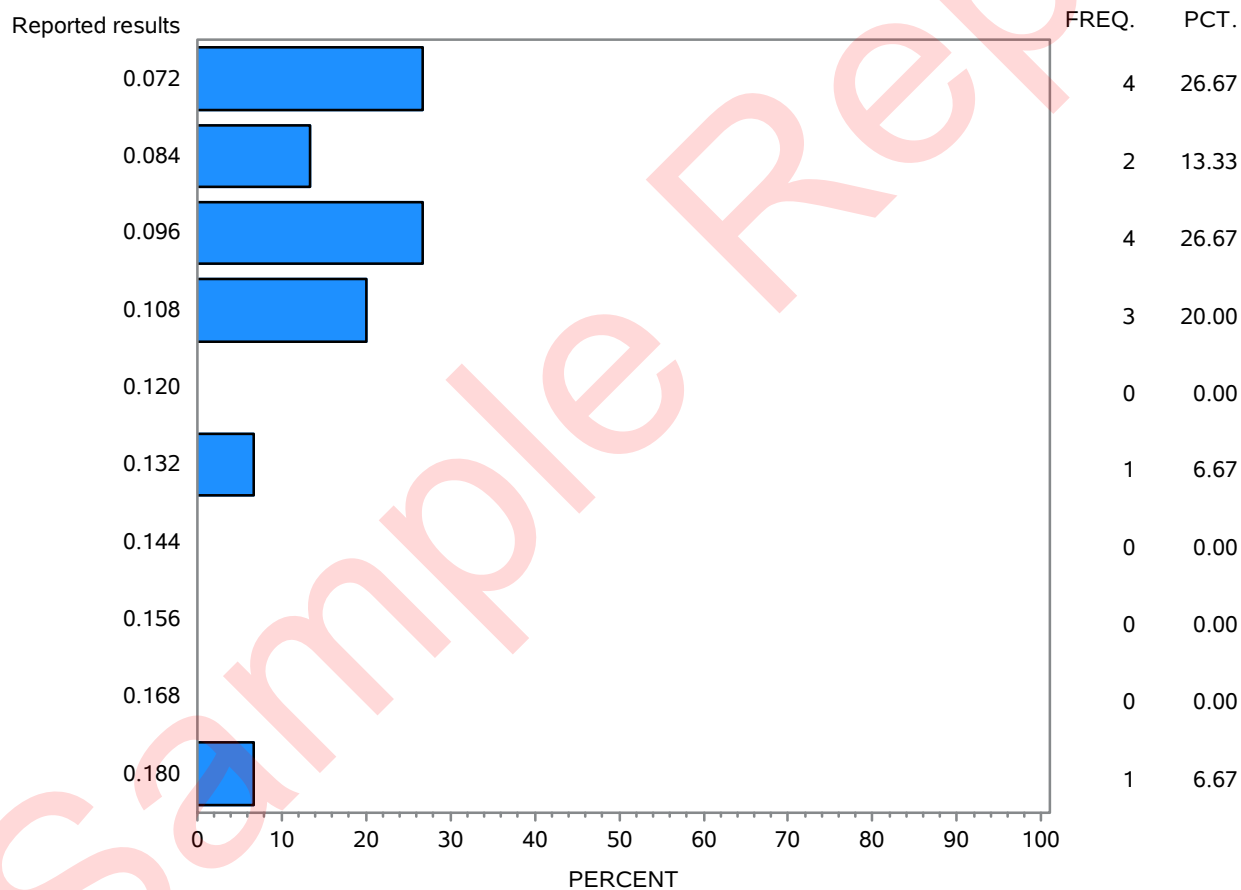
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Δ 8-tetrahydrocannabinol (Δ 8-THC)



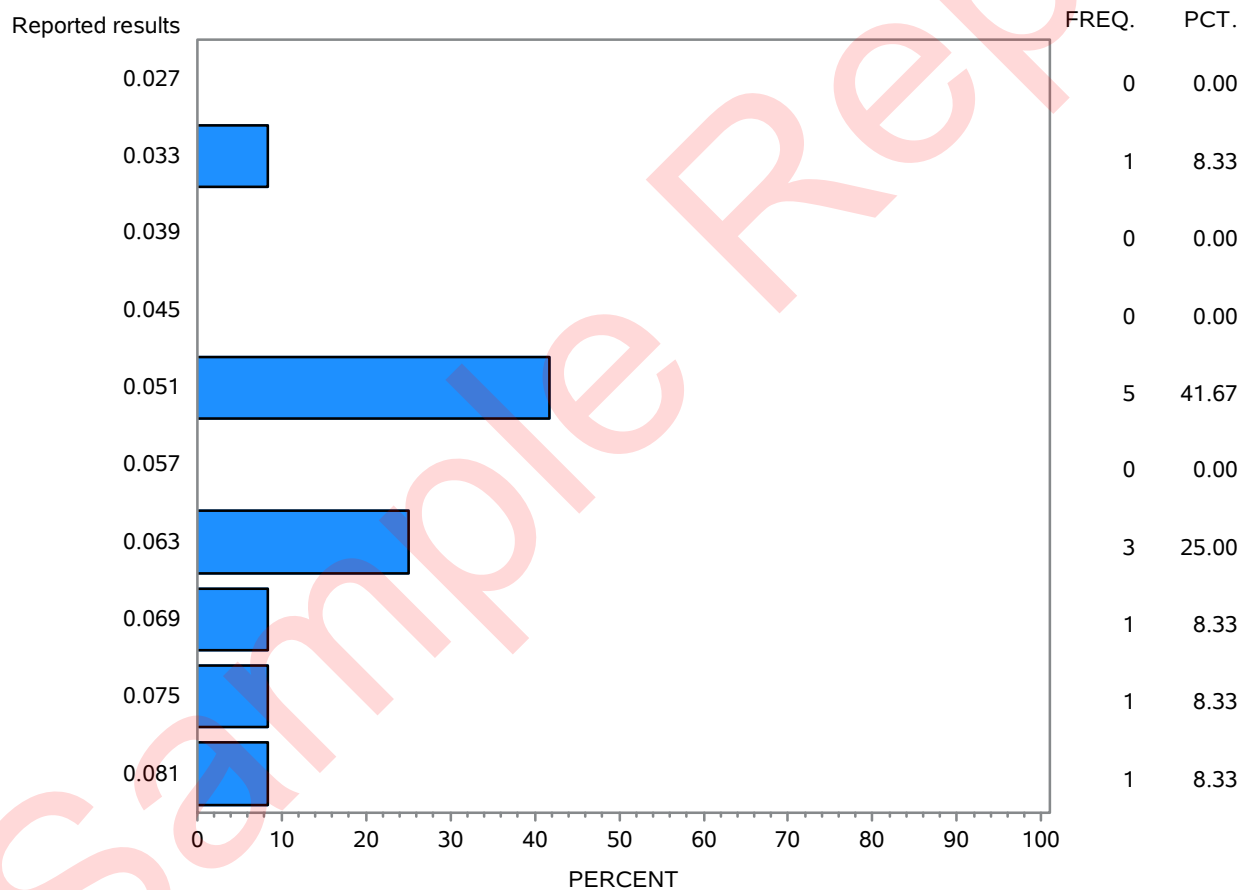
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Δ9-tetrahydrocannabinol (Δ9-THC)



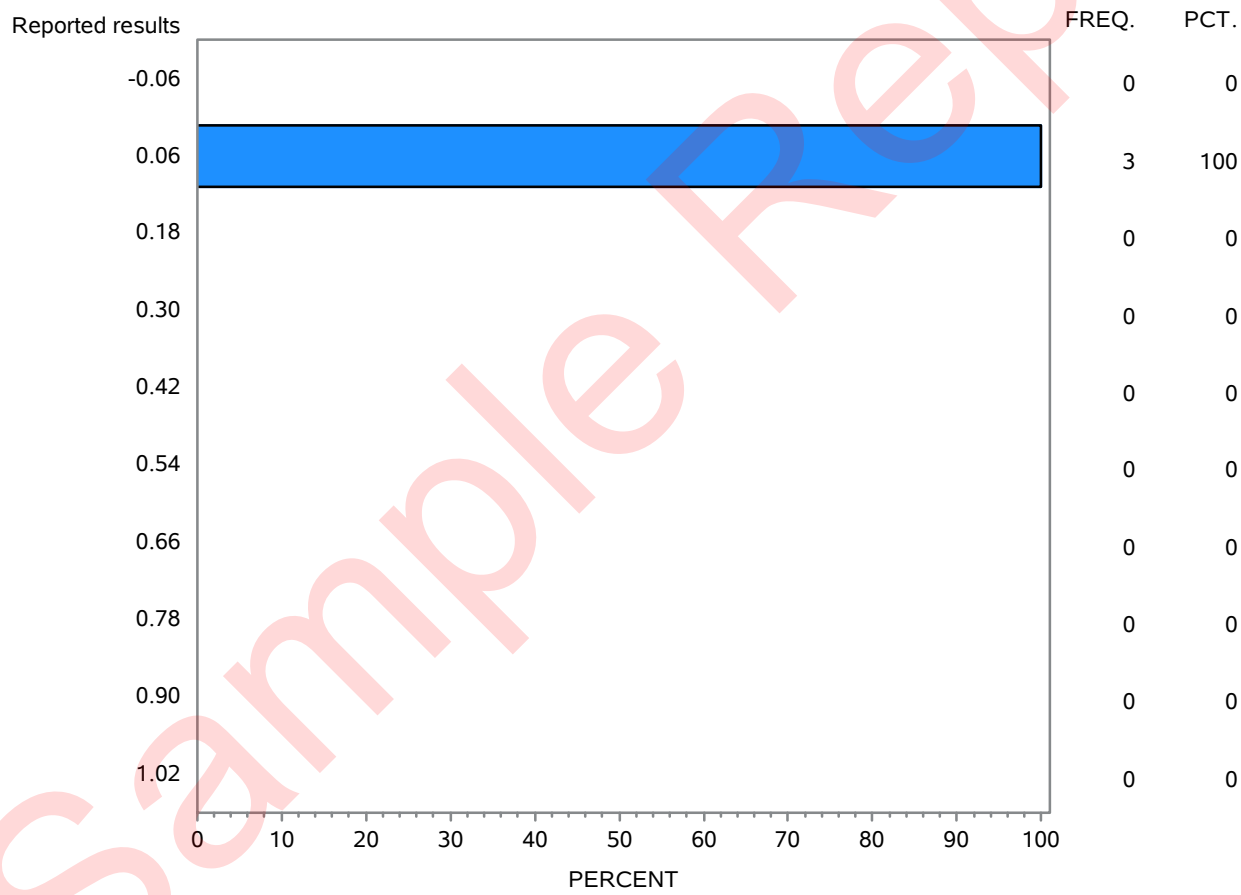
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Tetrahydrocannabinolic acid (THCA)



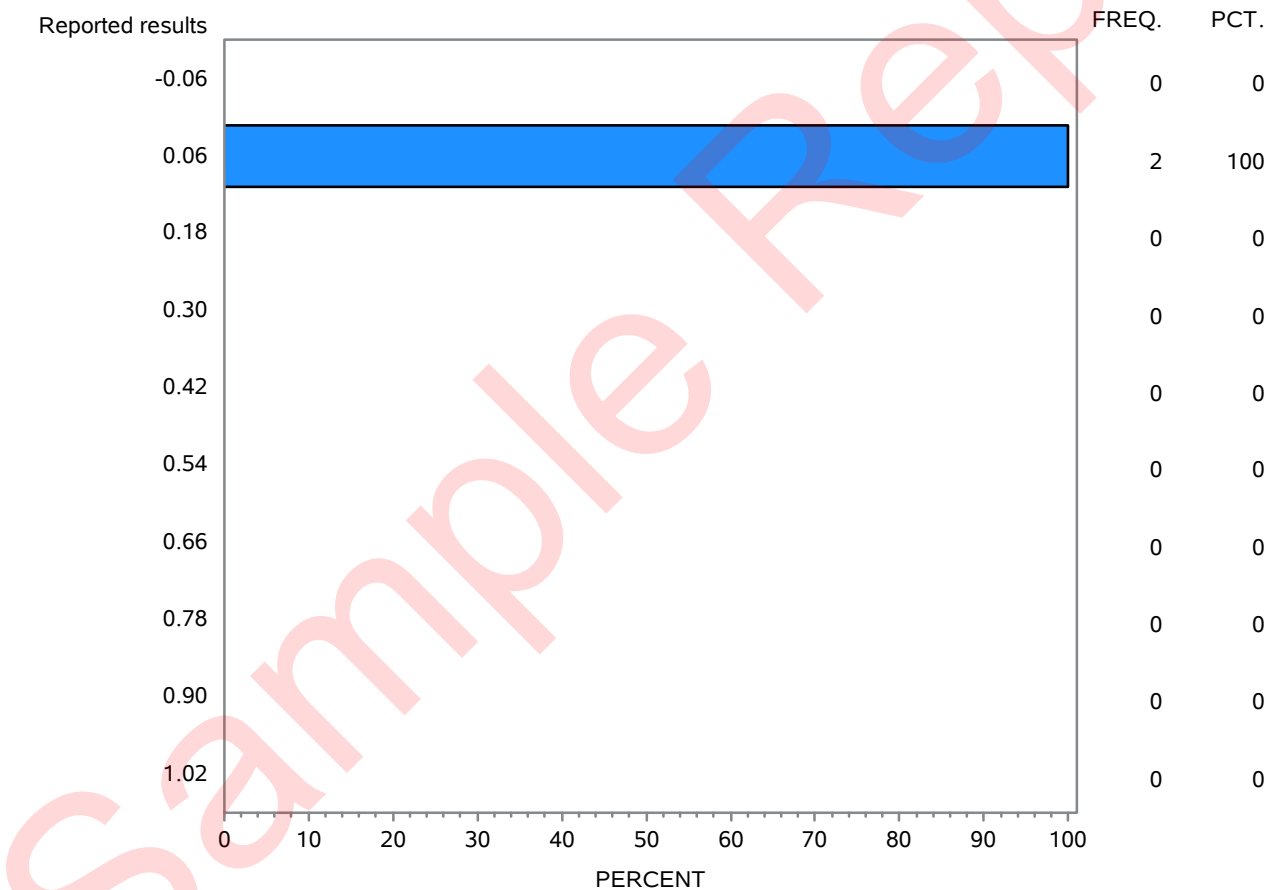
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Tetrahydrocannabivarin (THCV)



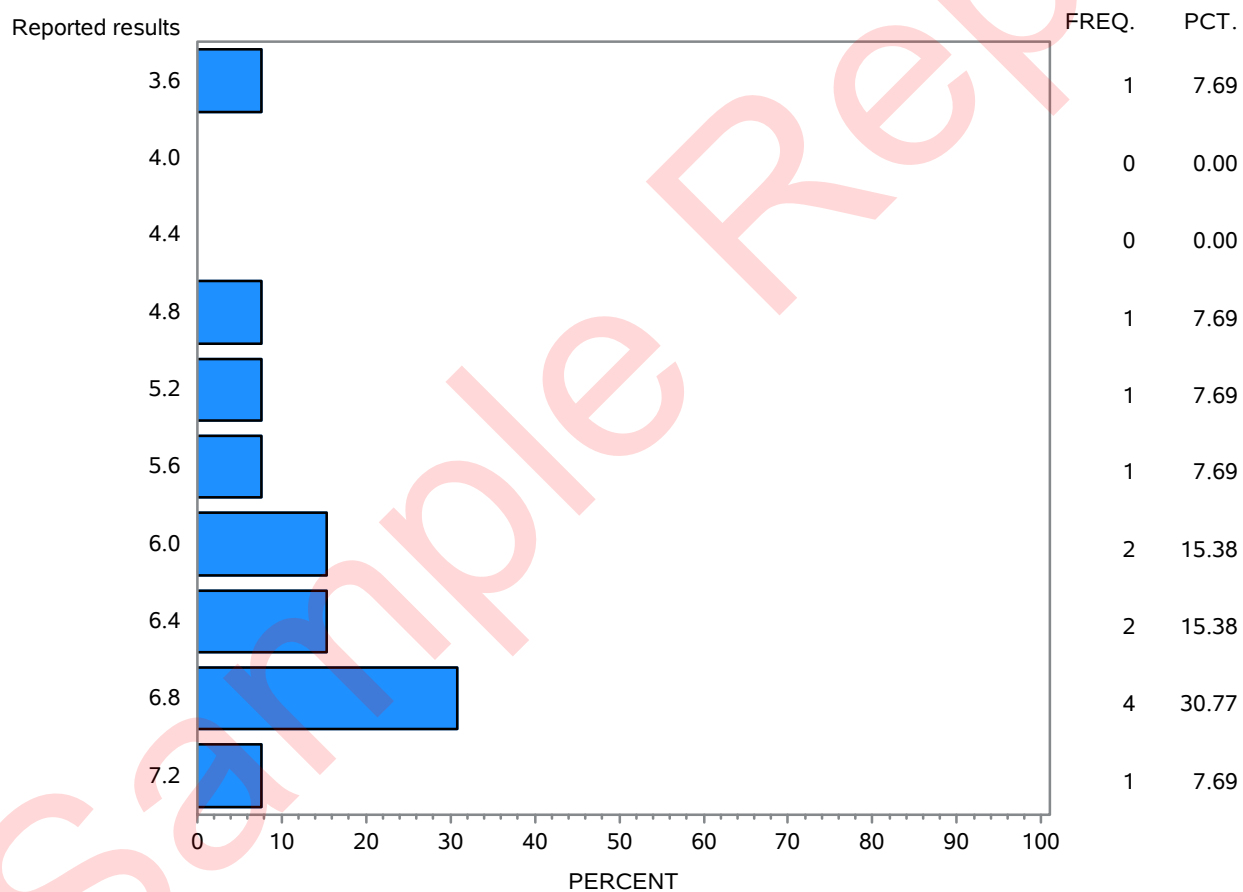
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Tetrahydrocannabivarinic acid (THCVA)



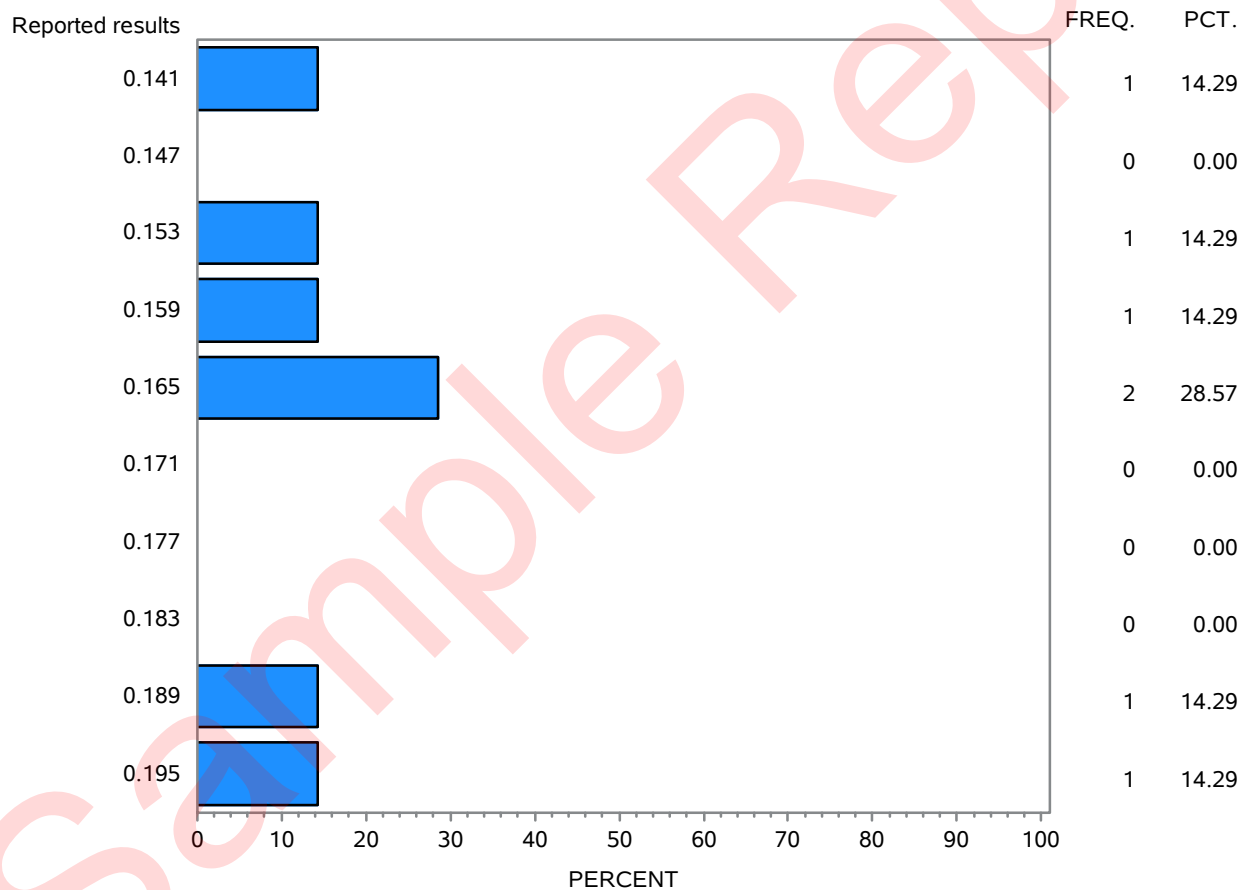
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Total CBD = (CBDA * 0.877) + CBD



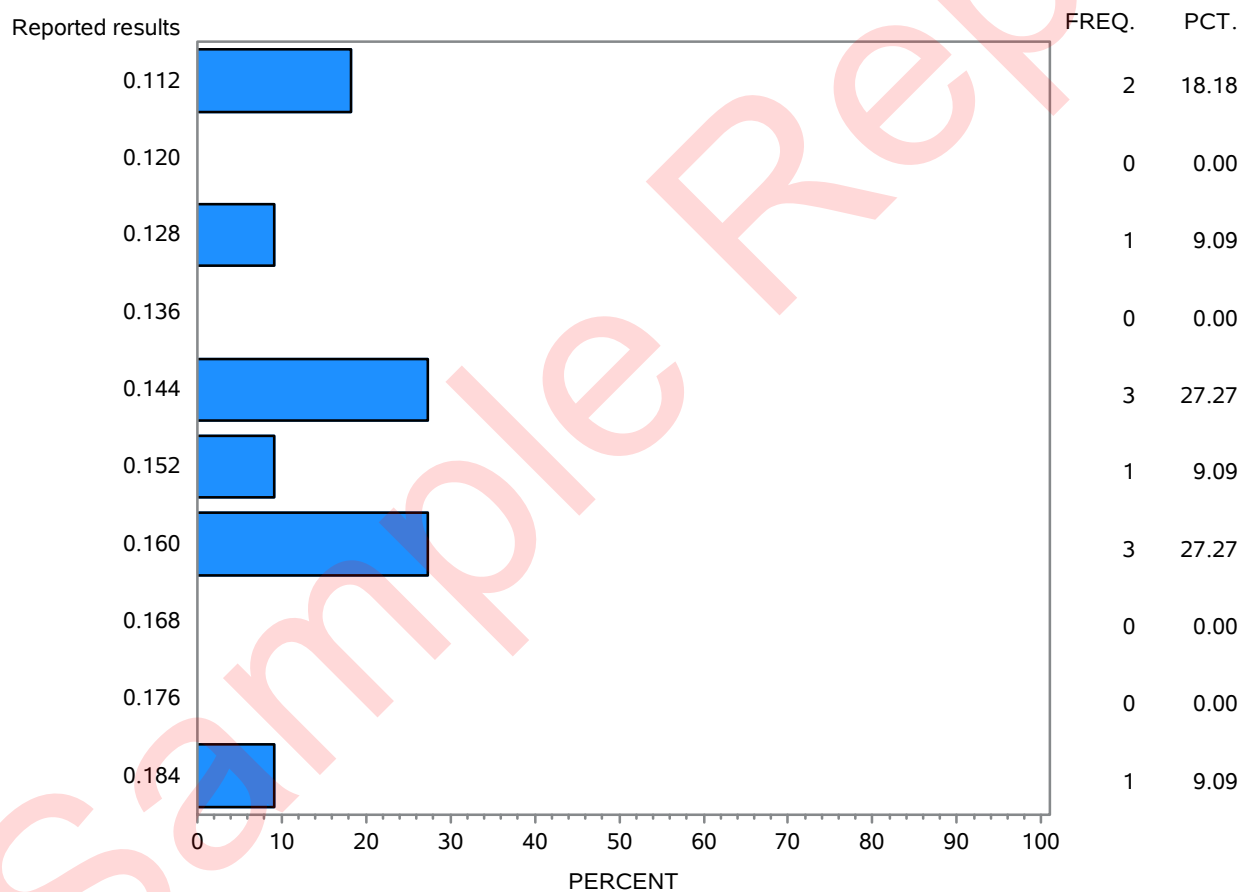
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Total CBG = (CBGA * 0.878) + CBG



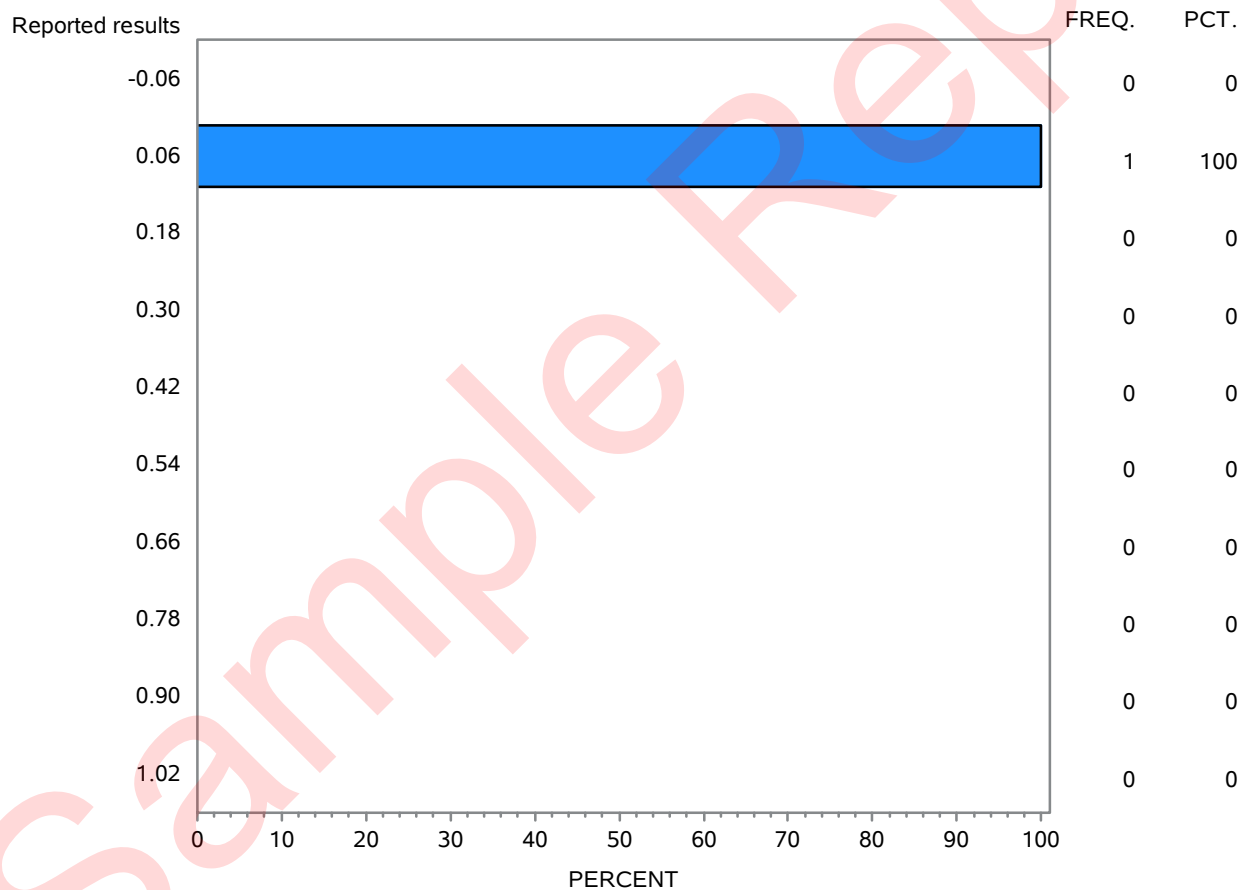
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Cannabinoids Test=% Total THC = (THCA * 0.877) + Δ9-THC



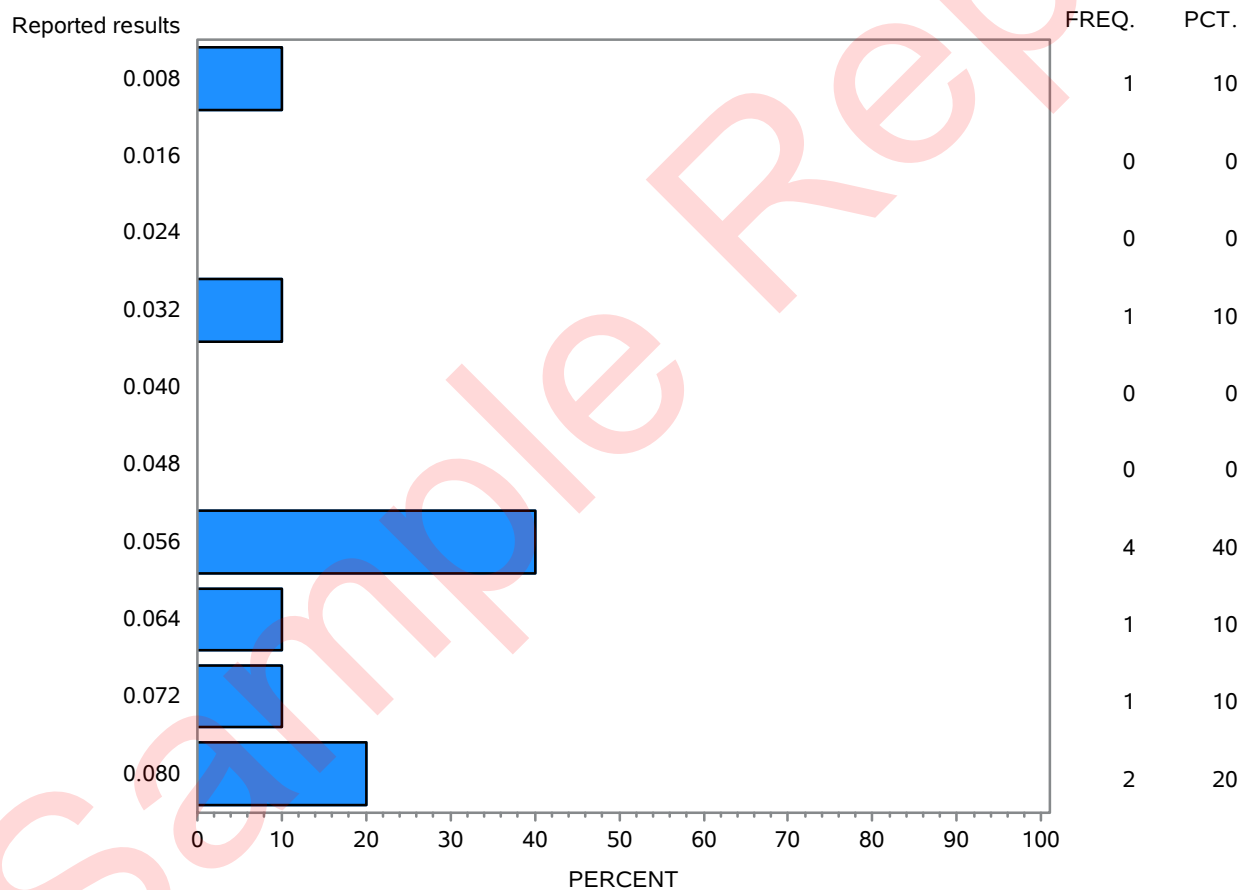
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% 3-carene



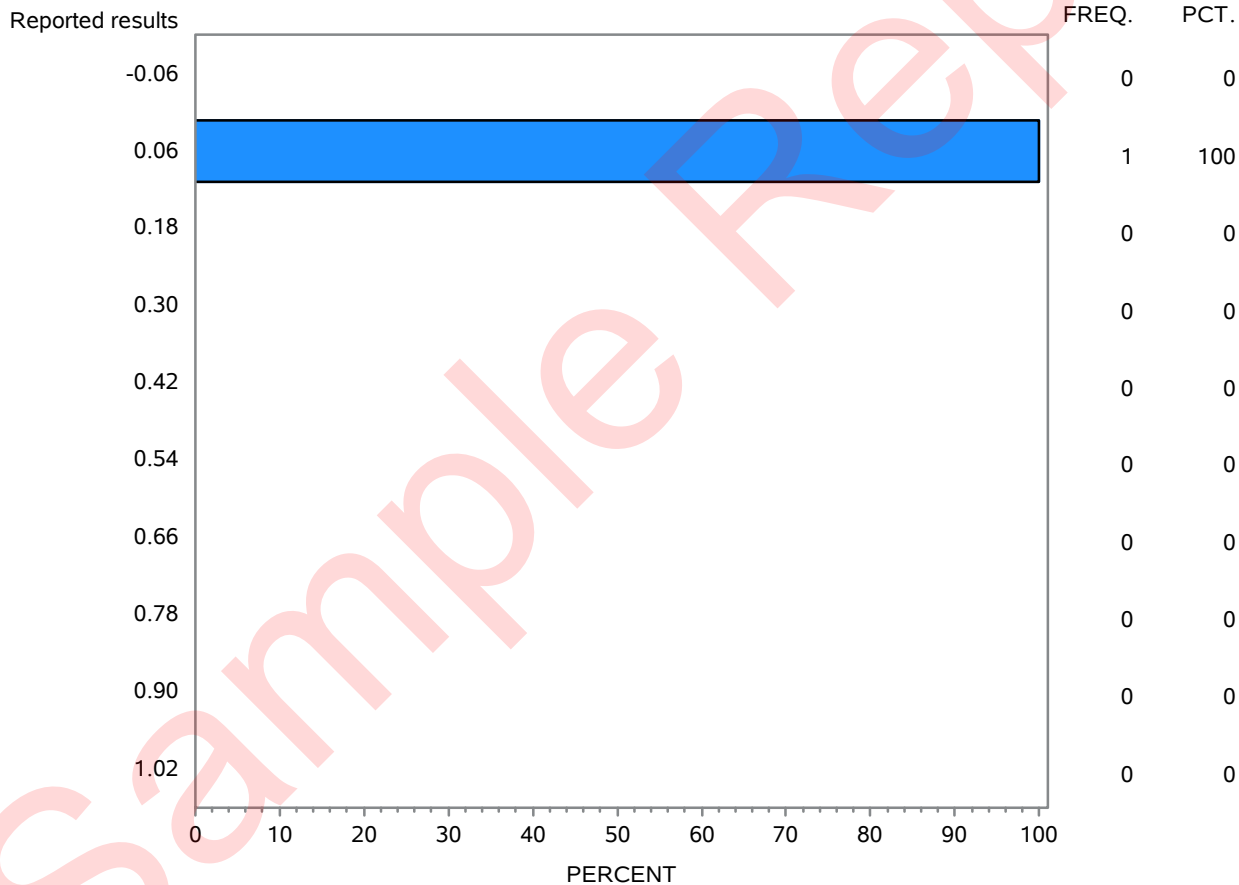
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-bisabolol



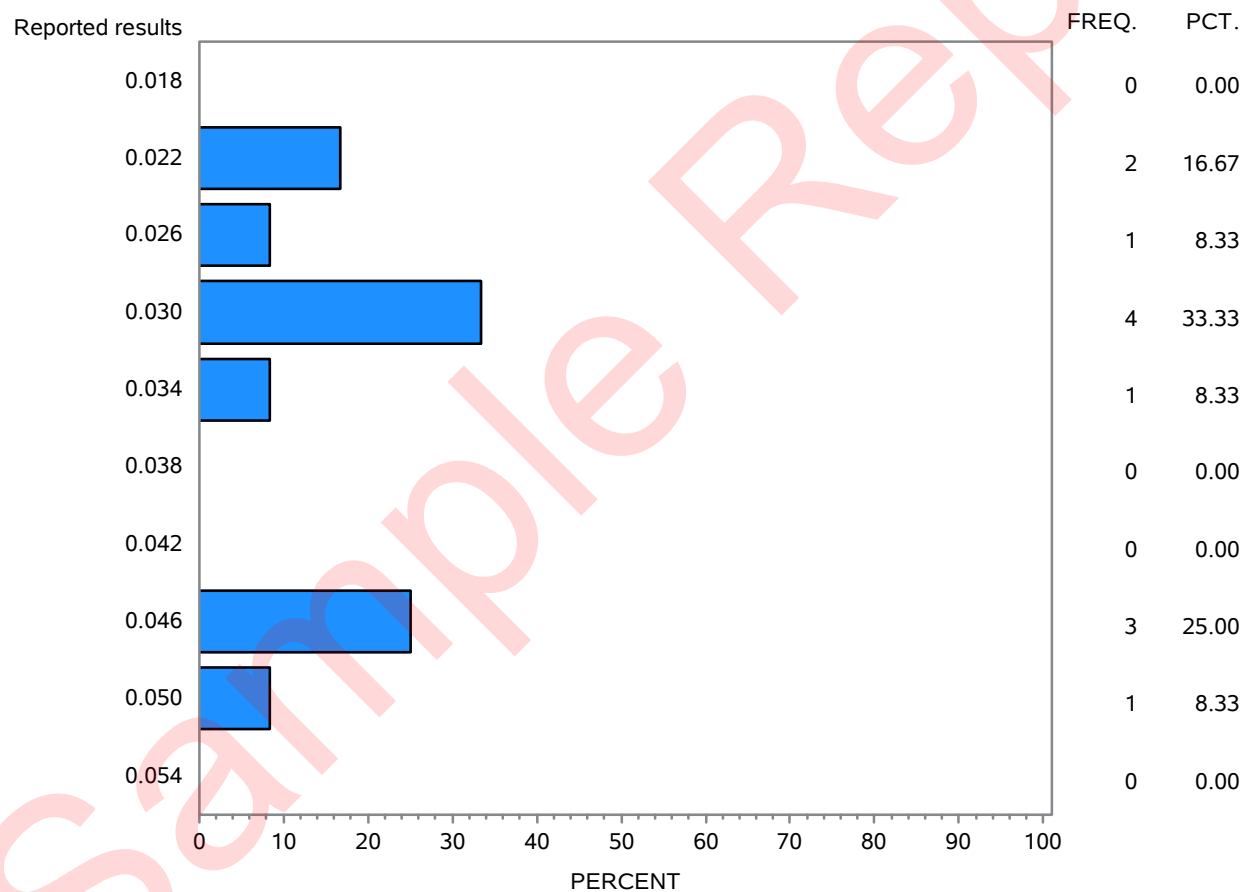
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-cedrene



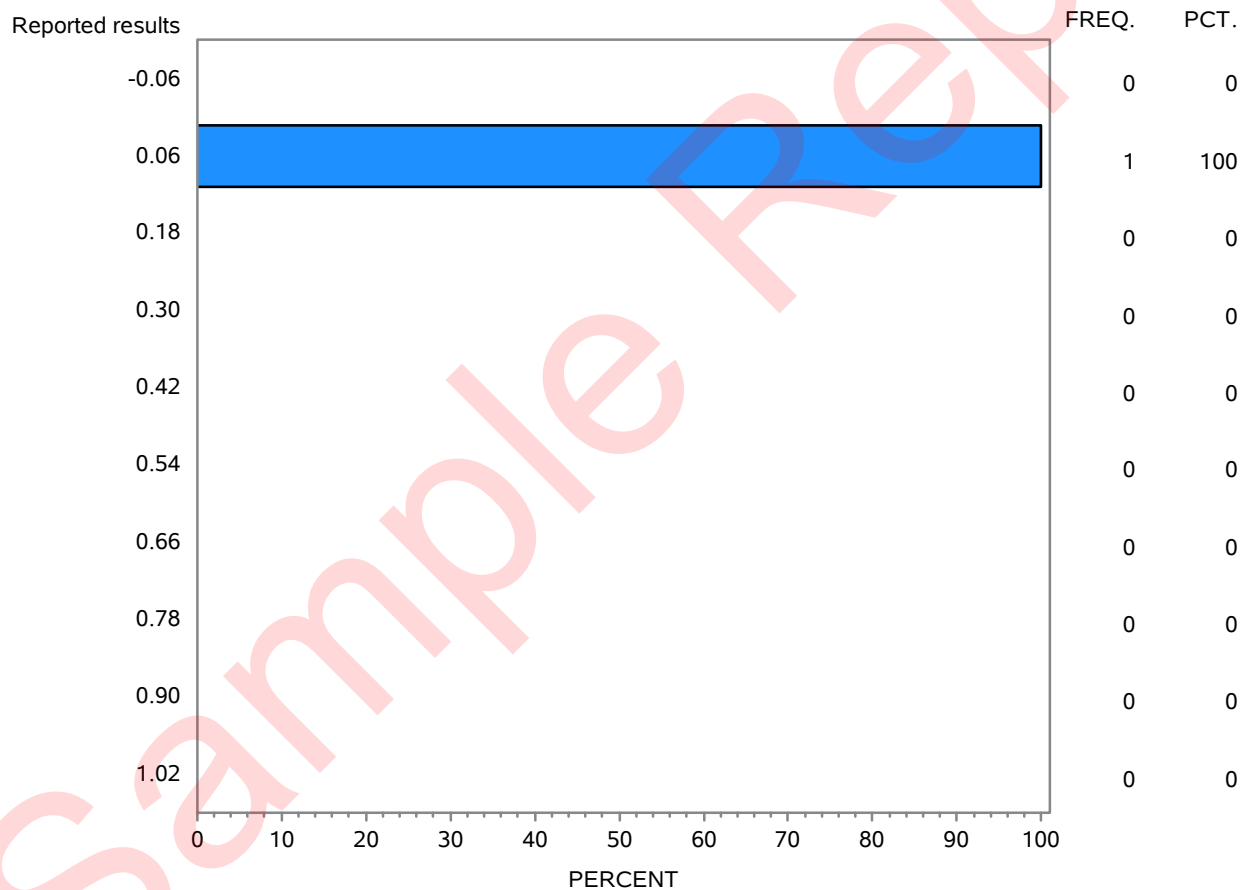
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-humulene



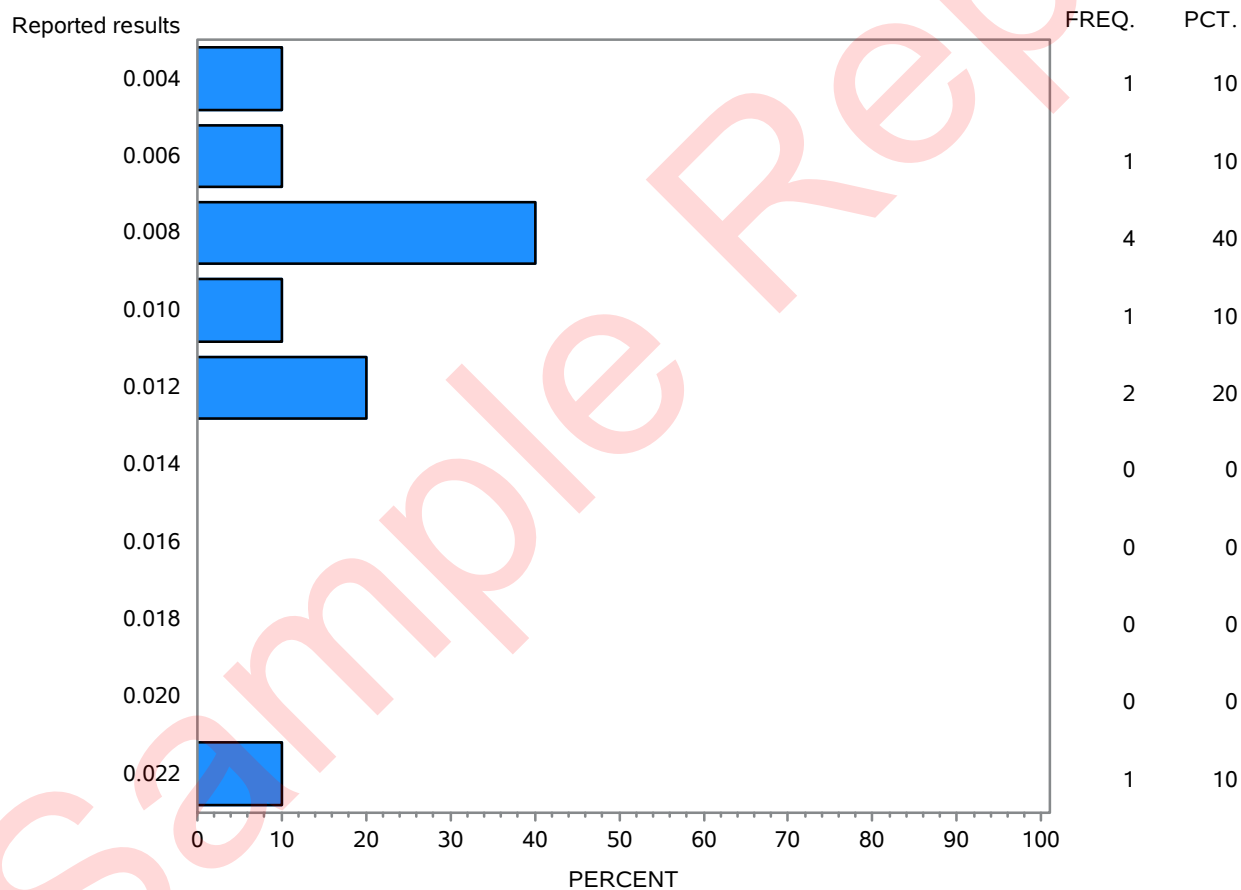
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-phellandrene



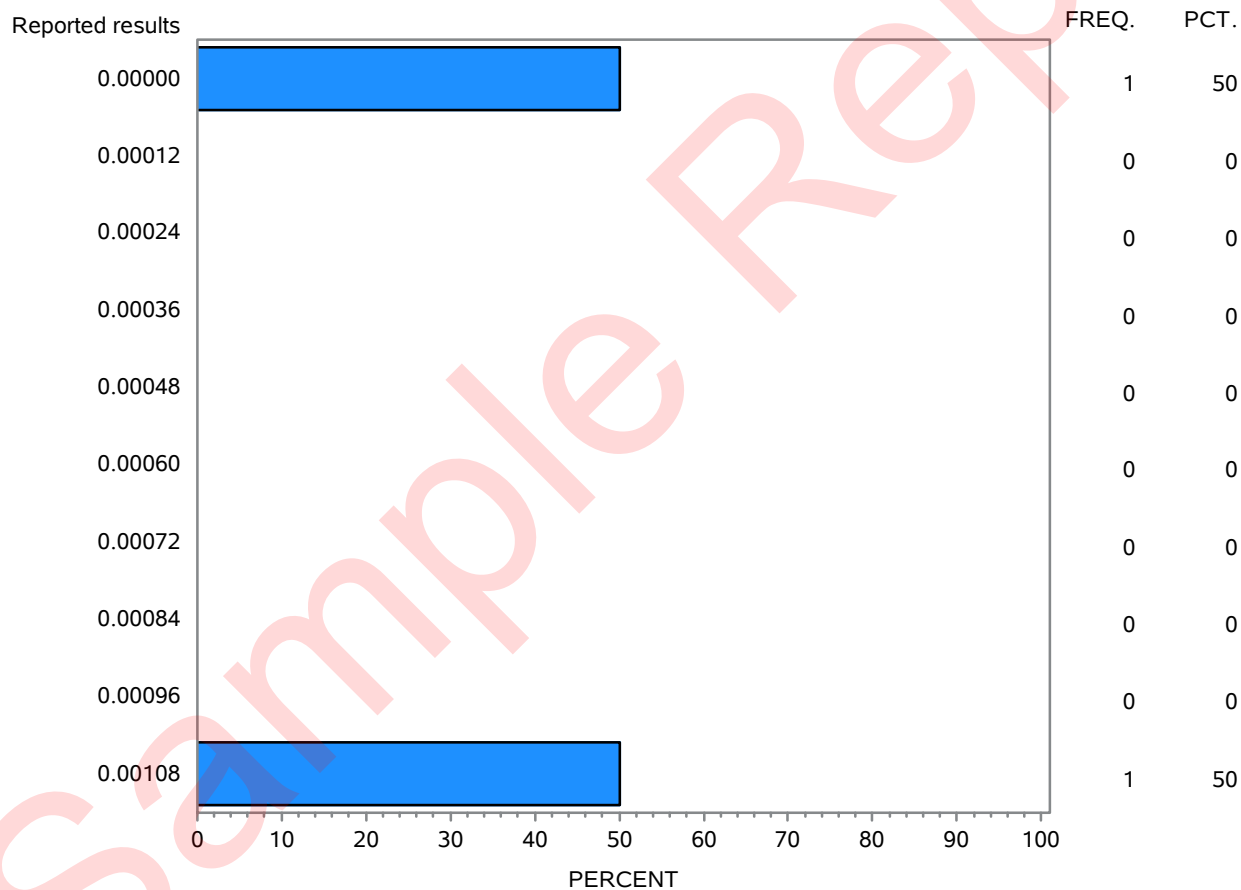
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-pinene



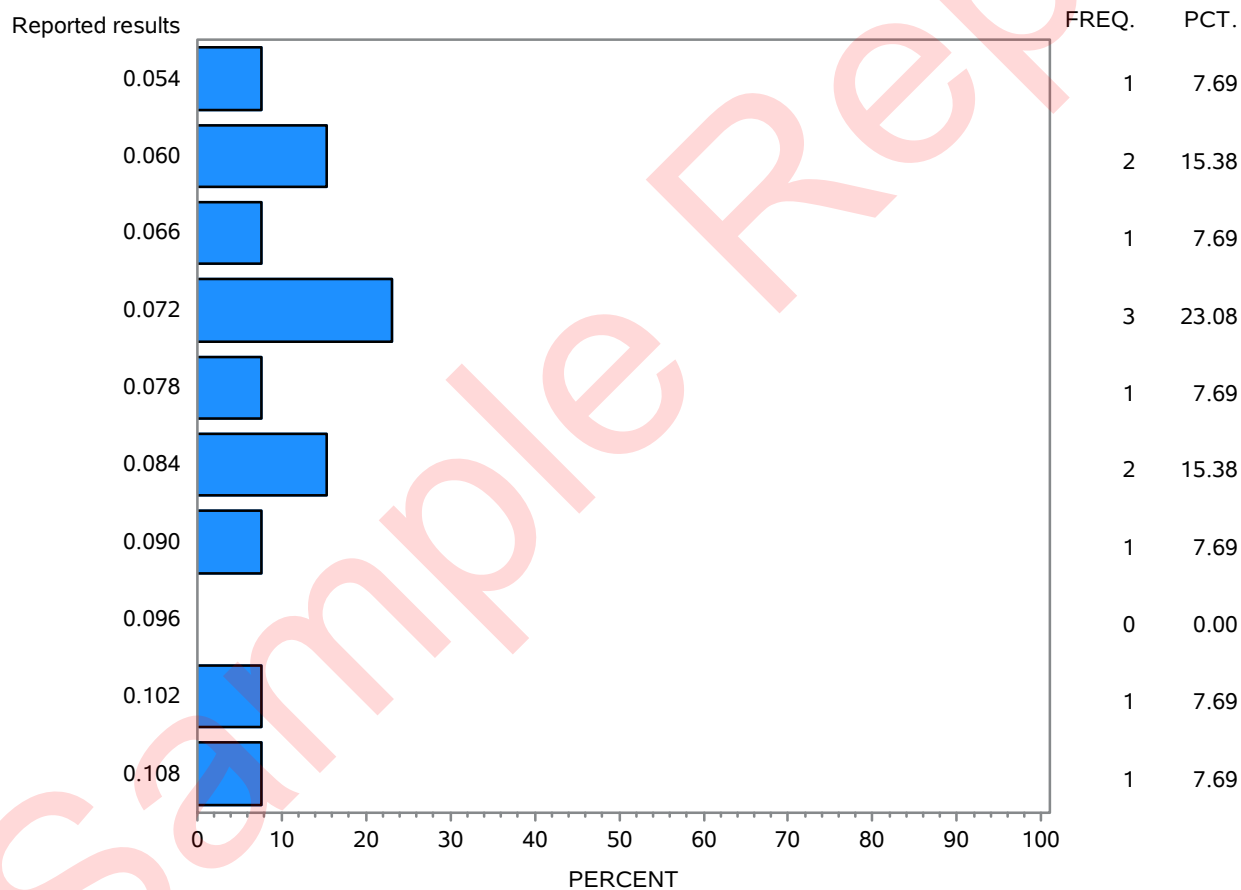
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Alpha-terpinene



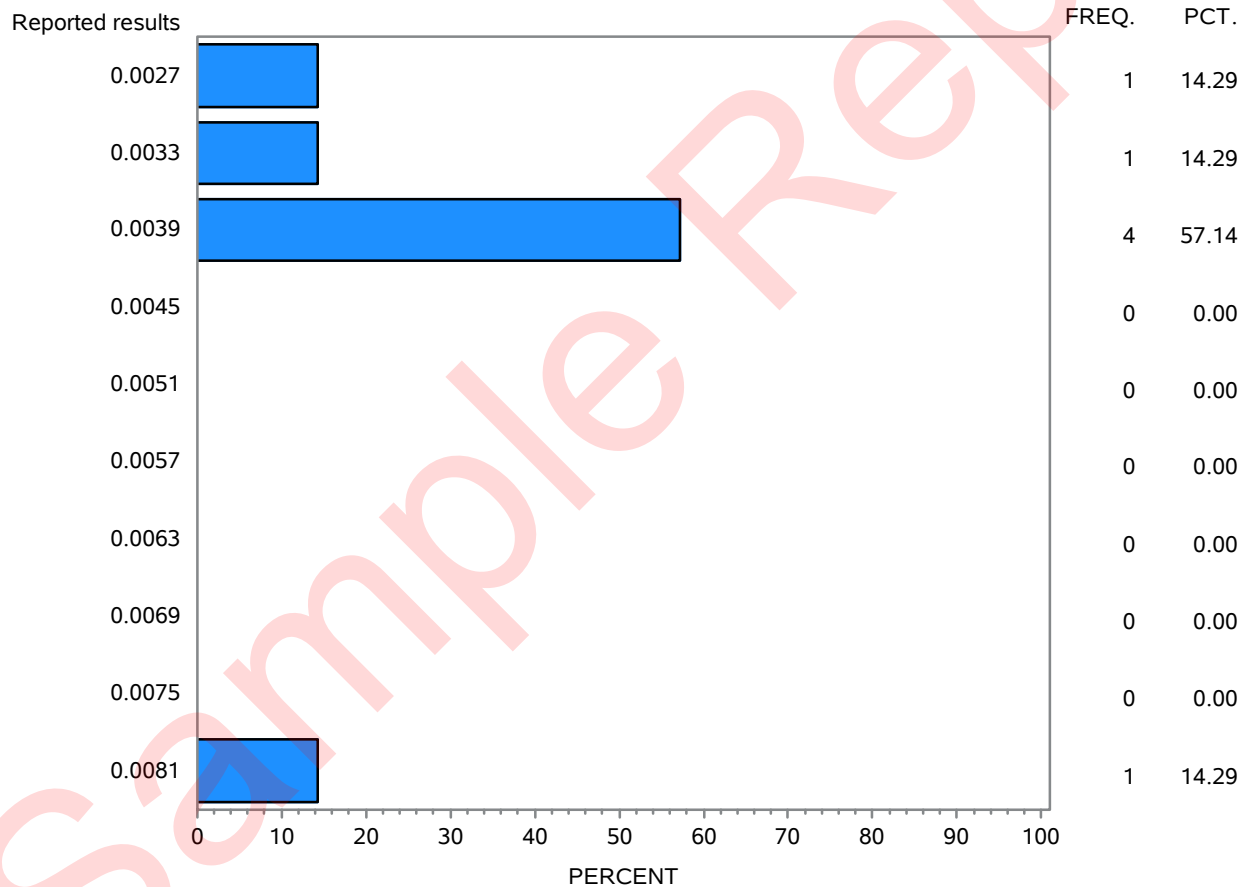
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Beta-caryophyllene



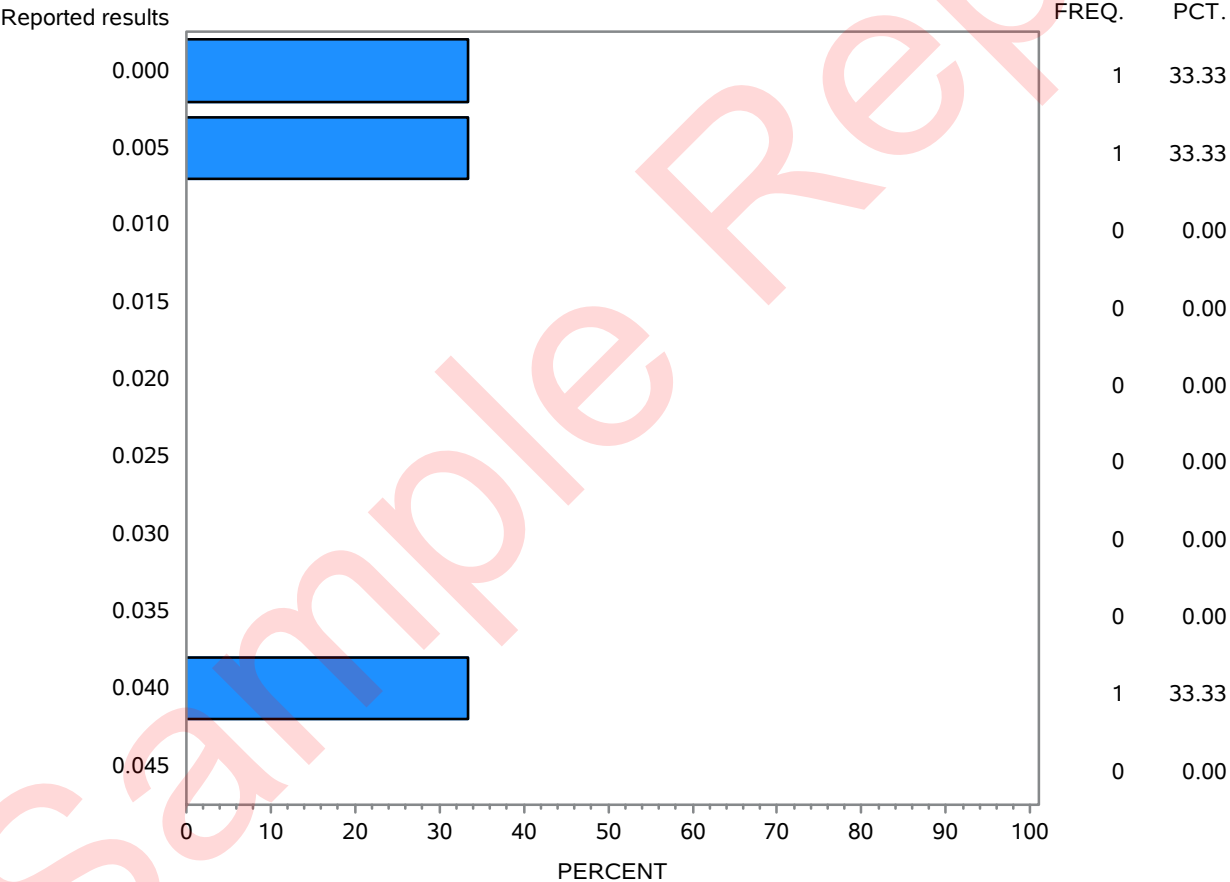
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Beta-myrcene



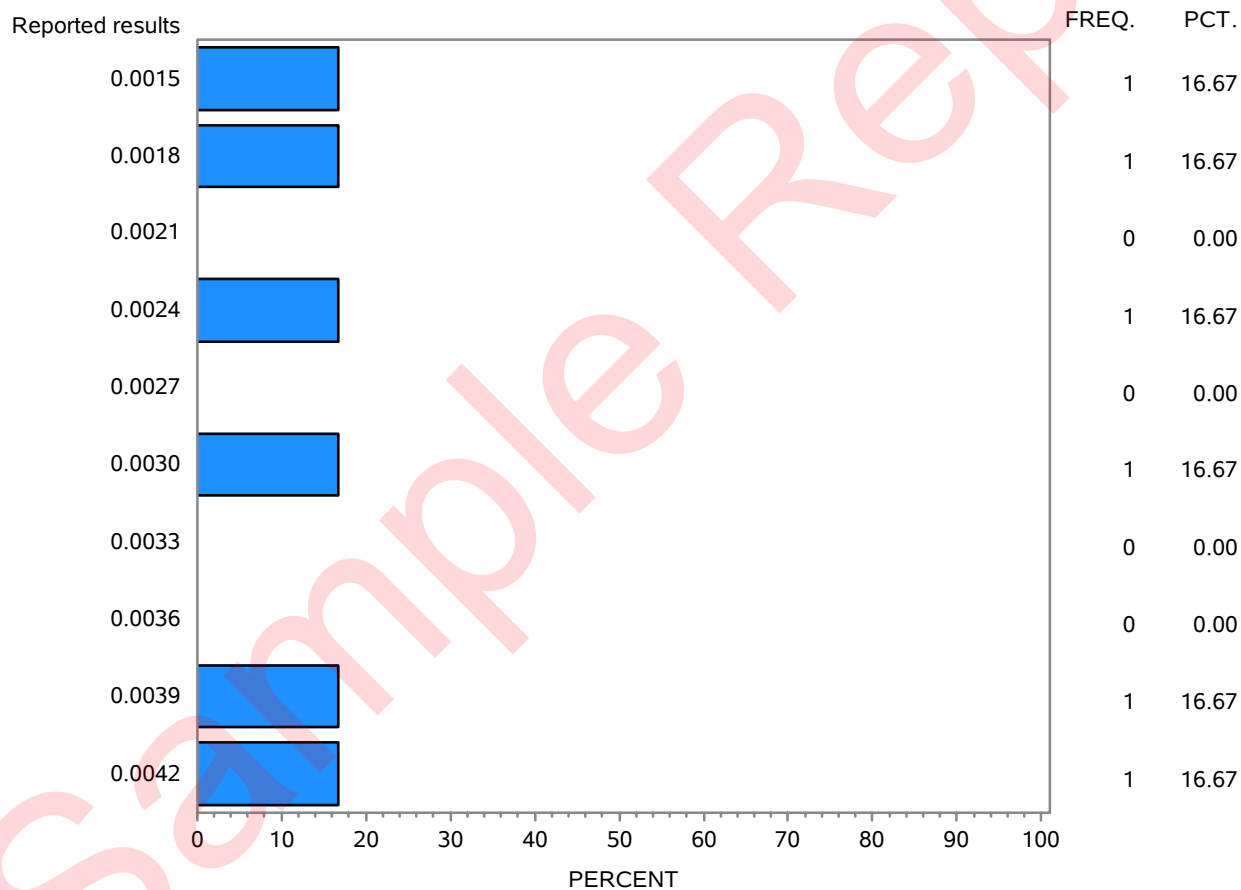
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Beta-ocimene



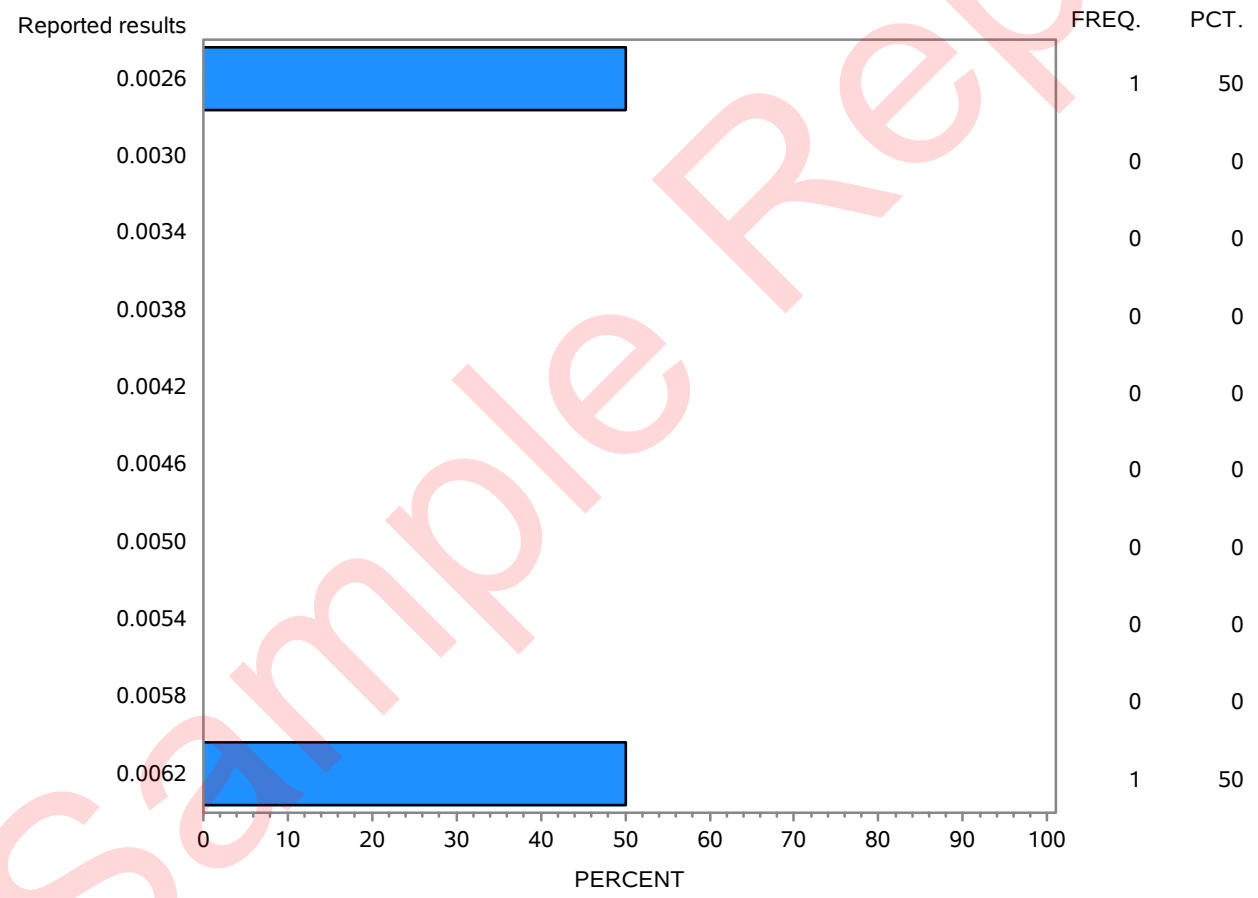
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Beta-pinene



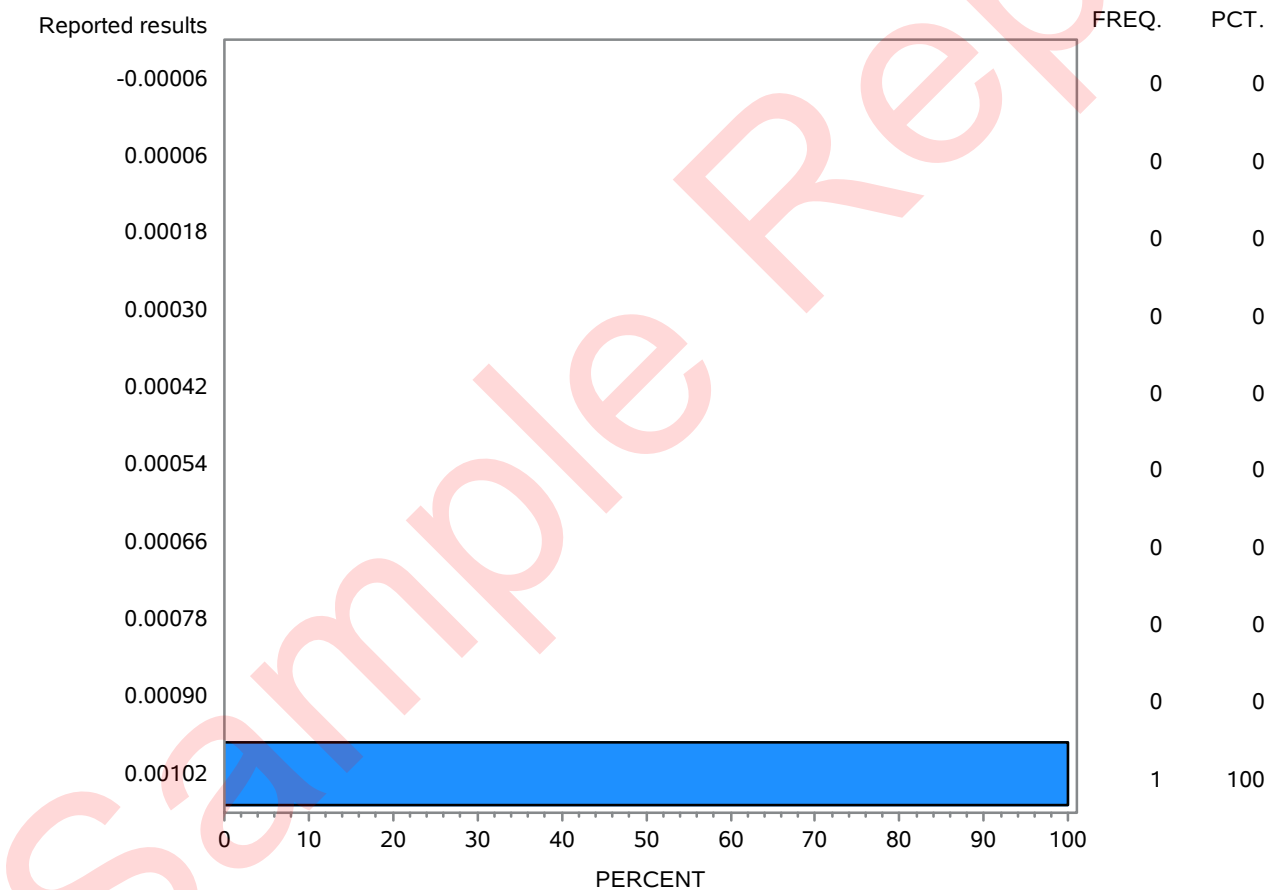
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Borneol



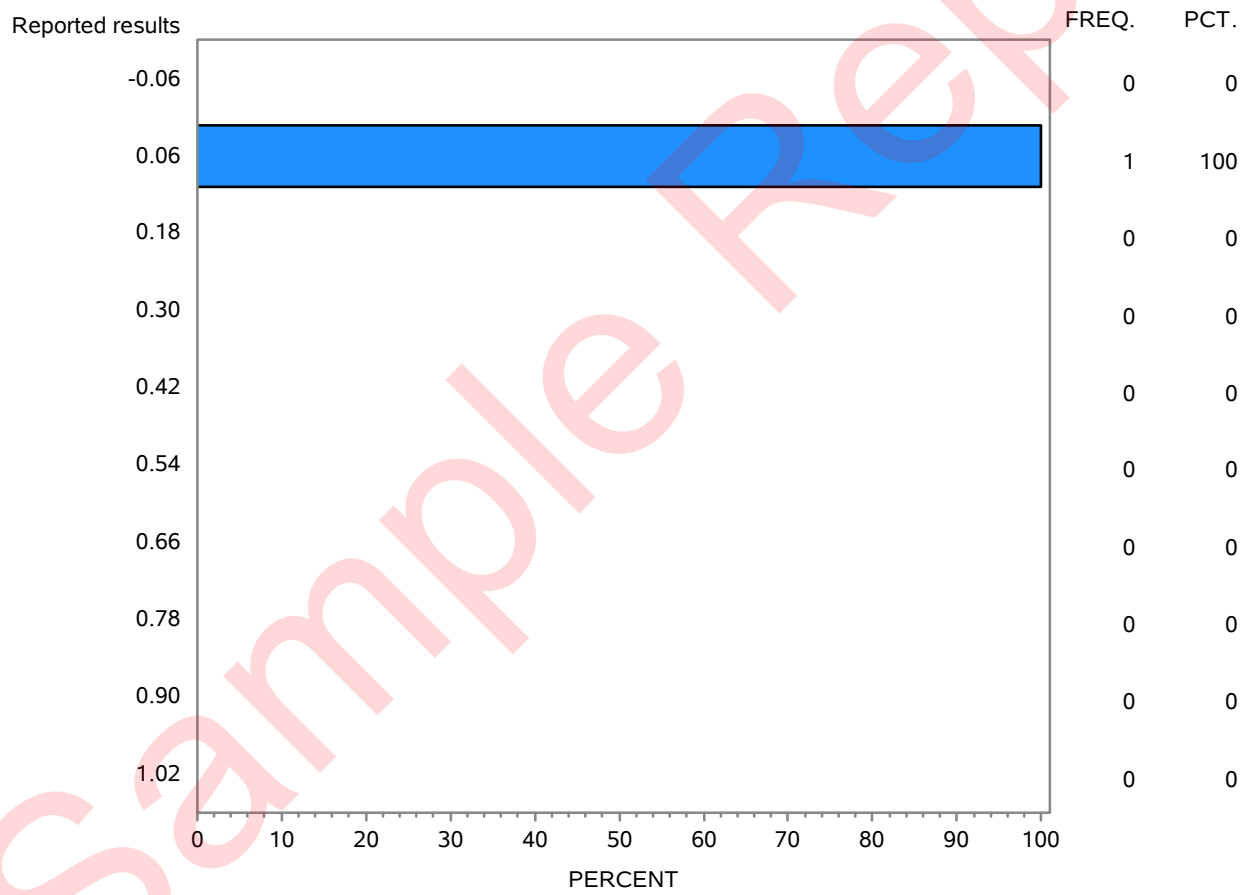
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Camphene



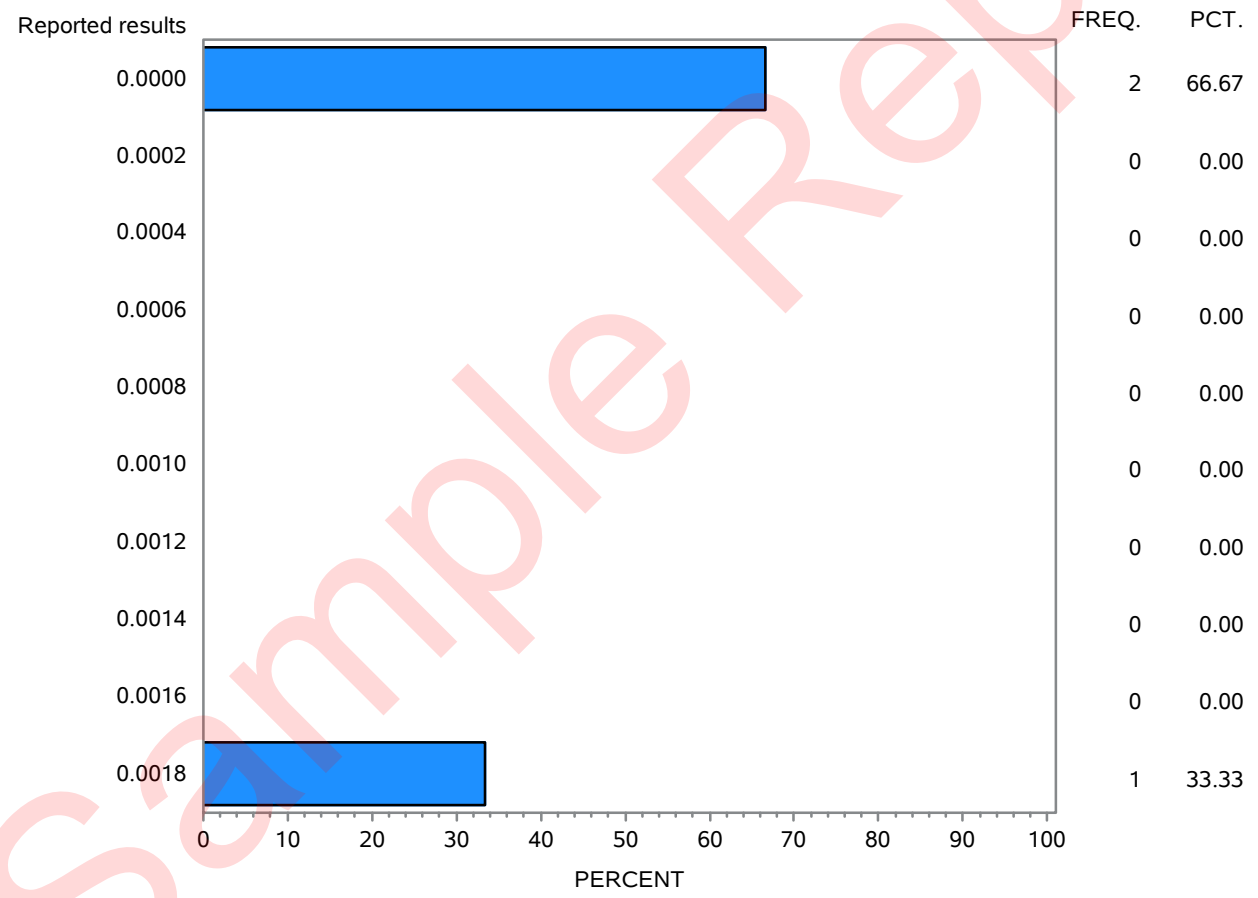
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Cedrol



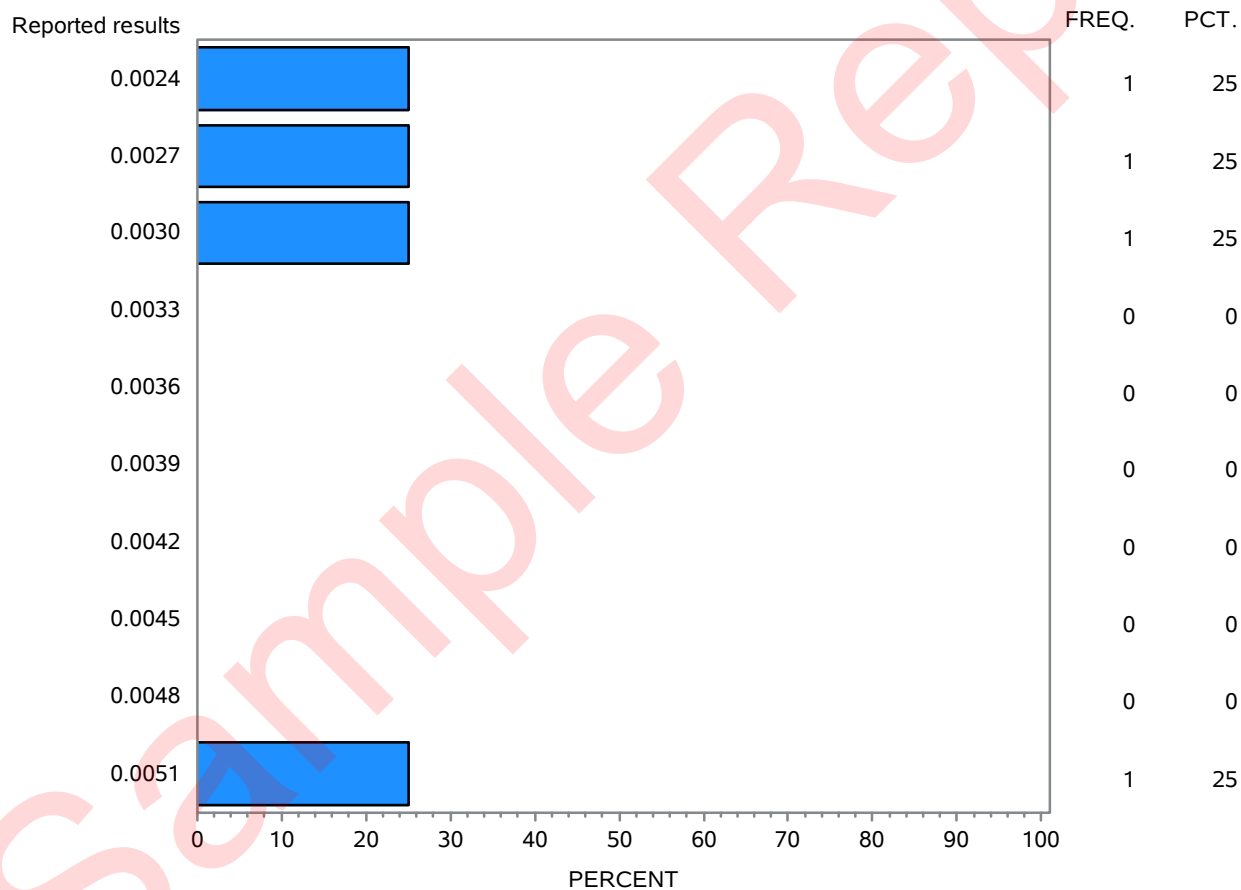
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Cis-nerolidol



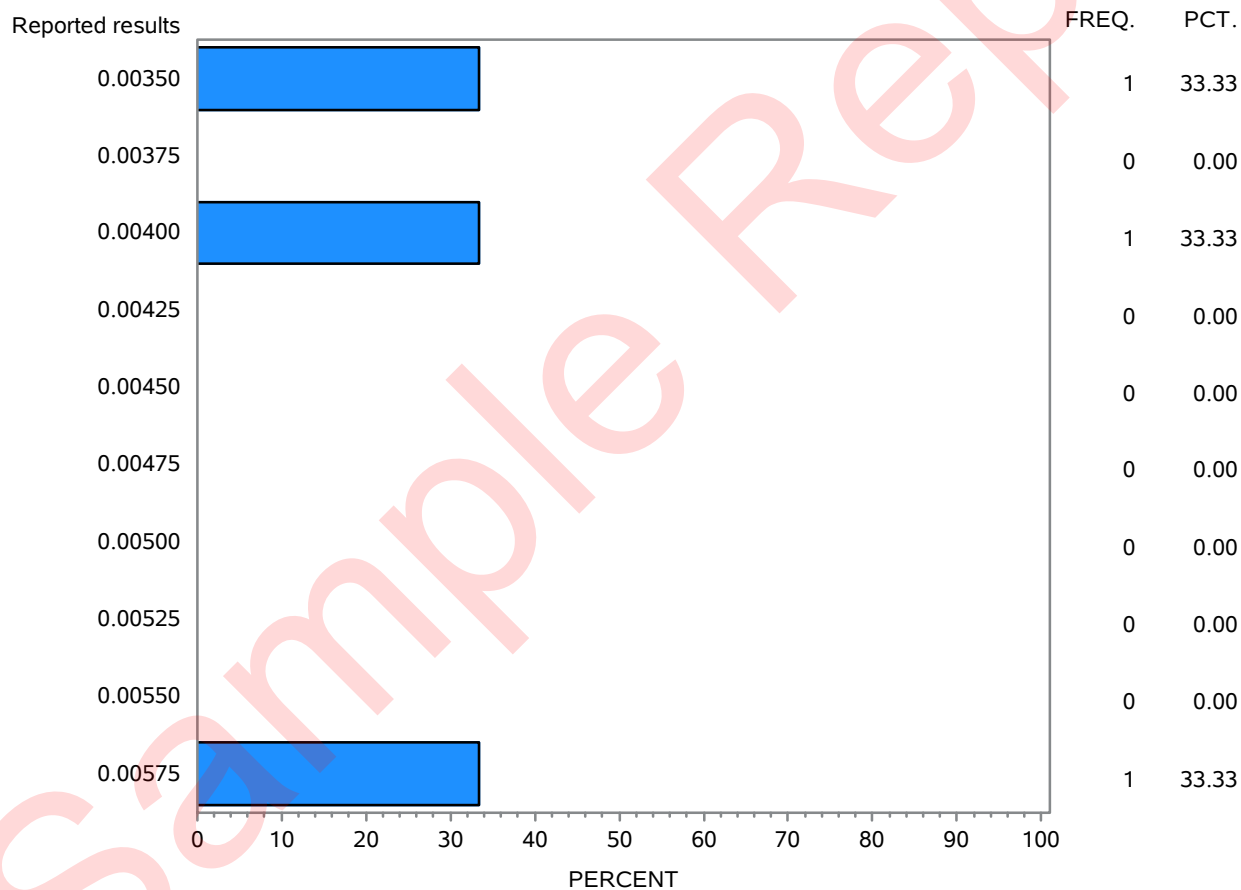
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Eucalyptol



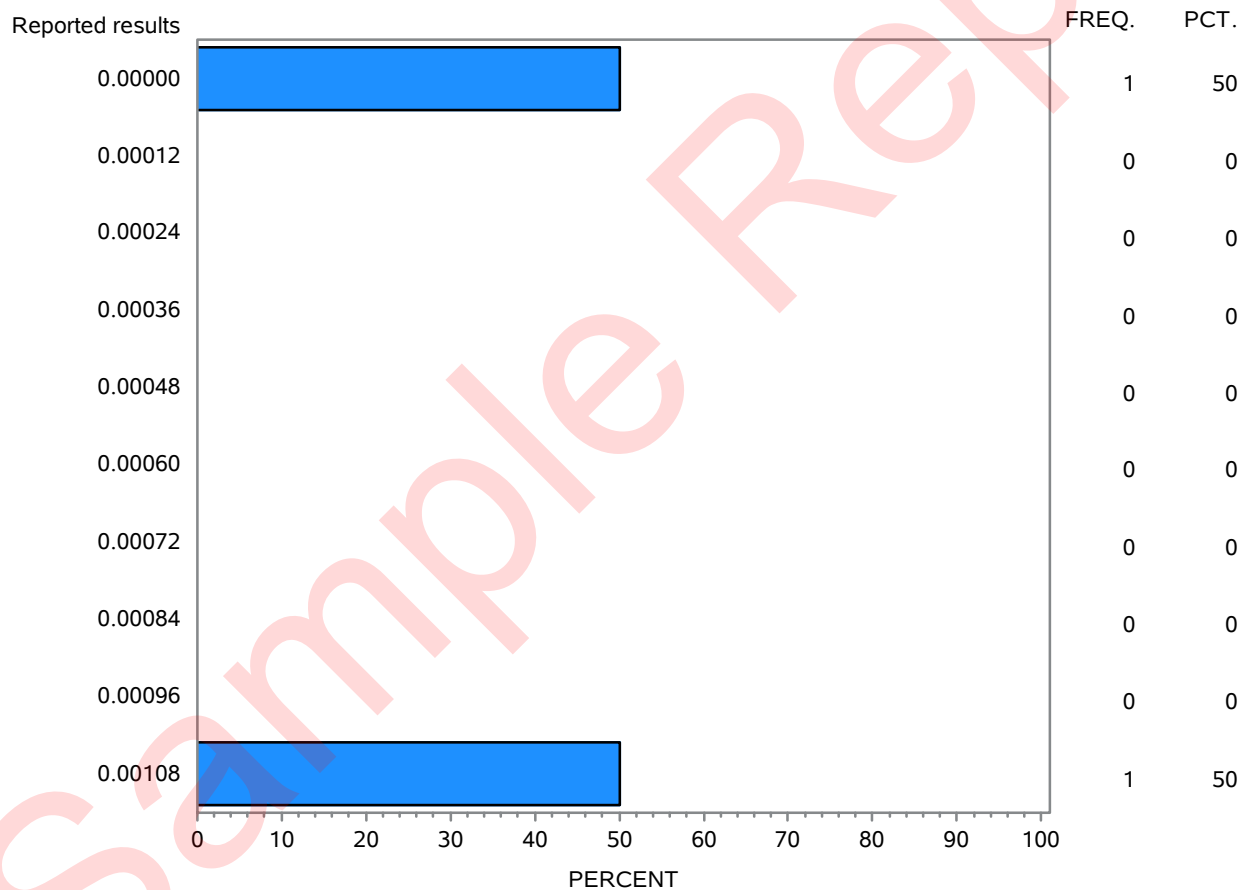
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Fenchyl alcohol



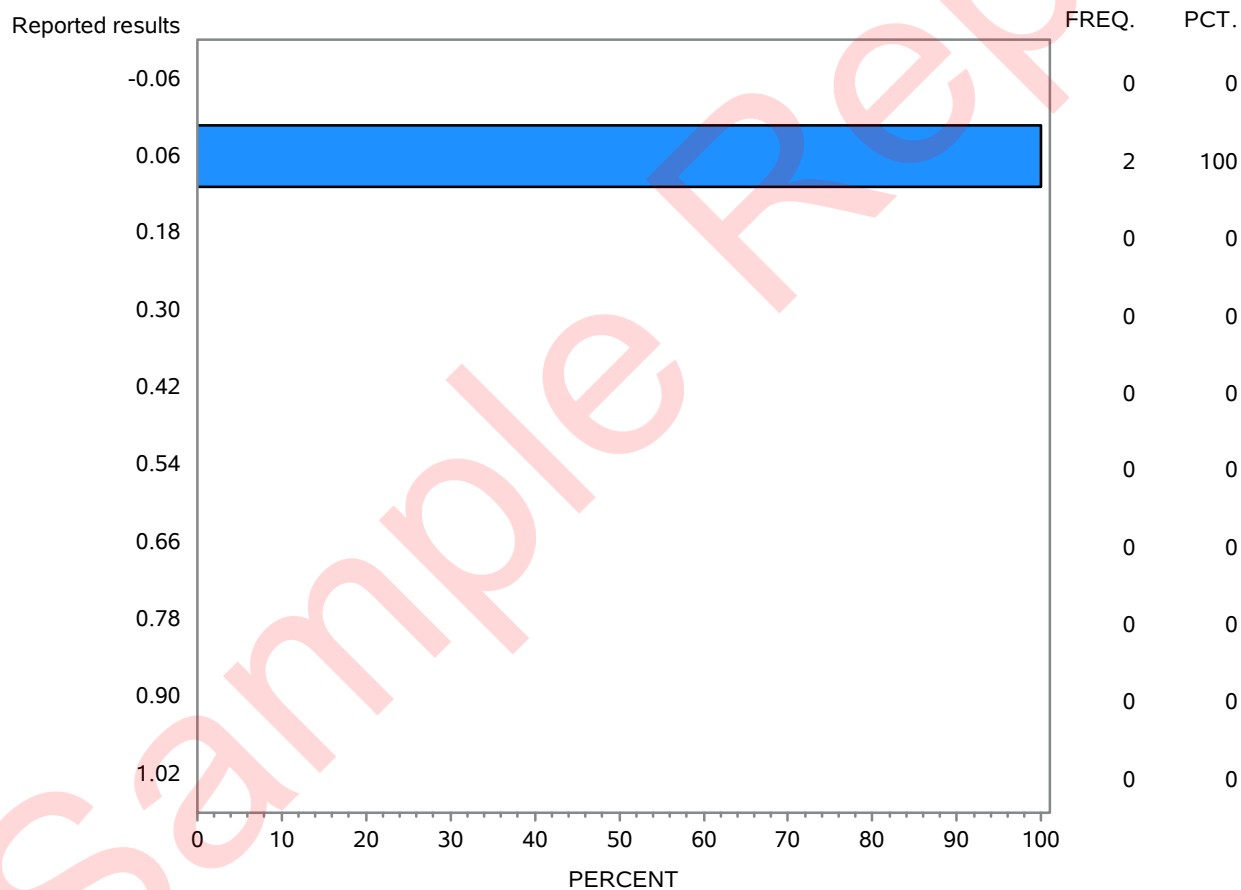
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Gamma-terpinene



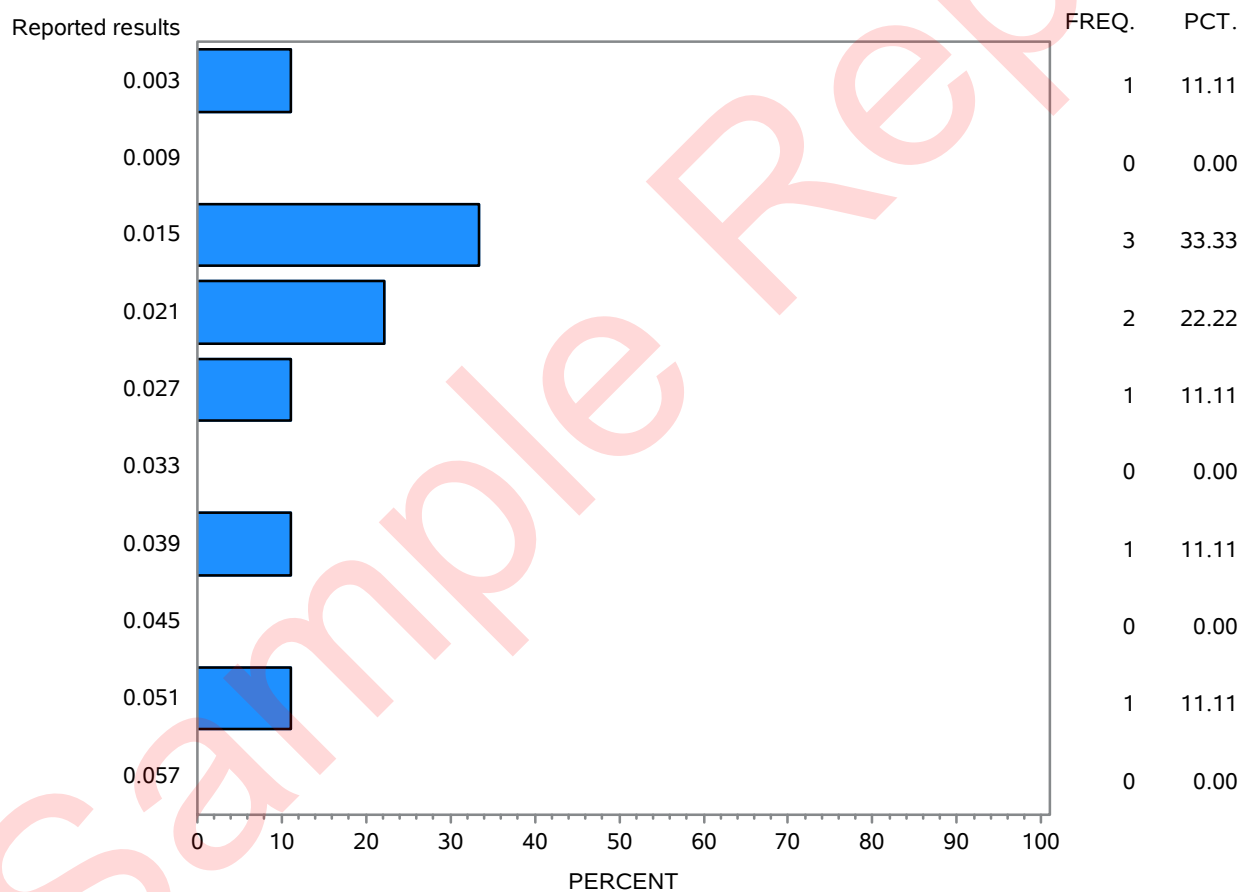
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Geraniol



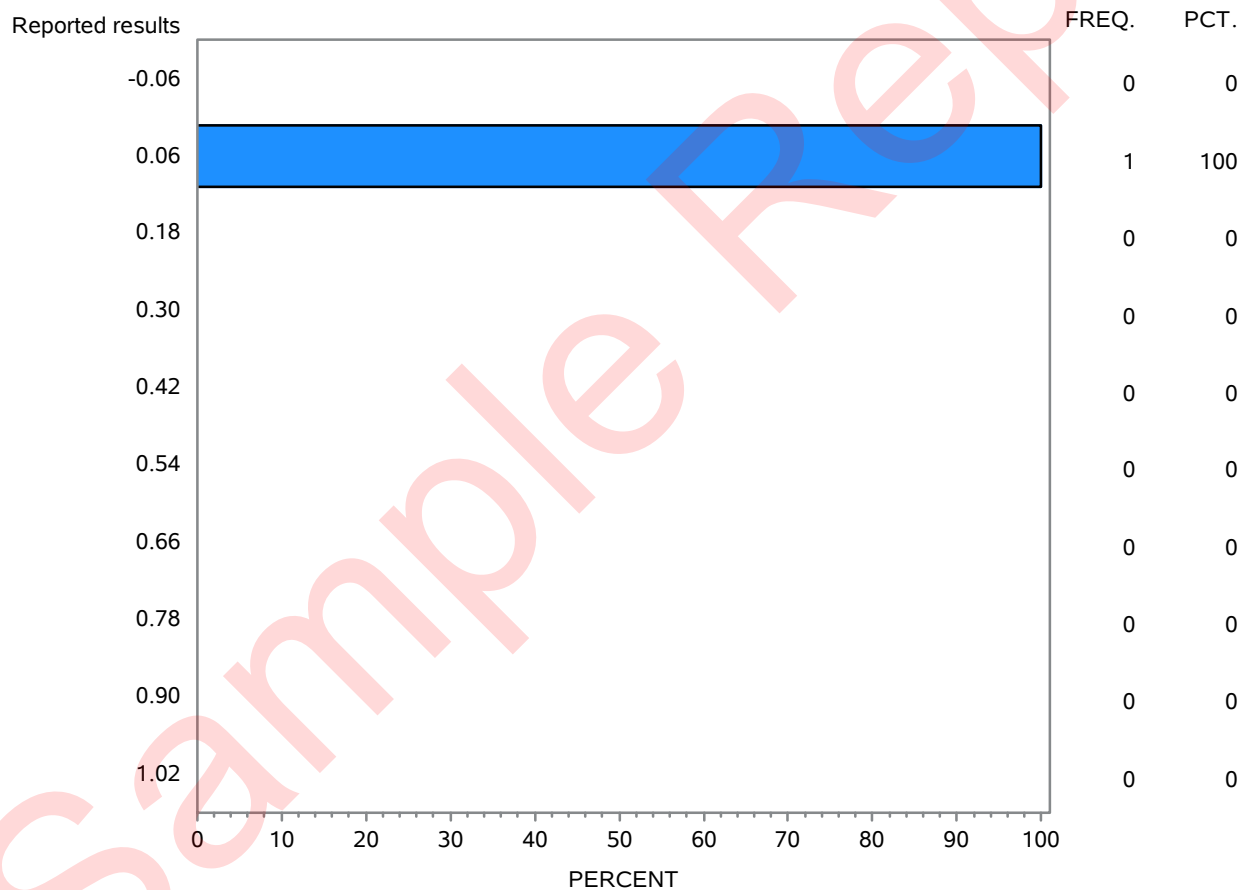
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Guaiol



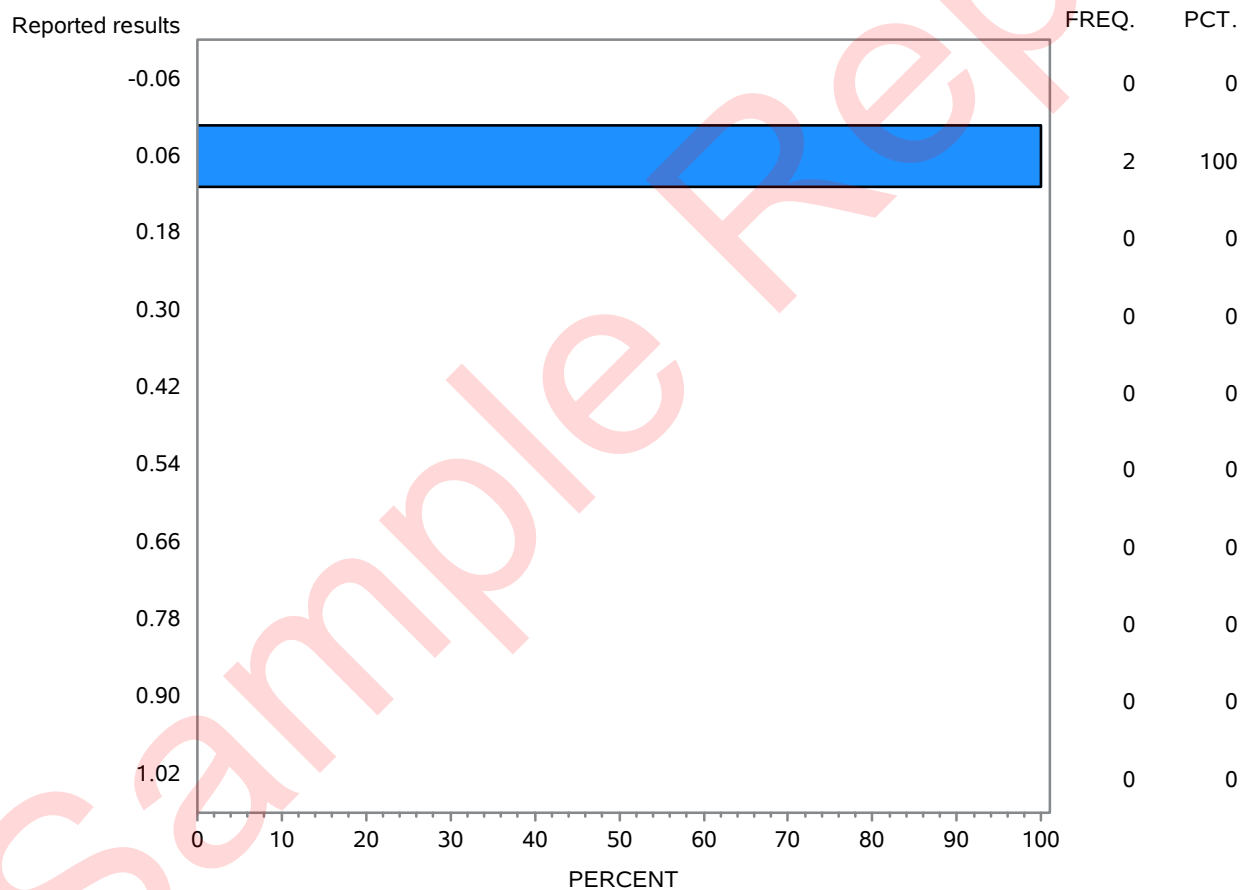
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Isoborneol



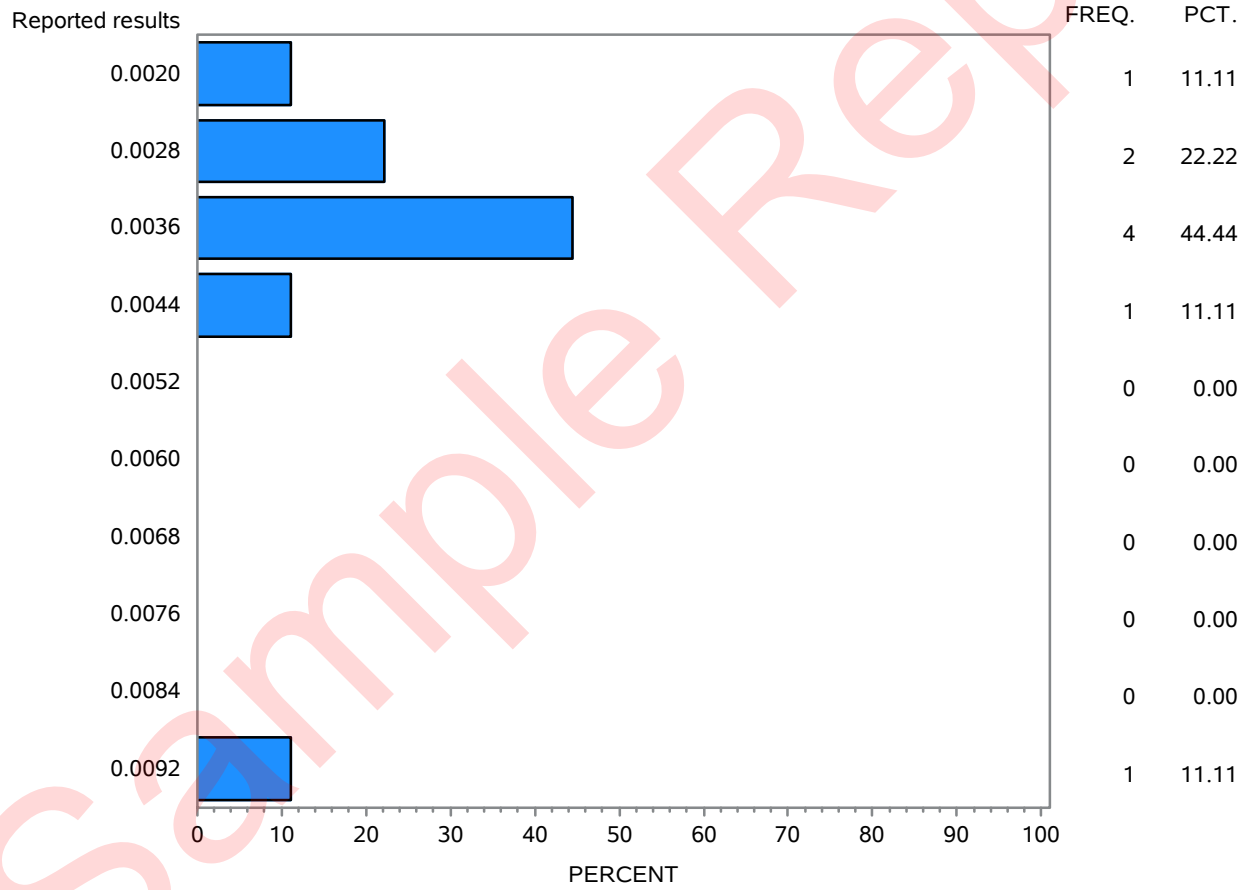
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% (-)-Isopulegol



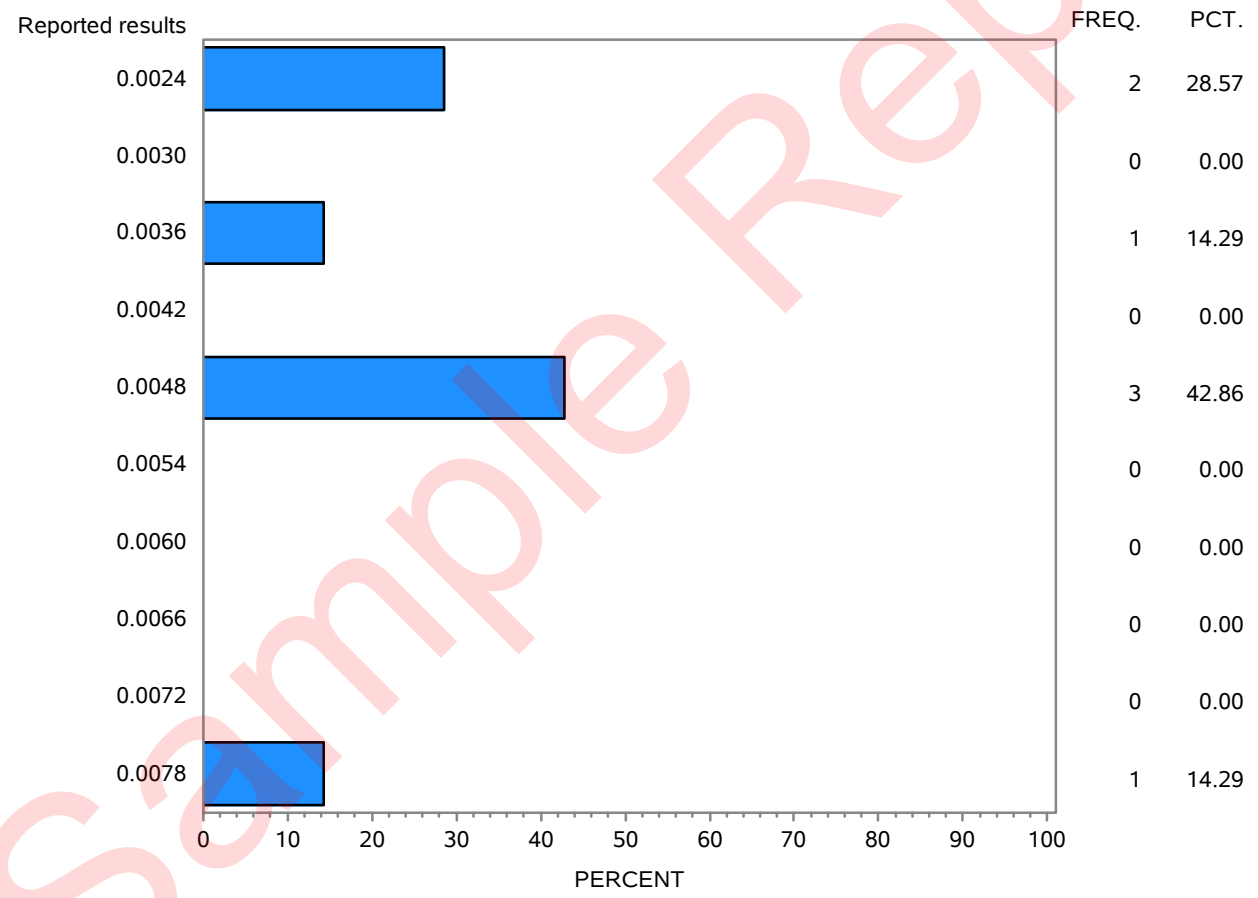
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Limonene



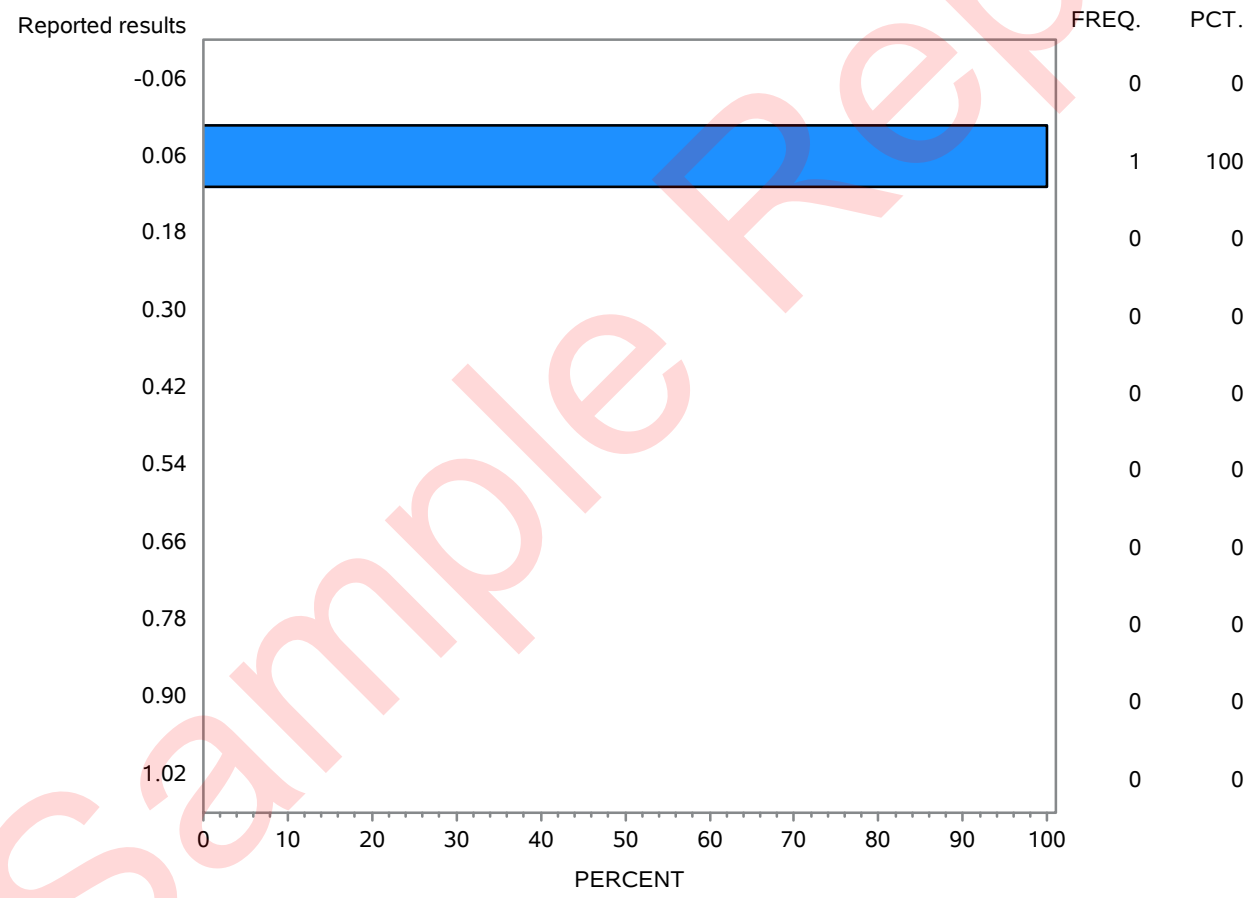
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Linalool



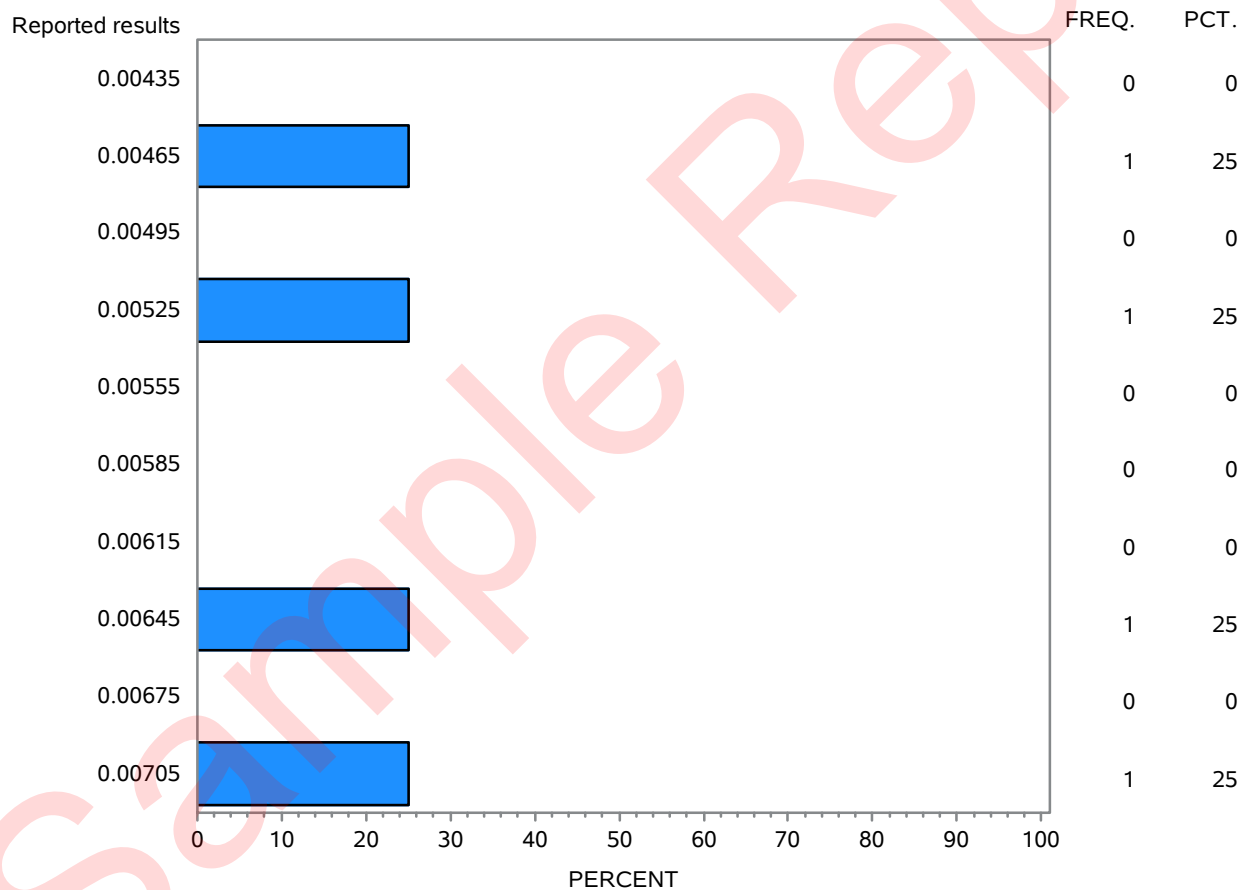
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Menthol



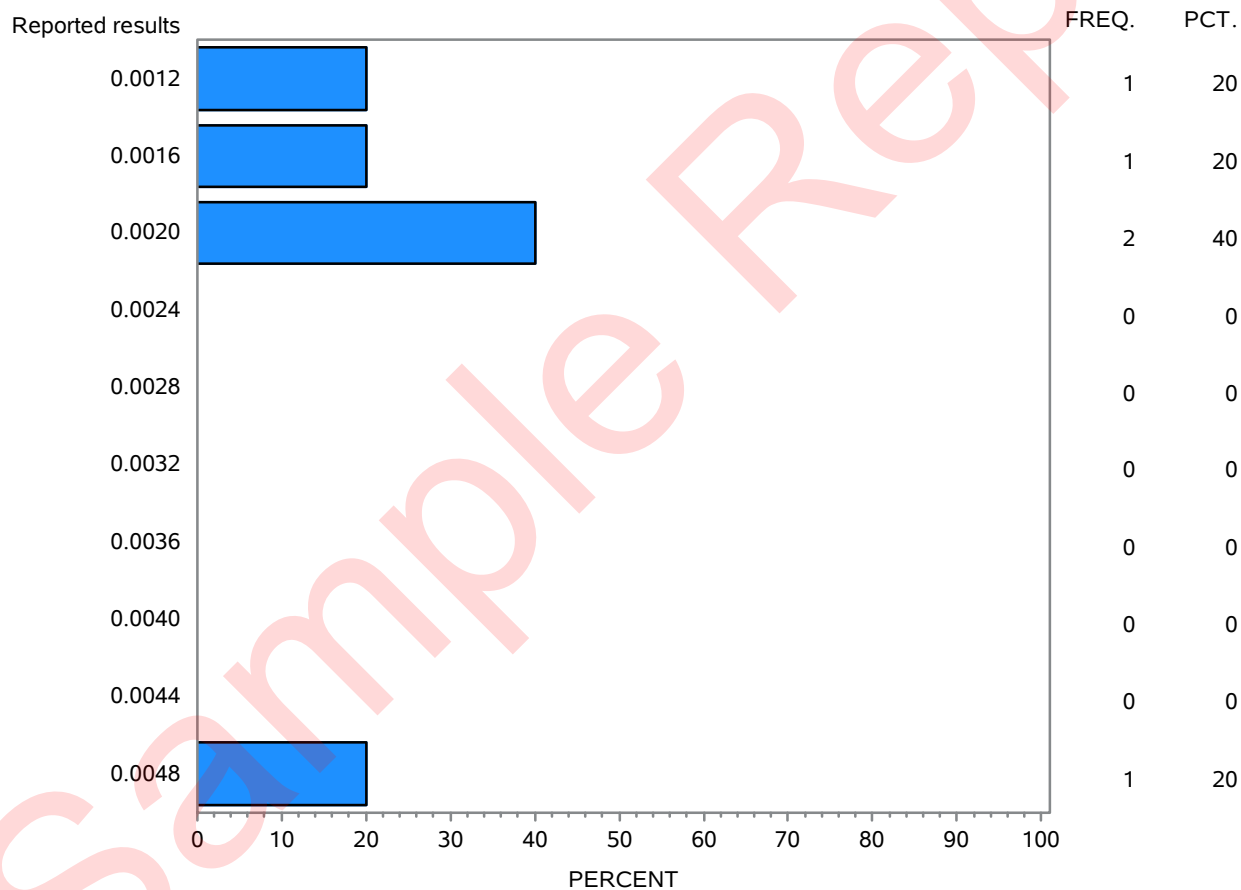
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Terpineol



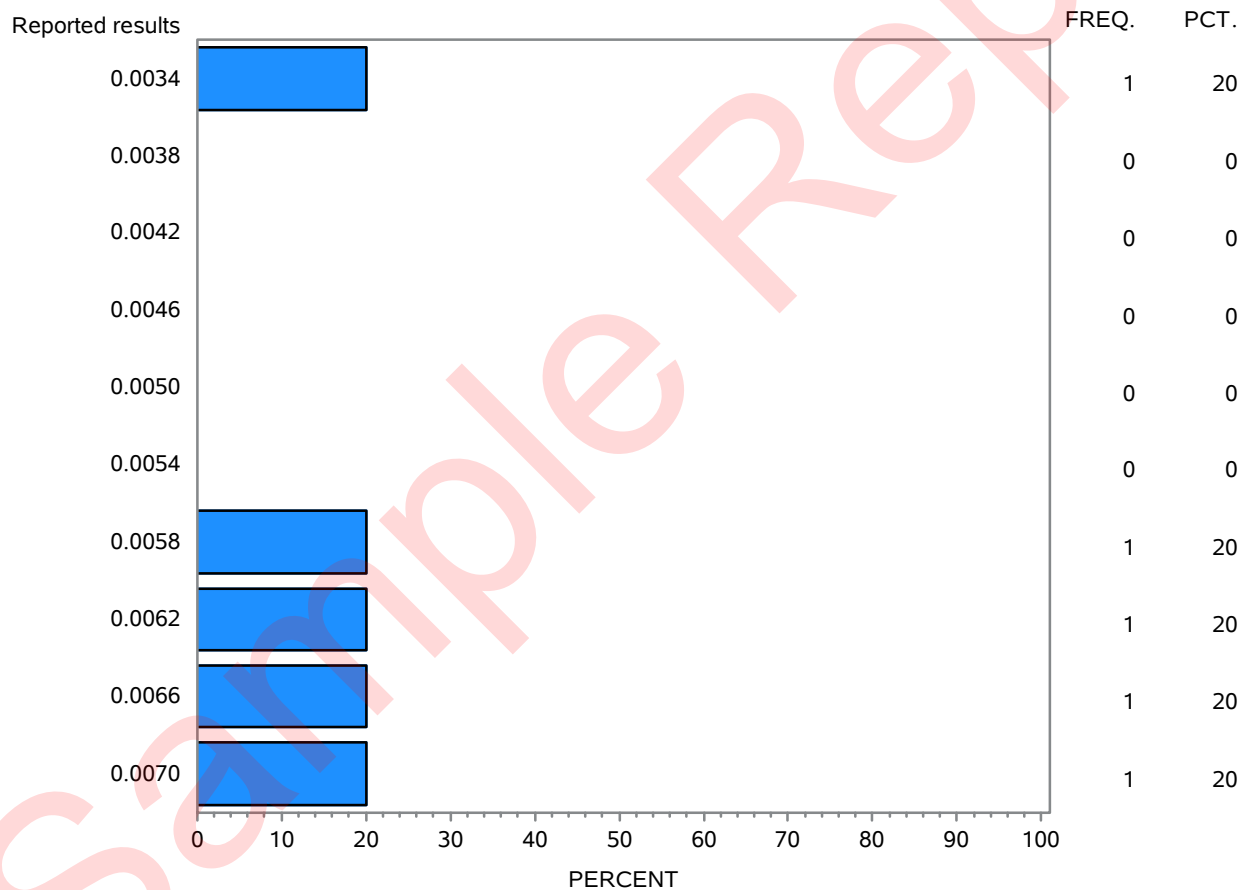
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Terpinolene



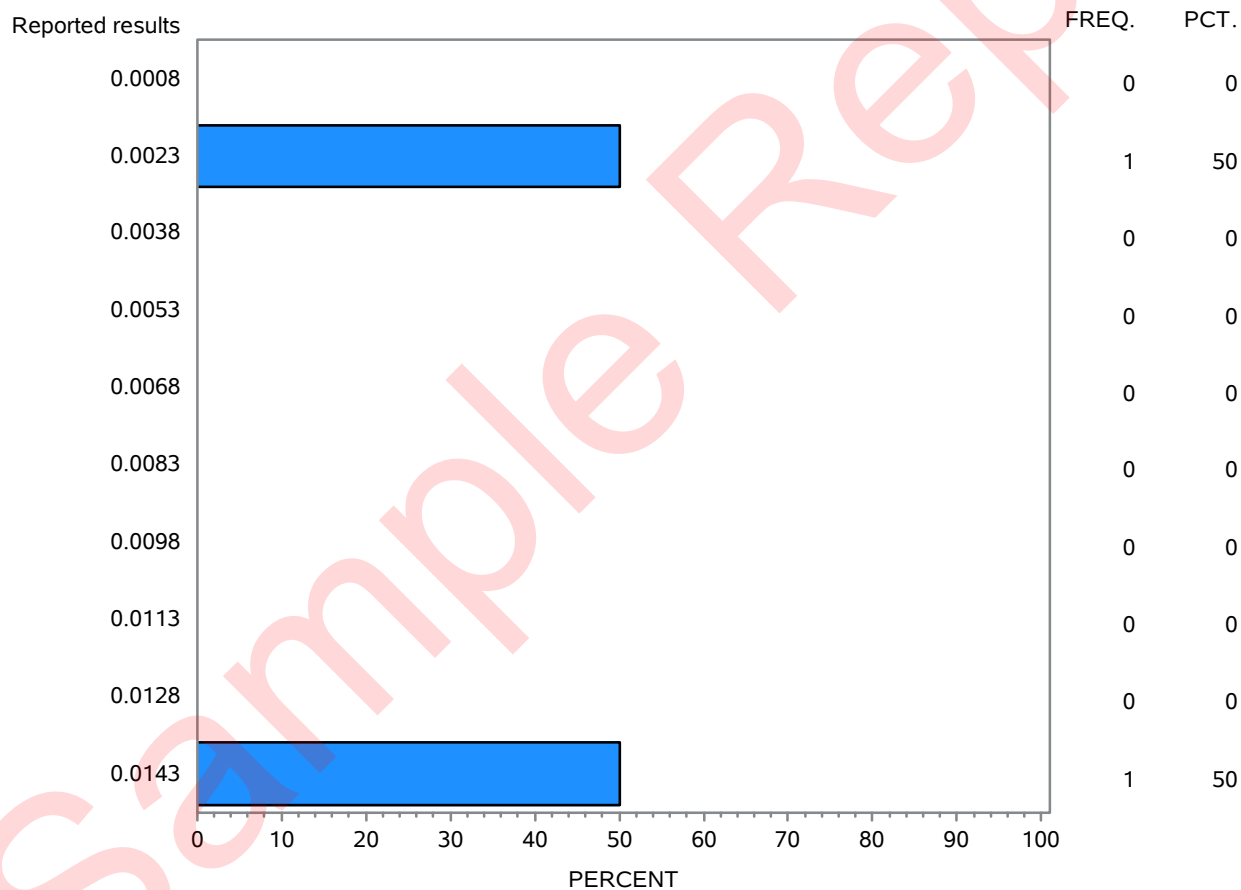
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Trans-nerolidol



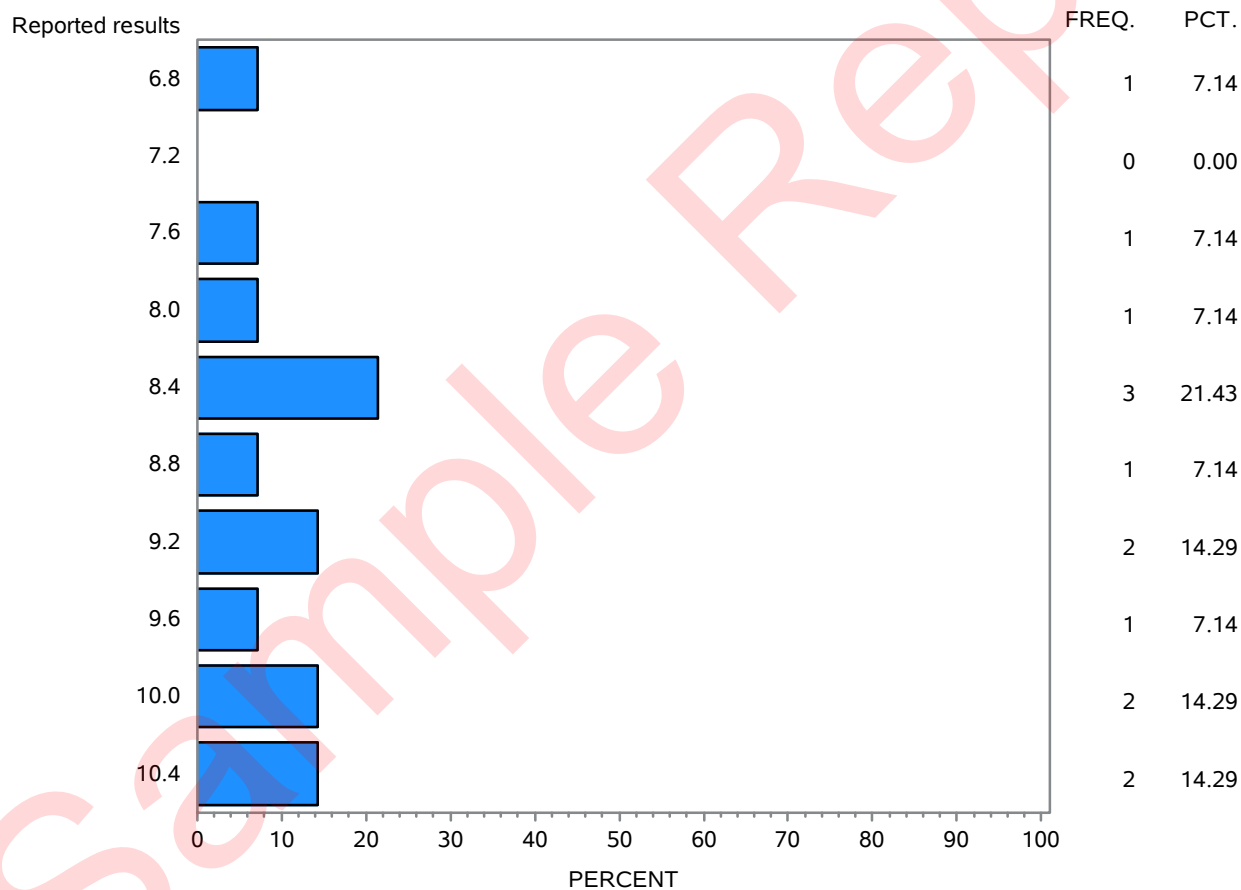
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Terpenes Test=% Valecene



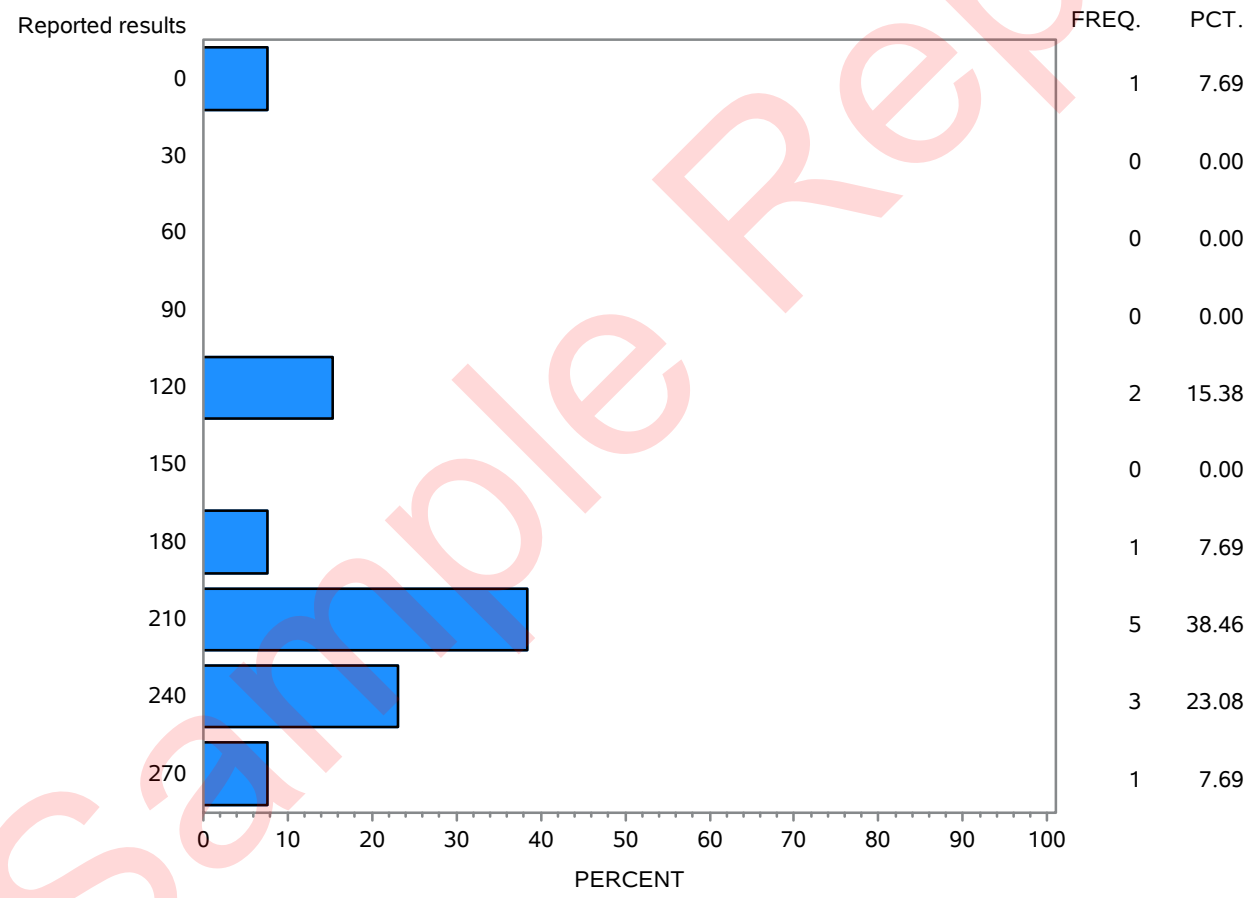
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Moisture Test=% Moisture



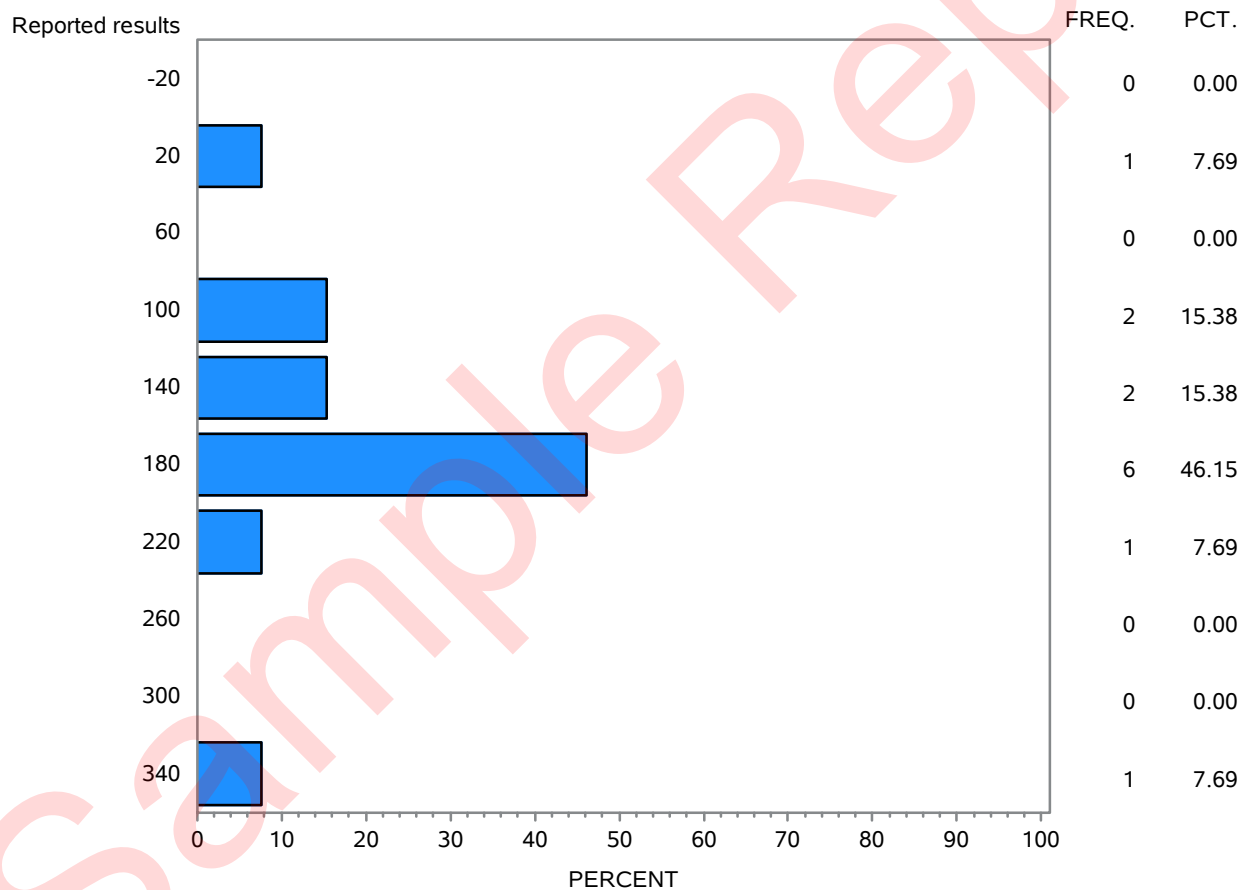
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Heavy Metals Test=ug/kg Total Arsenic



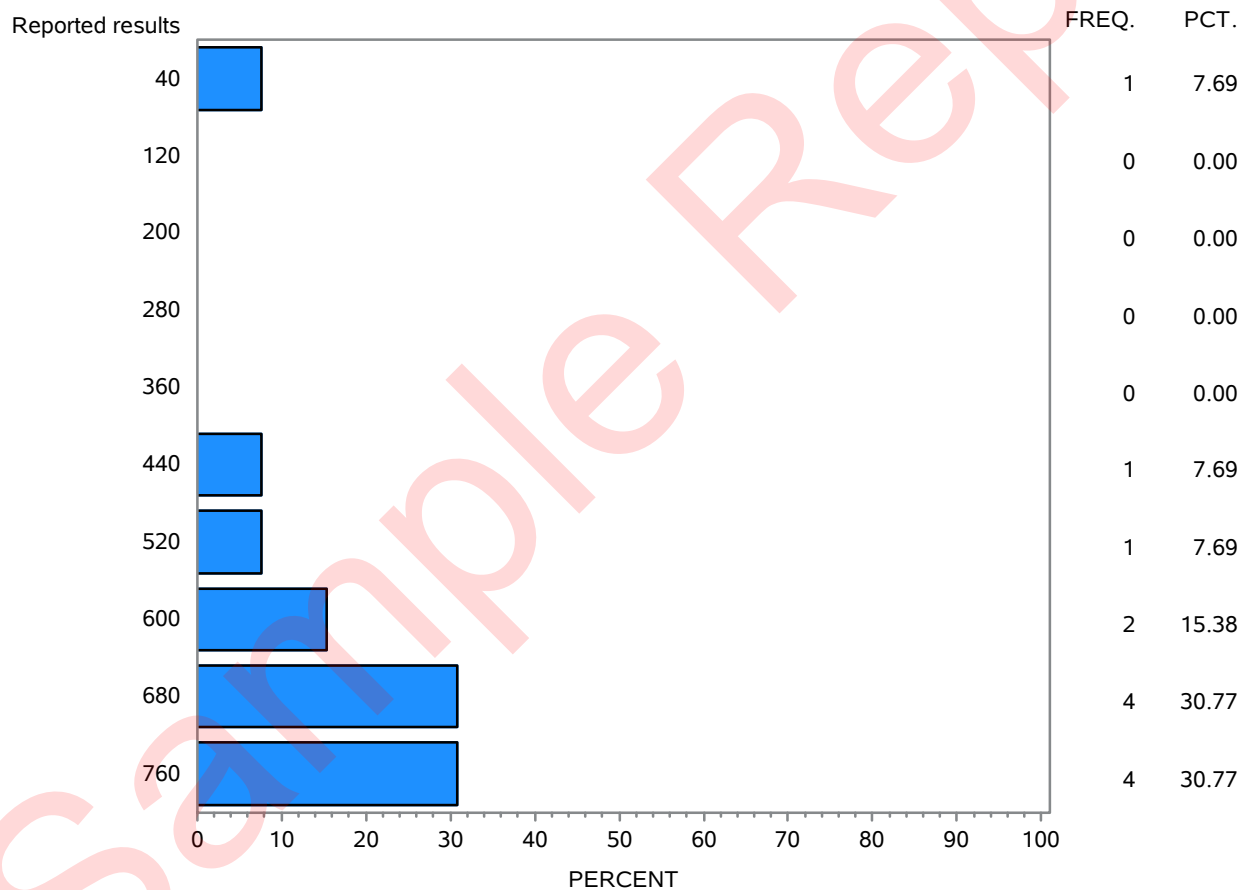
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Heavy Metals Test=ug/kg Total Cadmium



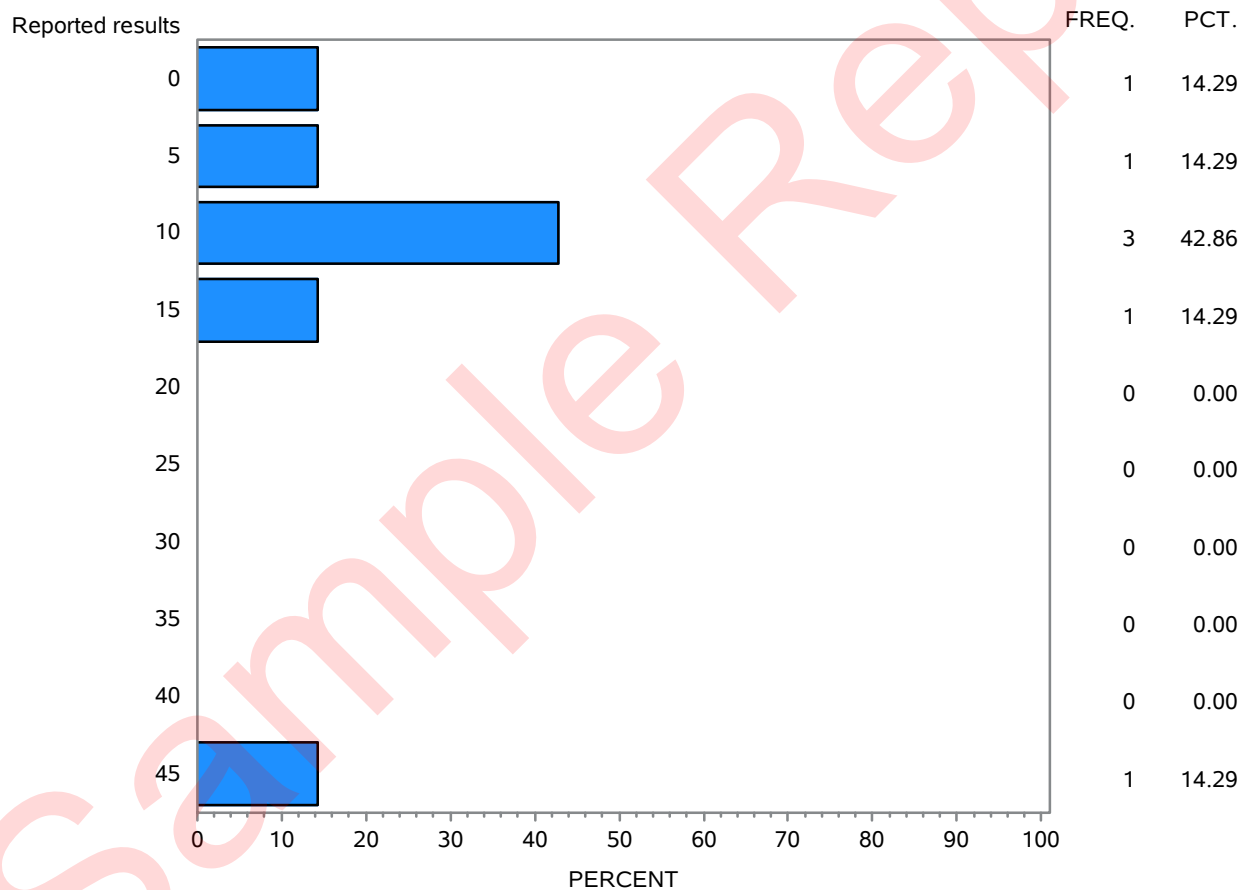
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Heavy Metals Test=ug/kg Total Lead



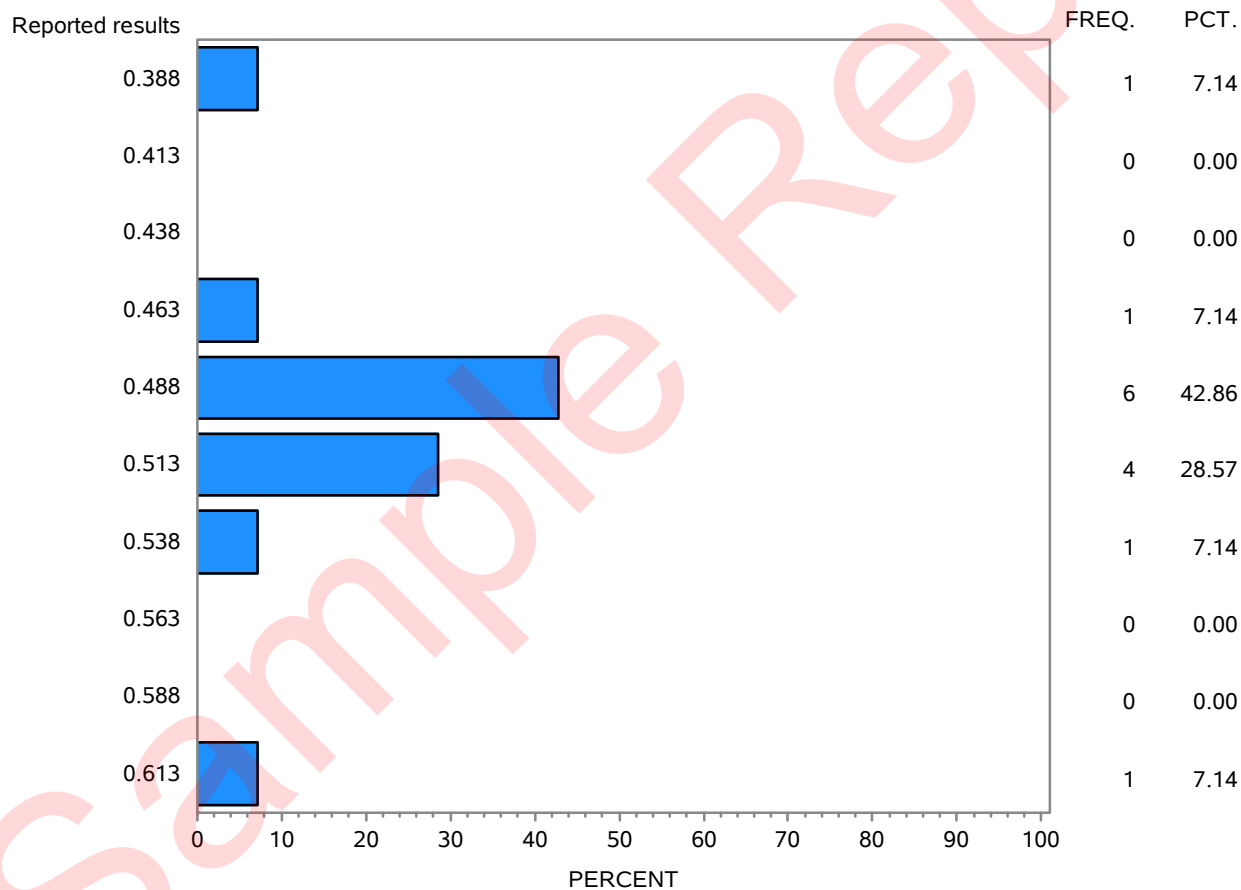
Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Heavy Metals Test=ug/kg Total Mercury



Appendix B
CH01/CH02 Hemp Blue Sample
Frequency Chart of Reported Results
Site = 193123

Analyte=Water Activity Test=Water Activity (aw)



Homogeneity & Stability Report

Homogeneity & Stability Results Summary

Blue Sample

Hemp - Moisture content, water activity, all assessed cannabinoids, terpenes, and heavy metals met the homogeneity and stability criteria and are considered acceptable.

Cannabinoids

Blue hemp samples were analyzed by Signature Science using HPLC-UV

Homogeneity/Stability Testing Results															
Cannabinoids	CBD	CBG	CBDA	CBN	d9-THC	CBDV	CBDVA	CBC	CBCA	CBGA	CBNA	THCA	Total THC	Total CBD	Total CBG
Homogeneity Mean (w/w%)	2.866	0.107	2.812	0.049	0.075	0.076	0.050	0.117	0.105	0.098	0.015	0.080	0.145	5.332	0.193
Total Homogeneity CV	8%	8%	7%	4%	8%	6%	9%	4%	6%	8%	6%	10%	6%	8%	8%
Stability Mean (w/w%)	2.678	0.089	2.540	0.045	0.071	0.073	0.043	0.106	0.095	0.088	0.036	0.048	0.114	4.905	0.166
Total Stability CV	5%	4%	5%	7%	4%	6%	6%	5%	4%	7%	6%	13%	6%	4%	5%
Percent Difference (Stability - Homogeneity / Homogeneity)	-7%	-17%	-10%	-7%	-6%	-4%	-14%	-9%	-10%	-10%	146%	-40%	-22%	-8%	-14%
Conclusion	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Homogeneity - Undetected/Less than LOQ Cannabinoids

Undetected/Less than LOQ Cannabinoids	d8-THC	THCVA	THCV	CBLA	CBL
Result (w/w%)	ND	ND	ND	ND	ND
LOQ (w/w%)	0.0002	0.0002	0.0002	0.0002	0.0002
LOD (w/w%)	0.0001	0.0001	0.0001	0.0001	0.0001

Stability - Undetected/Less than LOQ Cannabinoids

Results	Not Detected				
Cannabinoids	d8-THC	THCVA	THCV	CBLA	CBL
LOQ (w/w%)	0.0002	0.0002	0.0002	0.0002	0.0002
LOD (w/w%)	0.0001	0.0001	0.0001	0.0001	0.0001
Notes	All Homogeneity and all Stability results ND				

Homogeneity & Stability Report

Terpenes

Blue hemp samples were analyzed using GC-MS.

Homogeneity/Stability Testing Results												
Terpenes	Alpha-pinene	Beta-myrcene	Limonene	Terpinolene	Linalool	Eucalyptol	Beta-caryophyllene	Caryophyllene oxide	Alpha-humulene	Trans-nerolidol	Guaiol	Alpha-bisabolol
Homogeneity Mean (w/w%)	0.007	0.003	0.003	0.002	0.003	0.003	0.075	0.027	0.029	0.007	0.019	0.052
Total Homogeneity CV	20%	18%	21%	27%	8%	7%	9%	13%	11%	4%	9%	13%
Stability Mean (w/w%)	0.008	0.003	0.003	0.002	0.005	0.003	0.073	0.029	0.030	0.007	0.018	0.055
Total Stability CV	6%	8%	10%	8%	5%	12%	4%	3%	4%	3%	3%	3%
Percent Difference (Stability - Homogeneity / Homogeneity)	14%	17%	11%	17%	40%	12%	-3%	9%	3%	-3%	-3%	5%
Conclusion	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Homogeneity - Undetected/Less than LOQ Terpenes

Undetected/Less than LOQ Terpenes	Camphene	Beta-pinene	3-carene	Alpha-terpinene	P-cymene	Cis-beta-ocimene
Result (w/w %)	<LOQ	<LOQ	ND	ND	<LOQ	ND
LOQ (w/w %)	0.0020	0.0020	0.0020	0.0021	0.0022	0.0014
LOD (w/w %)	0.0016	0.0016	0.0016	0.0016	0.0017	0.0011
Undetected/Less than LOQ Terpenes	Trans-beta-ocimene	Total Beta-ocimene	Gamma-terpinene	Isopulegol	Geraniol	Cis-nerolidol
Result (w/w %)	<LOQ	<LOQ	ND	ND	ND	ND
LOQ (w/w %)	0.0005	0.0005	0.0021	0.0045	0.0053	0.0023
LOD (w/w %)	0.0004	0.0004	0.0017	0.0036	0.0043	0.0018

Homogeneity & Stability Report

Stability - Undetected/Less than LOQ Terpenes

Results	Detected but Not Consistently > LOQ					Not Detected						
Terpenes	Camphene	Beta-pinene	P-cymene	Trans-beta-ocimene	Total Beta-ocimene	3-carene	Alpha-terpinene	Cis-beta-ocimene	Gamma-terpinene	Isopulegol	Geraniol	Cis-nerolidol
LOQ (w/w%)	0.0020	0.0020	0.0022	0.0005	0.0005	0.0020	0.0021	0.0014	0.0021	0.0045	0.0053	0.0023
LOD (w/w%)	0.0016	0.0016	0.0017	0.0004	0.0004	0.0016	0.0016	0.0011	0.0017	0.0036	0.0043	0.0018

Heavy Metals

Blue hemp samples were evaluated for metals content by ICP-MS.

Homogeneity/Stability Testing Results											
Metals	Arsenic	Cadmium	Lead	Mercury	Chromium	Nickel	Selenium	Copper	Iron	Manganese	Zinc
Homogeneity Mean (ug/kg, ppb)	254	162	708	8.0	999	1652	199	11183	431500	264333	80200
Total Homogeneity CV	36%	15%	5%	5%	9%	8%	5%	7%	5%	5%	7%
Stability Mean (ug/kg, ppb)	203	177	740	9.5	949	1650	175	11160	454400	270400	82420
Total Stability CV	6%	9%	11%	3%	9%	6%	7%	4%	10%	2%	6%
Percent Difference (Stability - Homogeneity / Homogeneity)	-20%	9%	5%	20%	-5%	0%	-12%	0%	5%	2%	3%
Conclusion	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Homogeneity - Undetected/Less than LOQ Metals

Undetected/Less than LOQ Metals	Antimony
Result (ug/kg)	<LOQ
LOQ (ug/kg)	24.1
LOD (ug/kg)	8.1

Stability - Undetected/Less than LOQ Metals

Results	Detected but Not Consistently > LOQ
Metals	Antimony
LOQ (ug/kg)	24.1
LOD (ug/kg)	8.1
Notes	All Homogeneity and all Stability results ND

Homogeneity & Stability Report**Water Activity (Sample 1 – Blue)**

Samples were analyzed using ASTM D8196 to determine water activity.

Homogeneity/Stability Testing Results	
Water Activity	
Homogeneity Mean (aw)	0.52
Total Homogeneity CV	1%
Stability Mean (aw)	0.51
Total Stability CV	2%
Percent Difference (Stability - Homogeneity / Homogeneity)	-0.9%
Conclusion	Pass

Homogeneity & Stability Report**Moisture Content (Sample 1 – Blue)**

Analysis for moisture content for the hemp samples was performed by Signature Science.

Homogeneity/Stability Testing Results	
Moisture Content	
Homogeneity Mean (%)	7.9
Total Homogeneity CV	6%
Stability Mean (%)	8.4
Total Stability CV	1%
Percent Difference (Stability - Homogeneity / Homogeneity)	6.1%
Conclusion	Pass

Cannabis/Hemp Proficiency Testing (PT) Program

CHPT (Flower)

Sample 1 – Blue - Hemp

PROFICIENCY TEST INSTRUCTIONS

UPON RECEIPT, inspect the integrity of the package and its contents to ensure that the samples are intact and not leaking or compromised. Each package should contain one sealed barrier bag contained in a zip top bag. If problems are observed, contact Cannabis_PT@AOAC.org.

Sample 1 - Blue Details

Number of Samples	One sample per package
Sample IDs	Sample 1 – Blue Hemp
Sample Type (Matrix)	Ground hemp flower
Sample Amount	~10 g
Sample Temperature Upon Receipt	Satisfactory if received at $\leq 15^{\circ}\text{C}$
Sample Storage	Store samples frozen ($< -15^{\circ}\text{C}$)
Applicable Sample Testing Method(s)	cannabinoids (potency), terpenes, heavy metals, water activity, and/or moisture content

READ THESE INSTRUCTIONS in their entirety before proceeding with sample preparation and analysis. These instructions contain important information about the enclosed samples and specific requirements for this proficiency test. **Failure to read these instructions may adversely impact your performance on this proficiency test.**

Samples are provided for analytical purposes only. Provided samples are not for human consumption. Refer to the provided SDS(s) for health and safety considerations.

Part 1: AOAC Website

AOAC has sent an email notification to the laboratory's contact on record, which includes a link to the secure AOAC PT Website, along with the laboratory's login and password information. Instructions for Analysis and Instructions for Reporting are included on this site.

Applicable sample details and analysis and reporting instructions are also discussed below.

Part 2: Sample 1 – Blue Details

Sample 1 - Blue contains approximately 10 grams of ground hemp, allowing ~2 g for each of the five applicable analysis methods.

Refer to the provided SDS(s) for health, safety, and disposal considerations.

Part 3: Analysis

Sample 1 - Blue is suitable for analysis for cannabinoids (potency), terpenes, heavy metals, water activity, and/or moisture content. Participants may test samples for as many, or as few, of the methods and associated analytes as are relevant for their laboratory. Appendix A, B, and C provide the reportable list of cannabinoids, terpenes, and heavy metals, respectively.

Proficiency testing samples should be handled and analyzed in the same manner and following the same analytical standard operating procedures (SOPs) as routine samples. The participating laboratory should take appropriate action(s) to ensure a representative sample is tested (e.g., quantitative transfer, thorough mixing, other internal procedure).

Labs have four weeks to analyze samples and report results.

Shipping containers, and artificial ice are used for one-way shipping and do not need to be returned. Any unused sample should be disposed of in accordance with state and federal regulations and should not be returned.

Part 4: Reporting

Refer to the AOAC PT website for detailed reporting instructions, including significant figures, environmental conditions, and other requirements.

All results must be reported on an **as-received** basis (i.e., percent moisture should not be factored into the calculation and should be reported as a separate analysis result).

The table below provides the units for reporting each of the analytes of interest.

Table 1. Unit Reporting Requirements

Method	Units
Potency (cannabinoids)	Mass %
Terpenes	Mass %
Heavy Metals	ug/kg (ppb)
Water Activity	aw
Moisture Content	%

When reporting the laboratory's limit of detection (LOD) or limit of quantitation (LOQ) select the 'Less than LOD (Limit of Detection)' or 'Less than LOQ (Limit of Quantitation)' option and enter

the appropriate corresponding value. A value of zero should not be reported to indicate that the analyte was not detected.

Part 5: Schedule and Other Information

The table below contains the key dates for this PT round.

Table 2. Schedule

Event	Date
Sample Shipment	22 September 2025
Expected Sample Receipt	Next Day (domestic) Within 5 Days of Shipment (international)
Results Due	21 October 2025
Participant Results Released	≤ 30 days after receipt of all participant results

Questions and Comments

If you have questions, please contact Cannabis_PT@AOAC.org.

Test Material Provider:

signature
science LLC

APPENDIX A**Reportable Cannabinoids**

Compound	CAS Number
Cannabidiol (CBD)	13956-21-1
Cannabidiolic acid (CBDA)	1244-58-2
Cannabinol (CBN)	521-35-7
Cannabinolic acid (CBNA)	2808-39-1
Cannabichromene (CBC)	20675-51-8
Cannabichromenic acid (CBCA)	20408-52-0
Cannabidivarinic acid (CBDVA)	31932-13-5
Cannabigerol (CBG)	25654-31-3
Cannabigerolic acid (CBGA)	25555-57-1
Cannabidivarin (CBDV)	24274-48-4
Δ 8-tetrahydrocannabinol (Δ 8-THC)	5957-75-5
Δ 9-tetrahydrocannabinol (Δ 9-THC)	1972-08-3
Tetrahydrocannabinolic acid (THCA)	23978-85-0
Tetrahydrocannabivarin (THCV)	28172-17-0
Tetrahydrocannabivarinic acid (THCVA)	39986-26-0
Total CBD [Total CBD = (CBDA * 0.877) + CBD]	
Total CBG [Total CBG = (CBGA * 0.878) + CBG]	
Total THC [Total THC = (THCA * 0.877) + Δ 9-THC]	

APPENDIX B

Reportable Terpenes

Compound	CAS Number	Compound	CAS Number
3-carene	13466-78-9	Fenchone	7787-20-4
Alpha-bisabolol	23089-26-1	Fenchyl alcohol	1632-73-1
Alpha-cedrene	469-61-4	Gamma-terpinene	99-85-4
Alpha-humulene	6753-98-6	Geraniol	106-24-1
Alpha-phellandrene	4221-98-1	Guaiol	489-86-1
Alpha-pinene	80-56-8	Isoborneol	124-76-5
Alpha-terpinene	99-86-5	Isopulegol	489-86-1
Beta-caryophyllene	87-44-5	Limonene	5989-27-5
Beta-myrcene	123-35-3	Linalool	78-70-6
Beta-ocimene	13877-91-3	Menthol	2216-51-5
Beta-pinene	19902-08-0	O-cymene	527-84-4
Borneol	464-45-9	Pulegone	89-82-7
Camphene	79-92-5	Terpineol	8000-41-7
Camphor	464-48-2	Terpinolene	586-62-9
Cedrol	77-53-2	Trans-nerolidol	40716-66-3
Cis-nerolidol	3790-78-1	Valencene	4630-07-3
Eucalyptol	470-82-6		

APPENDIX C

Reportable Heavy Metals

Compound	CAS Number
Arsenic	7440-38-2
Cadmium	7440-43-9
Lead	7439-92-1
Mercury	439-97-6
Antimony	744-36-0
Barium	744-39-3
Chromium	18540-29-9
Copper	44-50-8
Nickel	7440-02-0
Silver	7440-22-4
Selenium	7782-49-2
Zinc	7440-66-6

-----End of Document-----



CH01 - Hemp Dried Flower/Biomass Proficiency Testing Program

Red Sample - Pesticides & Mycotoxins

PT Round # 5

Shipment Date: 09-22-2025

Final Report Issue Date: 12-05-2025

Round ID: CH01-092225

AOAC INTERNATIONAL
2275 Research Blvd, Ste 300
Rockville, MD 20850
Email: Cannabis_PT@AOAC.org



CERT # 1782.01
Proficiency Testing Provider

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This report has been authorized by
Shane Flynn, Senior Director
Proficiency Testing

Shane P Flynn

1.0 Introduction

Test materials for the Hemp Dried Flower/Biomass Proficiency Testing Program were shipped to participants on September 22, 2025. Each laboratory was given a site identification number in order to maintain confidentiality. Instructions for Analysis and instructions on how to report results within the AOAC Proficiency Testing website was provided to the participants. Participants were instructed to analyze the test materials according to procedures routinely used in their laboratories. Labs had 28 days to analyze and report. The results were to be recorded and submitted to AOAC INTERNATIONAL by October 21, 2025.

2.0 Test Design

The matrix selected for the Hemp round was an indoor grown, Sativa hemp flower strain. The dried hemp flower matrix was grown, and cured to the test material provider's specifications. The matrix was prepared according to SOPs, which included the use of a clean stainless-steel grinder and medium-sized screen to create an "oregano"-sized ground hemp flower. After grinding, the material was homogenized thoroughly by mixing. The homogeneous, like routine samples were packaged, stored, and then shipped to participants. Analyses requested are listed on the Instructions for Analyses (Appendix F).

Red sample contains spiked pesticide compounds and mycotoxins. Table 1 below provides the list of pesticides and mycotoxins included in the Red Sample and provides the spiked concentration of each pesticide and mycotoxin.

Table 1

Spiked Compound	CAS Number	Spike Concentration ($\mu\text{g/g}$, ppm)
acetamiprid	135410-20-7	0.160
diazinon	333-41-5	0.280
coumaphos	56-72-4	0.096
fenpyroximate	111812-58-9	0.280
hexythiazox	78587-05-0	0.144
imazalil	35554-44-0	0.128
propiconazole	60207-90-1	0.160
tebuconazole	107534-96-3	0.192
aflatoxin B2	7220-81-7	0.043
aflatoxin G1	1165-39-5	0.038

3.0 Homogeneity

Three samples were analyzed in duplicate to provide assurance that samples were homogeneous within and across the samples prepared. The criteria for assessing homogeneity testing were that the percent recoveries for each spiked target fall between 70% to 130%. All eight spiked pesticides and both mycotoxins met this homogeneity criteria. Future rounds will have tightened percent recoveries. See Appendix E for full homogeneity and stability.

4.0 Preparation of Test Materials

Each set of test materials consisted of one sample containing approximately 2.5 grams of dried hemp for analysis and a 1.0 gram blank. Red samples were prepared to provide pesticide and mycotoxin contaminated ground hemp samples for evaluation by participants. All spikes and solutions were prepared in dichloromethane (DCM) using volumetric flasks. Prior to sample creation, high-level stock solutions were created from neat pesticides with a purity >99%, which were then used to prepare an intermediate pesticide spiking solution. The final spiking solution was prepared using the intermediate pesticide solution and 3 ug/mL mycotoxin standards.

Samples were prepared and shipped by the following Laboratory:

signature
science[®] LLC

8501 North Mopac Expressway
Austin, TX 78759

5.0 Analyses Requested

Red Sample was to be analyzed for all pesticide residues below that are relevant to the participating laboratory. Results should only be reported for pesticide residues listed below.

Pesticides Residue	CAS#	Pesticides Residue	CAS#
Abamectin (Avermectins: B1a & B1b)	71751-41-2	Flonicamid	158062-67-0
Acephate	30560-19-1	Fludioxonil	131341-86-1
Acequinocyl	57960-19-7	Fluopyram	658066-35-4
Acetamiprid	135410-20-7	Flurprimidol	56425-91-3
Aldicarb	116-06-3	Hexythiazox	78587-05-0
Allethrin	584-79-2	Imazalil	35554-44-0
Ancymidol	12771-68-5	Imidacloprid	138261-41-3
Azadirachtin	108168-76-9	Iprodione	36734-19-7
Azoxystrobin	131860-33-8	Kinoprene	37882-31-8
Benzovindiflupyr	1072957-71-1	Kresoxim-methyl	143390-89-0
Bifenazate	149877-41-8	Malathion	121-75-5
Bifenthrin	82657-04-3	Metalaxyl	57837-19-1
Boscalid	188425-85-6	Methiocarb	2032-65-7
Buprofezin	69327-76-0	Methomyl	16752-77-5
Captan	133-06-2	Methoprene	40596-69-8
Carbaryl	63-25-2	Methyl parathion	298-00-0
Carbofuran	1563-66-2	Mevinphos	7786-34-7
Chlorantraniliprole	500008-45-7	MGK-264	113-48-4
Chlordane	57-74-9	Myclobutanil	88671-89-0
Chlorfenapyr	122453-73-0	Naled (Systhane) (Dibrom)	300-76-5
Chlormequat chloride	999-81-5	Novaluron	116714-46-6
Chlorpyrifos	2921-88-2	Oxamyl	23135-22-0
Clofentezine	74115-24-5	Paclobutrazol	76738-62-0
Clothianidin	21088-92-5	Pentachloronitrobenzene (Quintozone)	82-68-8
Coumaphos	56-72-4	Permethrin (mix of isomers)	52645-53-1
Cyantraniliprole	736994-63-1	Phenothrin (d-phenothrin)	26002-80-2
Cyfluthrin (Baythroid)	68359-37-5	Phosmet (Imidan)	732-11-6

Cypermethrin	52315-07-8	Phosmet (oxon)	3735-33-9
Cyprodinil	121552-61-2	Piperonyl butoxide	55218
Daminozide	1596-84-5	Pirimicarb	23103-98-2
Deltamethrin	52918-63-5	Prallethrin (mix of isomers)	23031-36-9
Diazinon	333-41-5	Propiconazole (tilt)	60207-90-1
Dichlorvos	62-73-7	Propoxur (Baygon)	114-26-1
Dimethoate	60-51-5	Pyraclostrobin	175013-18-0
Dimethomorph	110488-70-5	Pyrethrin (mix of isomers)	8003-34-7
Dinotefuran	165252-70-0	Pyridaben	96489-71-3
Dodemorph	1593-77-7	Resmethrin	10453-86-8
Endosulfan I (alpha)	959-98-8	Spinetoram	187166-40-1
Endosulfan II (beta)	33213-65-9	Spinosad (mixture of A and D)	168316-95-8
Endosulfan sulfate	1031-07-8	Spirodiclofen	148477-71-8
Ethephon	16672-87-0	Spiromesifen	283594-90-1
Ethoprophos (Prophos)	13194-48-4	Spirotetramat	203313-25-1
Etofenprox	80844-07-1	Spiroxamine	118134-30-8
Etoxazole	153233-91-1	Tebuconazole	107534-96-3
Etridiazole (Terrazole)	2593-15-9	Tebufenozide	112410-23-8
Fenhexamid	126833-17-8	Teflubenzuron	83121-18-0
Fenoxycarb	79127-80-3	Tetrachlorvinphos	961-11-5
Fenpyroximate (mix of isomers)	111812-58-9	Tetramethrin	7696-12-0
Fensulfothion	115-90-2	Thiacloprid	111988-49-9
Fenthion	55-38-9	Thiamethoxam	153719-23-4
Fenvalerate (Sanmarton)	51630-58-1	Thiophanate-methyl	23564-05-8
Fipronil	120068-37-3	Trifloxystrobin	141517-21-7

The participants had the option of marking the analysis as Not Tested for any pesticide not routinely tested by their laboratory. This designation was submitted to AOAC®. Information on the method used for each analyses was requested.

6.0 Calculation and Interpretation of z-scores:

For each individual result, a z-score was calculated as follows:

$$Z_i = \frac{X_i - X_{pt}}{\delta_{pt}}$$

where:

Z_i = the z score (standard score)

X_i = the reported value of analyte

X_{pt} = the assigned value, the best estimate of the true concentration

δ_{pt} = the estimate of variation (standard deviation)

The robust procedure from *ISO 13528:2022(E), Statistical methods for use in proficiency testing by interlaboratory comparisons* is used in processing the result data. Robust statistics relies on medians rather than means and uses more information from the central than from the outlying observations.

The assigned/target values used were based on the medians of up to five data points by Reference Laboratories. The standard deviations used were 20% of the assigned/target values. Measurement uncertainty (standard uncertainty of the assigned value) has also been provided.

$MU = (1.25 * (sd/\sqrt{n}))$ where n=sample size

The following interpretation of z-scores for each individual test result is provided in of ISO/ IEC 17043:2023 Conformity Assessment - General requirements for proficiency testing schemes common examples of application of z-scores:

- A result that gives $|z| \leq 2.0$ is considered to be acceptable.
- A result that gives $2.0 < |z| < 3.0$ is considered to give a warning signal.
- A result that gives $|z| \geq 3.0$ is considered to be unacceptable (or action signal).

Evaluations

When an assigned value is available and a z-score can be calculated the following labels have been applied to the Evaluation.

In this report a z-score of $|z| \leq 2.00$ is labeled as **ACCEPTABLE**

In this report a z-score of $2.00 < |z| < 3.00$ is labeled as **WARNING**

In this report a z-score of $|z| \geq 3.00$ is labeled as **UNACCEPTABLE**

- Any result that is reported by a participant laboratory as detected, and a value is provided, is **ACCEPTABLE** if the reported value is within the acceptable range. If the reported value exceeds the acceptable range, this would be **UNACCEPTABLE**.
- Any result that is reported by a participant laboratory as detected but <LOQ, is considered **ACCEPTABLE**, if the reported LOQ value is within or above the acceptable range. If the LOQ value exceeds the acceptable range, this would be **UNACCEPTABLE**.
- Any result that is reported by a participant laboratory as <LOD or <LOQ, for a pesticide or mycotoxin that was not spiked or incurred, is **ACCEPTABLE**. If a laboratory reports a detectable value for a non-spiked residue, it would be **UNACCEPTABLE**.
- Any result that is reported by a participant laboratory considered as “Non-Detect” is considered **UNACCEPTABLE**. A Non-Detect occurs when a participating laboratory indicates they analyze for a pesticide or mycotoxin but does not have a reported result for that analyte even though it was spiked into the sample.

7.0 General Discussion of Results

Calculations for z scores based on the data presented in the results sheet might be slightly different from the z-scores assigned by AOAC. The z-scores assigned by AOAC are based on calculations that may use more significant figures than is possible to display on the results sheet.

Confidentiality of results has been maintained by issuing site identification codes to the participants. Results in reports have only been identified by the site identification code if individual results from other specific laboratories are listed. Results were submitted by both Participating Laboratories and participating Reference Laboratories. Test materials were exposed to the same shipping conditions for both types of laboratories. This report includes information only for the pesticides listed in Section 5.0. Some pesticides had fewer participants submitting results because some of the laboratories do not routinely test all the pesticides.

Each laboratory is responsible for the stability of the compounds in the extract covering the time between extraction and analysis under the storage conditions in that laboratory. Stability will be dependent on the solvent the extract is in, the storage conditions, and the type of container used to store the extract. It is recommended that the analysis proceed as quickly as possible after extraction. Z-scores have been calculated for those pesticides and mycotoxins where the following criteria were met for the specific analyte in the specific sample; when the usable results from: at least four out of the five Reference laboratories are within 2 standard deviations of the target concentration (assigned value), or if only four of the five Reference laboratories analyze for a specific residue then three of the four Reference laboratories must be within 2 standard deviations of the target concentration, or if only three Reference laboratories analyze for a residue, then all three Reference laboratories must be within 2 standard deviations of the target concentration.

Appendix A is included in this report to show participating laboratories' reported results, methods used, z-scores and the programs assigned values, standard deviations, medians, acceptable ranges, evaluations, measurement uncertainty, and more. If a participating laboratory received a Not-Detected, it is up to that laboratory to evaluate the result based on its own limit of quantification (LOQ). Appendix B is included to show results for all residues not spiked. Appendix C displays the reported values, methods used for all participating labs and their corresponding z-scores. The same information is provided for the Reference Labs. Each laboratory should use the information in Appendix A, Appendix B, and Appendix C to determine areas of improvement. Appendix D Graphs illustrate the results of all the Participant Laboratories

Pesticides

The assigned/target values used were the median of the Reference Laboratories. The standard deviation was 20% of the assigned/target values. This standard deviation will be reduced as participating laboratories improve. Z-scores were calculated for the following pesticides: Acetamiprid, Coumaphos, Diazinon, Fenpyroximate, Hexythiazox, Imazalil, Propiconazole, and Tebuconazole. Other pesticides may have been detected but were not spiked in the sample. These analytes are labeled as "Additional Residues Reported" and are listed in Appendix B. Appendix B also includes <LOQ and <LOD information for all unspiked pesticides.

Currently the program includes 5-10 unique pesticides per round in matrix. Each round cycles through the pesticides listed (i.e., the pesticide list in the appendix included with participant instructions). This number of pesticides is representative of what a laboratory may encounter during routine testing. Including more pesticides per sample could make the samples less realistic of what would be expected for an actual operational sample, and therefore, be less fit for purpose. Laboratories are expected to get the correct answer for the spiked pesticides and the unspiked pesticides just like they would for operational samples.

AOAC is evaluating ways to provide more pesticides per round.

Mycotoxins

The assigned/target values used were the median of the Reference Laboratories. The standard deviation was 20% of the assigned/target values. This standard deviation will be reduced as participating laboratories improve. Z-scores were calculated for the following mycotoxins: Aflatoxin B2 and Aflatoxin G1. If other mycotoxins not spiked into the matrix were detected they are listed on the Appendix B additional residues.

8.0 Comments and Recommendations

Pesticides

Overall, participating laboratories performed well. One laboratory received an UNACCEPTABLE evaluation for Coumaphos because their reported “less than” result was below the acceptable range. Another laboratory received an UNACCEPTABLE evaluation for Coumaphos because their reported value was below the acceptable range.

One laboratory received an UNACCEPTABLE evaluation for Hexythiazox due to a “less than” result that fell below the acceptable range. Another laboratory also received an UNACCEPTABLE evaluation for Hexythiazox because they did not detect the residue.

One laboratory received UNACCEPTABLE evaluations for all reported residues, as every value submitted was above the acceptable range. Laboratories should investigate method performance and/or potential reporting errors when this issue occurs.

Another laboratory received three UNACCEPTABLE evaluations for Pyroximate, Hexythiazox, and Propiconazole because they did not detect these residues. The same laboratory also received an UNACCEPTABLE evaluation for Tebuconazole due to a “less than” result that fell below the acceptable range.

Mycotoxins

Overall, participating laboratories performed well. One laboratory received an UNACCEPTABLE evaluation for G1 because their reported “less than” value fell below the acceptable range. Another laboratory received an UNACCEPTABLE evaluation for G1 because their reported value exceeded the acceptable range.

One laboratory received UNACCEPTABLE evaluations for Aflatoxin B2 and G1 due to reported results that were significantly above the acceptable ranges, which may have been caused by reporting in incorrect units. Another laboratory also received an UNACCEPTABLE evaluation for G1 for the same reason—its reported value was significantly above the acceptable range and may have resulted from incorrect unit reporting.

Laboratories are encouraged to verify that all units are correctly reported prior to submission.

9.0 Distribution of Results Plots

The distribution of results plots provides information on the distribution of results for each compound. The plots illustrate the results of all the participant laboratories versus the reference laboratories versus the targeted value. Some of the plots include the statement "reference labs are indicated by squares", and there are no squares on the plot. If the reference laboratories did not test for a specific analyte, their representative squares are not indicated on the plots, even though they are mentioned in the legends. At the advice of an expert in statistical graphics and design of data visualization, changes have been made to improve the plots. Data from the Subscribing Laboratories is displayed as individual data points with no connecting line. The target value is displayed with a dashed horizontal reference line. Reference labs are indicated by squares. If a laboratory marked a compound as "not tested," it was not included on the graph. The key to the graph identifies each line. Only data that fell within a z- score value of ± 5 have been included in the graphs. As AOAC® continues to improve its reporting format, changes may occur.

If a participant would like to appeal against the assessment of their performance in this proficiency testing scheme please contact staff at Cannabis_PT@AOAC.org

Appendix A
CH01/CH03 Hemp Proficiency Testing Program
(Pesticides and Mycotoxins)
Site=188050 Lab Reporting Details

Site	Program	Metric	Value
188050	CH01	Lab Name	XXX XXXXXXXXXXXXX
		Analyst Name	XXXX XXXXX
		Laboratory Address	XXXXXX XXXXXX
		Laboratory Address2	
		City	XXXX XXX
		State	XX
		Postal Code	XXXXXX
		Country	XXXXXXX XXXXXX
		License #	
		Test Initiation Date	09/22/2025
		Test Close Date	10/21/2025
		Submission Date	10/21/2025
		Results Processed Date	11/24/2025

AOAC
INTERNATIONAL



PROFICIENCY TESTING

Report Issued by:
AOAC INTERNATIONAL
2275 Research Blvd. Ste 300
Rockville, MD 20850

Report Authorized by:
Shane Flynn, Senior Director of Proficiency Testing

Appendix A
CH01/CH03 Hemp Testing Results and Z-scores
Site=188050 Red Sample Analyte Group = Pesticides ug/g (ppm)

Test	Reported result	Acceptable Range	Number of reported results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Median of Ref Labs	Z-score	Evaluation	Standard uncertainty of the assigned value	Notes
Acetamiprid	0.1210	(0.058 - 0.232)	12	0.153	0.148	0.037	0.145	0.02900	0.145	-0.83	ACCEPTABLE	0.010	
Coumaphos	0.0861	(0.0396 - 0.1584)	7	0.074	0.086	0.032	0.099	0.01980	0.099	-0.65	ACCEPTABLE	0.009	
Diazinon	0.2620	(0.1096 - 0.4384)	12	0.269	0.252	0.097	0.274	0.05480	0.274	-0.22	ACCEPTABLE	0.020	
Fenpyroximate (mix of isomers)	0.2140	(0.0992 - 0.3968)	11	0.241	0.236	0.117	0.248	0.04960	0.248	-0.69	ACCEPTABLE	0.019	
Hexythiazox	0.0954	(0.0552 - 0.2208)	11	0.113	0.101	0.070	0.138	0.02760	0.138	-1.54	ACCEPTABLE	0.010	
Imazalil	0.1010	(0.0452 - 0.1808)	12	0.127	0.115	0.037	0.113	0.02260	0.113	-0.53	ACCEPTABLE	0.008	
Propiconazole (tilt)	0.1160	(0.0672 - 0.2688)	11	0.151	0.148	0.079	0.168	0.03360	0.168	-1.55	ACCEPTABLE	0.013	
Tebuconazole	0.1800	(0.068 - 0.272)	10	0.160	0.156	0.079	0.170	0.03400	0.170	0.29	ACCEPTABLE	0.013	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

*A result that gives $|z| \leq 2.0$ is considered to be **Acceptable***

*A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal***

*A result that gives $|z| \geq 3.0$ is considered to be **Unacceptable (or action signal)***

Appendix A
CH01/CH03 Hemp Testing Results and Z-scores
Site=188050 **Red Sample** Analyte Group = Mycotoxins ug/g (ppm)

Test	Reported result	Acceptable Range	Number of reported results	Participant Mean	Participant Median	Participant SD	Assigned Value	Standard Deviation	Median of Ref Labs	Z-score	Evaluation	Standard uncertainty of the assigned value	Notes
Aflatoxin_B2	0.0324	(0.0188 - 0.0752)	10	3.837	0.039	12.014	0.047	0.00940	0.048	-1.55	ACCEPTABLE	0.004	
Aflatoxin_G1	0.0251	(0.0168 - 0.0672)	10	12.009	0.037	28.951	0.042	0.00840	0.044	-2.01	WARNING	0.003	

The following interpretation of z-scores for each individual test result is provided in ISO/IEC 17043:2023(E):

A result that gives $|z| \leq 2.0$ is considered to be **Acceptable**

A result that gives $2.0 < |z| < 3.0$ is considered to give a **Warning signal**

A result that gives $|z| \geq 3.0$ is considered to be **Unacceptable (or action signal)**

Appendix B

CH01/CH03 Hemp Additional Residues Reported in the September 22, 2025 Samples

Lab Number: 188050

Group=Pesticides ug/g (ppm)

Sample	CH01 Pesticide Residue	Method Reported by 188050	Modifier Reported by 188050	Value Reported by 188050	Evaluation
<i>Red</i>	Abamectin	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Acephate	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Acequinocyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Aldicarb	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Ancymidol			Not Tested	NOT TESTED
<i>Red</i>	Azoxystrobin	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Bifenazate	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Bifenthrin	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Boscalid	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Captan	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Carbaryl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Carbofuran	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Chlorantraniliprole	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Chlordane	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Chlorfenapyr	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Chlormequat chloride			Not Tested	NOT TESTED
<i>Red</i>	Chlorpyrifos	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Clofentezine	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Cyantraniliprole	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Cyfluthrin	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Cypermethrin	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Daminozide	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Dichlorvos	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Dimethoate	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Dimethomorph	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Ethephon			Not Tested	NOT TESTED
<i>Red</i>	Ethoprophos (Propfos)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Etofenprox	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Etoxazole	LC-MSMS	<LOD		ACCEPTABLE

Appendix B

CH01/CH03 Hemp Additional Residues Reported in the September 22, 2025 Samples

Lab Number: 188050

Group=Pesticides ug/g (ppm)

Sample	CH01 Pesticide Residue	Method Reported by 188050	Modifier Reported by 188050	Value Reported by 188050	Evaluation
<i>Red</i>	Fenhexamid	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Fenoxycarb	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Fipronil	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Flonicamid	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Fludioxonil	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Flurprimidol			Not Tested	NOT TESTED
<i>Red</i>	Imidacloprid	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Kresoxim-methyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Malathion-methyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Metalaxyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Methiocarb	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Methomyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Methyl parathion	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Mevinphos	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Myclobutanil	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Naled (Systhane) (Dibrom)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Oxamyl	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Paclobutrazol	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Pentachloronitrobenzene (Quintozene)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Permethrin (mix of isomers)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Phosmet (Imidan)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Phosmet (oxon)			Not Tested	NOT TESTED
<i>Red</i>	Piperonyl butoxide	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Prallethrin (mix of isomers)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Propoxur (Baygon)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Pyrethrin (mix of isomers)	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Pyridaben	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Spinetoram	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Spinosad	LC-MSMS	<LOD		ACCEPTABLE

Appendix B

CH01/CH03 Hemp Additional Residues Reported in the September 22, 2025 Samples

Lab Number: 188050

Group=Pesticides ug/g (ppm)

Sample	CH01 Pesticide Residue	Method Reported by 188050	Modifier Reported by 188050	Value Reported by 188050	Evaluation
<i>Red</i>	Spiromesifen	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Spirotetramat	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Spiroxamine	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Thiacloprid	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Thiamethoxam	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Trifloxystrobin	LC-MSMS	<LOD		ACCEPTABLE

Appendix B

CH01/CH03 Hemp Additional Residues Reported in the September 22, 2025 Samples

Lab Number: 188050

Group=Mycotoxins ug/g (ppm)

Sample	CH01 Pesticide Residue	Method Reported by 188050	Modifier Reported by 188050	Value Reported by 188050	Evaluation
<i>Red</i>	Aflatoxin_B1	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Aflatoxin_G2	LC-MSMS	<LOD		ACCEPTABLE
<i>Red</i>	Ochratoxin_A	LC-MSMS	<LOD		ACCEPTABLE

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Acetamiprid

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.1640	0.6552	0.0105
LC-MS/MS	.		0.1580	0.4483	0.0105
MF-CHEM-13	.		0.1140	-1.0690	0.0105
LC-MS/MS	.		0.1440	-0.0345	0.0105
SOP.404	.		0.1450	0.0000	0.0105
LCQQQ	0.1370	-0.2759			0.0105
lc/ms/ms	0.1130	-1.1034			0.0105
LC-MSMS	0.1210	-0.8276			0.0105
	Not Tested				
ENV Method 6	0.1570	0.4138			0.0105
	Not Tested				
LCMS	0.2529	3.7193			0.0105
CDFA Cannabis	0.1500	0.1724			0.0105
No Method Provided	0.1760	1.0690			0.0105

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Coumaphos

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.0900	-0.4545	0.0094
LC-MS/MS	.		0.0980	-0.0505	0.0094
MF-CHEM-13	.		0.1040	0.2525	0.0094
LC-MS/MS	.		< 0.1000		
	.		Not Tested		
LCQQQ	Not Tested				
lc/ms/ms	0.0170	-4.1414			0.0094
LC-MSMS	0.0861	-0.6515			0.0094
	Not Tested				
ENV Method 6	0.0448	-2.7374			0.0094
	Not Tested				
	Not Tested				
CDFA Cannabis	0.0780	-1.0606			0.0094
	Not Tested				

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Diazinon

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.2860	0.2190	0.0198
LC-MS/MS	.		0.2880	0.2555	0.0198
MF-CHEM-13	.		0.2740	0.0000	0.0198
LC-MS/MS	.		0.1990	-1.3686	0.0198
SOP.404	.		0.2550	-0.3467	0.0198
LCQQQ	0.2290	-0.8212			0.0198
lc/ms/ms	0.2250	-0.8942			0.0198
LC-MSMS	0.2620	-0.2190			0.0198
	Not Tested				
ENV Method 6	0.2490	-0.4562			0.0198
	Not Tested				
lcms	0.5571	5.1651			0.0198
CDFA Cannabis	0.2300	-0.8029			0.0198
No Method Provided	0.1740	-1.8248			0.0198

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Fenpyroximate (mix of

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.2480	0.0000	0.0187
LC-MS/MS	.		0.2670	0.3831	0.0187
MF-CHEM-13	.		0.2360	-0.2419	0.0187
LC-MS/MS	.		0.1850	-1.2702	0.0187
SOP.404	.		0.2530	0.1008	0.0187
LCQQQ	0.1950	-1.0685			0.0187
lc/ms/ms	0.2740	0.5242			0.0187
LC-MSMS	0.2140	-0.6855			0.0187
	Not Tested				
	Not Tested				
	Not Tested				
LCMS	0.5236	5.5554			0.0187
CDFA Cannabis	0.2300	-0.3629			0.0187
	0.0200				

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Hexythiazox

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.1380	0.0000	0.0104
LC-MS/MS	.		0.1400	0.0725	0.0104
MF-CHEM-13	.		0.0840	-1.9565	0.0104
LC-MS/MS	.		0.1620	0.8696	0.0104
No Method Provided	.		< 0.0244		
LCQQQ	0.1010	-1.3406			0.0104
lc/ms/ms	0.1060	-1.1594			0.0104
LC-MSMS	0.0954	-1.5435			0.0104
	Not Tested				
	0.0200				
	Not Tested				
LCMS	0.2764	5.0127			0.0104
CDFA Cannabis	0.1000	-1.3768			0.0104
	0.0200				

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Imazalil

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.1260	0.5752	0.0082
LC-MS/MS	.		0.1130	0.0000	0.0082
MF-CHEM-13	.		0.1070	-0.2655	0.0082
LC-MS/MS	.		0.1370	1.0619	0.0082
SOP.404	.		0.1050	-0.3540	0.0082
LCQQQ	0.1160	0.1327			0.0082
lc/ms/ms	0.0980	-0.6637			0.0082
LC-MSMS	0.1010	-0.5310			0.0082
	Not Tested				
ENV Method 6	0.0863	-1.1814			0.0082
LC-MS/MS	0.1535	1.7934			0.0082
LCMS	0.2124	4.3960			0.0082
	Not Tested				
No Method Provided	0.1740	2.6991			0.0082

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Propiconazole (tilt)

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.1630	-0.1488	0.0127
LC-MS/MS	.		0.1940	0.7738	0.0127
MF-CHEM-13	.		0.1230	-1.3393	0.0127
LC-MS/MS	.		0.1730	0.1488	0.0127
SOP.404	.		0.1680	0.0000	0.0127
LCQQQ	0.1420	-0.7738			0.0127
lc/ms/ms	0.1480	-0.5952			0.0127
LC-MSMS	0.1160	-1.5476			0.0127
	Not Tested				
ENV Method 6	0.0744	-2.7857			0.0127
	Not Tested				
LCMS	0.3351	4.9732			0.0127
	Not Tested				
	0.0200				

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Pesticides ug/g (ppm) Test=Tebuconazole

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.1980	0.8235	0.0134
LC-MS/MS	.		0.1860	0.4706	0.0134
MF-CHEM-13	.		0.1520	-0.5294	0.0134
LC-MS/MS	.		0.1540	-0.4706	0.0134
	.		Not Tested		
LCQQQ	0.0973	-2.1382			0.0134
lc/ms/ms	0.1570	-0.3824			0.0134
LC-MSMS	0.1800	0.2941			0.0134
	Not Tested				
ENV Method 6	0.0965	-2.1618			0.0134
	Not Tested				
LCMS	0.3371	4.9147			0.0134
	Not Tested				
No Method Provided	0.0430	-3.7353			0.0134

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

Group=Mycotoxins ug/g (ppm) Test=Aflatoxin_B2

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.0480	0.1064	0.0037
LC-MS/MS	.		0.0510	0.4255	0.0037
MF-CHEM-13	.		38.0300	4040.7447	0.0037
LC-MS/MS	.		0.0460	-0.1064	0.0037
SOP.404	.		0.0381	-0.9468	0.0037
LCQQQ	0.0398	-0.7660			0.0037
lc/ms/ms	0.0320	-1.5957			0.0037
LC-MSMS	0.0324	-1.5532			0.0037
	Not Tested				
	Not Tested				
LC-MS	0.0245	-2.3989			0.0037
LCMS	0.0262	-2.2085			0.0037
	Not Tested				
	Not Tested				

Appendix C

CH01/CH03 Hemp Display of All Reported Results and z-Scores (When Applicable)

Ship Date: 9/22/2025

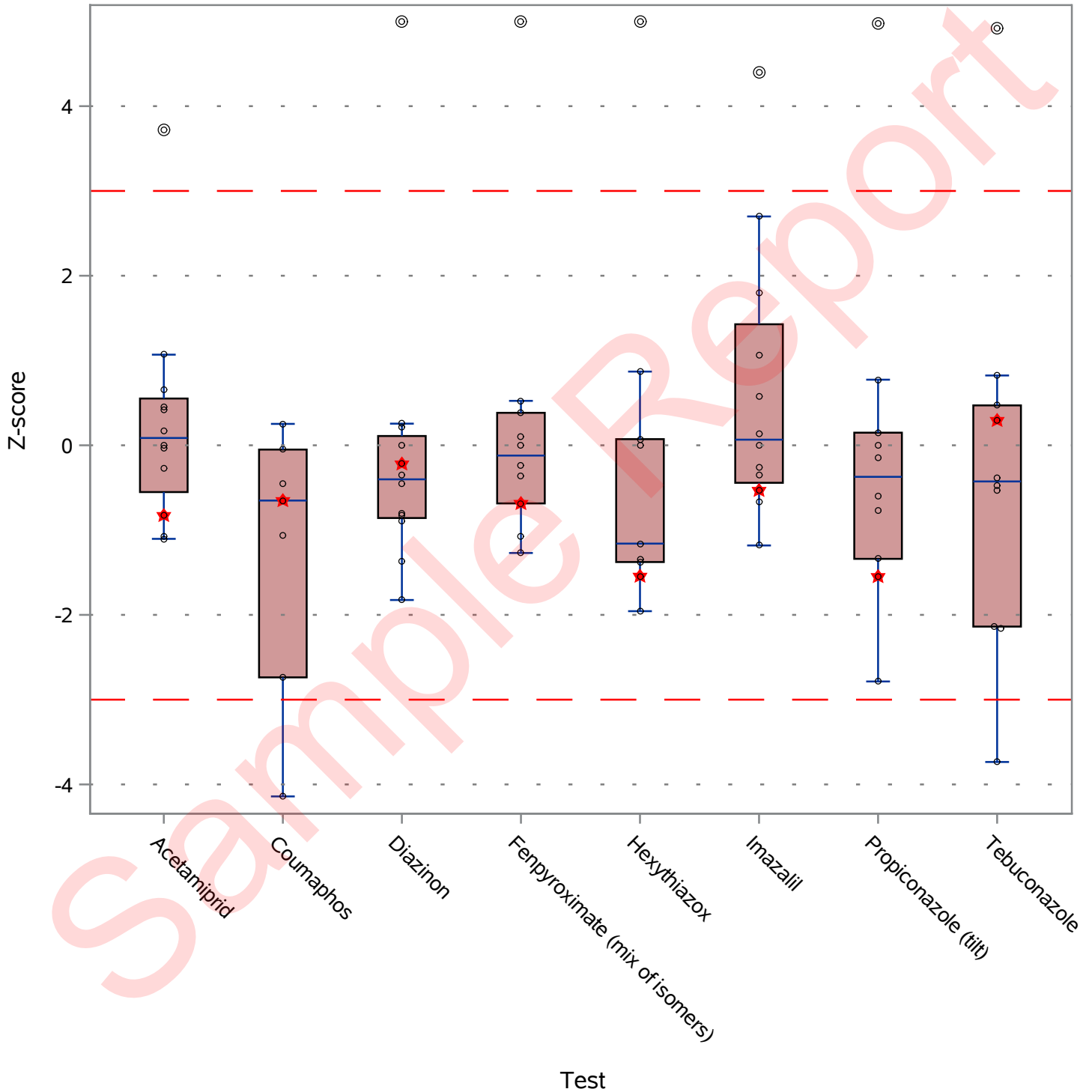
Group=Mycotoxins ug/g (ppm) Test=Aflatoxin_G1

Method	Participating Laboratories Reported Result	Participating Laboratories z-Score	Reference Laboratories Reported Result	Reference Laboratories z-Score	Standard uncertainty of the assigned value
LC-MS/MS	.		0.0400	-0.2381	0.0033
LC-MS/MS	.		0.0440	0.2381	0.0033
MF-CHEM-13	.		29.7600	3537.8571	0.0033
LC-MS/MS	.		0.1070	7.7381	0.0033
SOP.404	.		0.0295	-1.4881	0.0033
LCQQQ	Not Tested				
lc/ms/ms	0.0340	-0.9524			0.0033
LC-MSMS	0.0251	-2.0119			0.0033
	Not Tested				
	Not Tested				
LC-MS	0.0315	-1.2488			0.0033
LCMS	0.0220	-2.3798			0.0033
	Not Tested				
No Method Provided	90.0000	10709.286			0.0033

Appendix D

CH01/CH03 Hemp Z-Score Distributions Red Sample Site = 188050

Group=Pesticides ug/g (ppm)

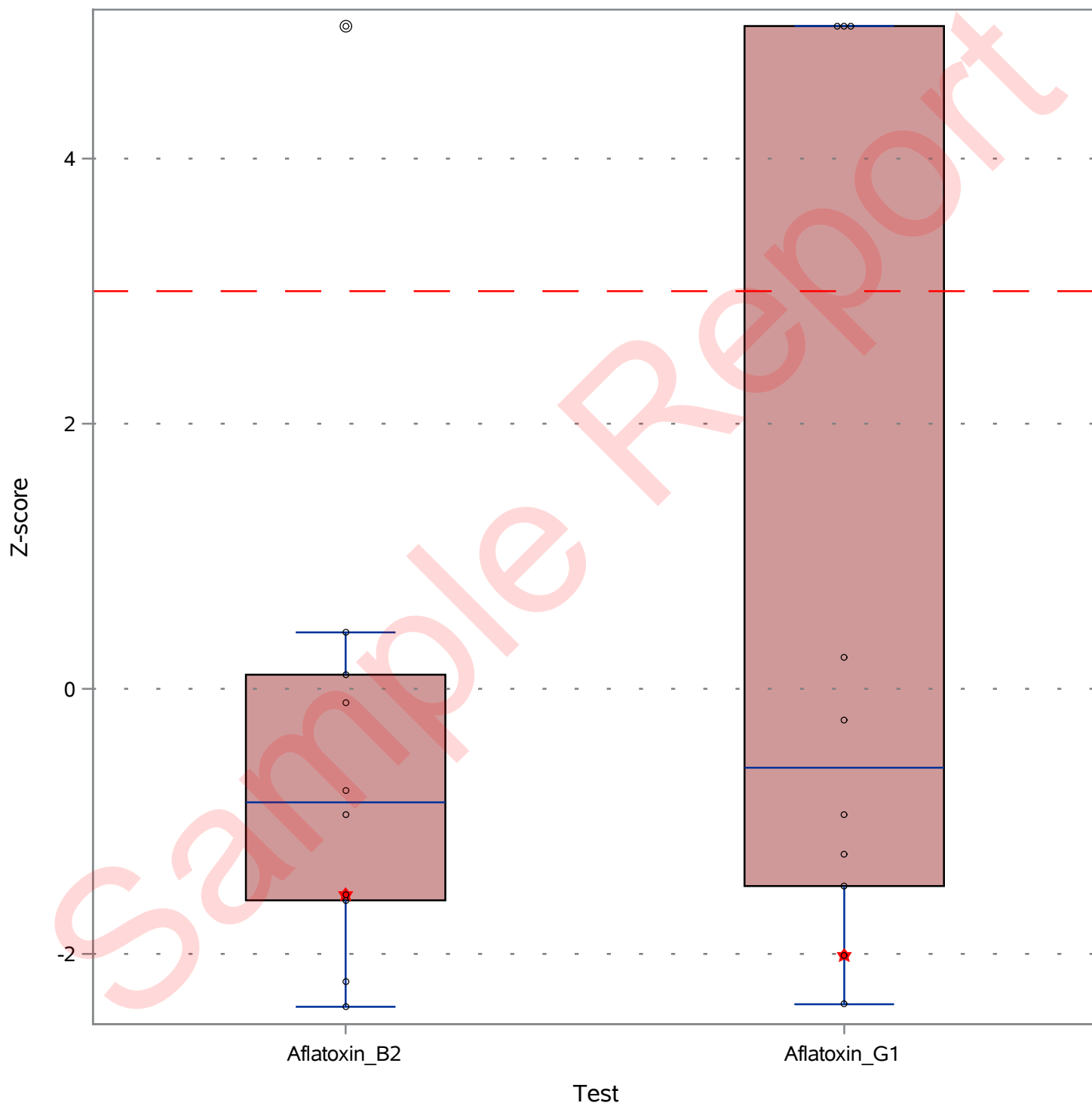


Note: Your Result (Red Star) Compared to All Results

Appendix D

CH01/CH03 Hemp Z-Score Distributions
Red Sample
Site = 188050

Group=Mycotoxins ug/g (ppm)

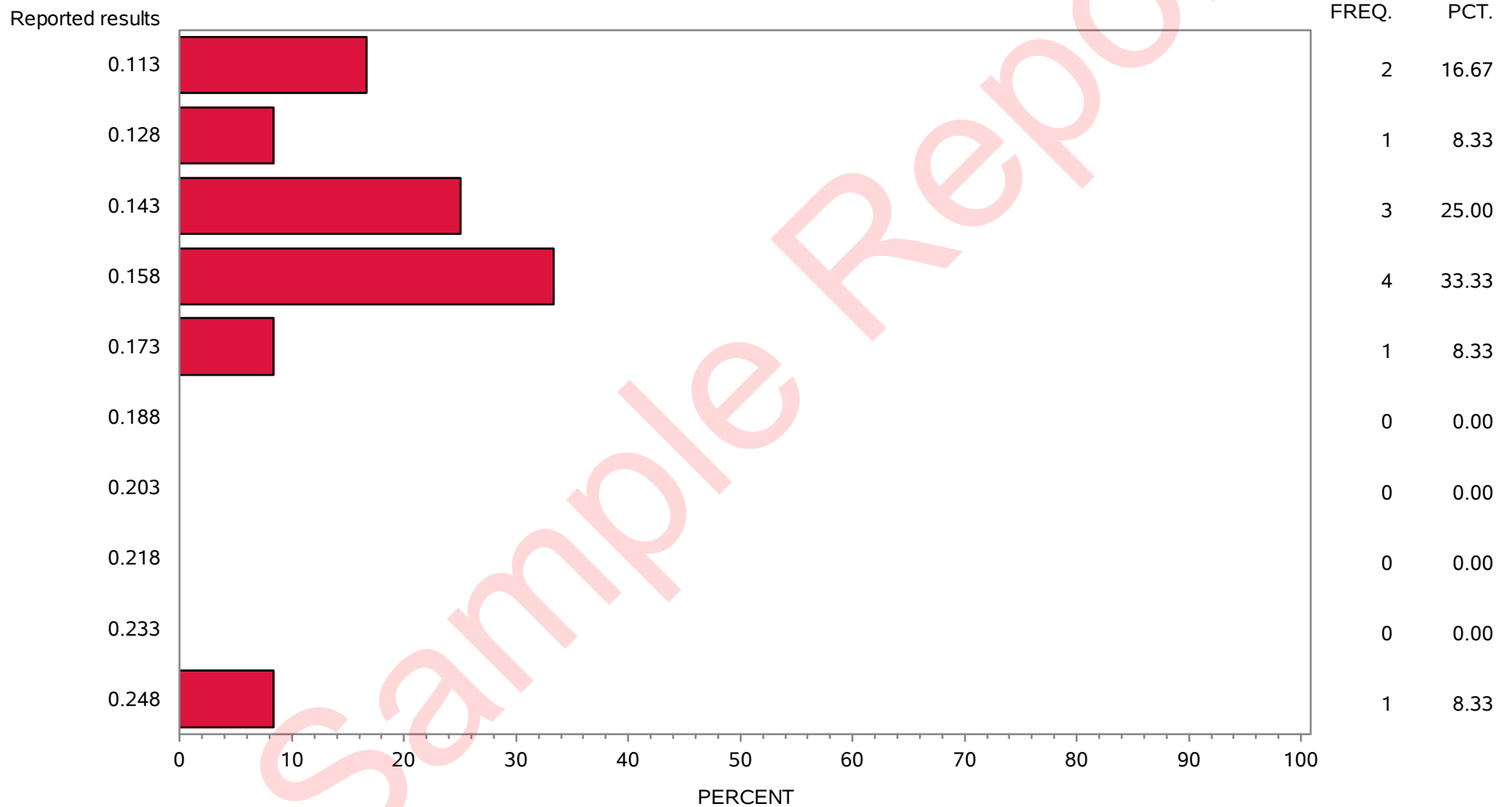


Note: Your Result (Red Star) Compared to All Results

Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

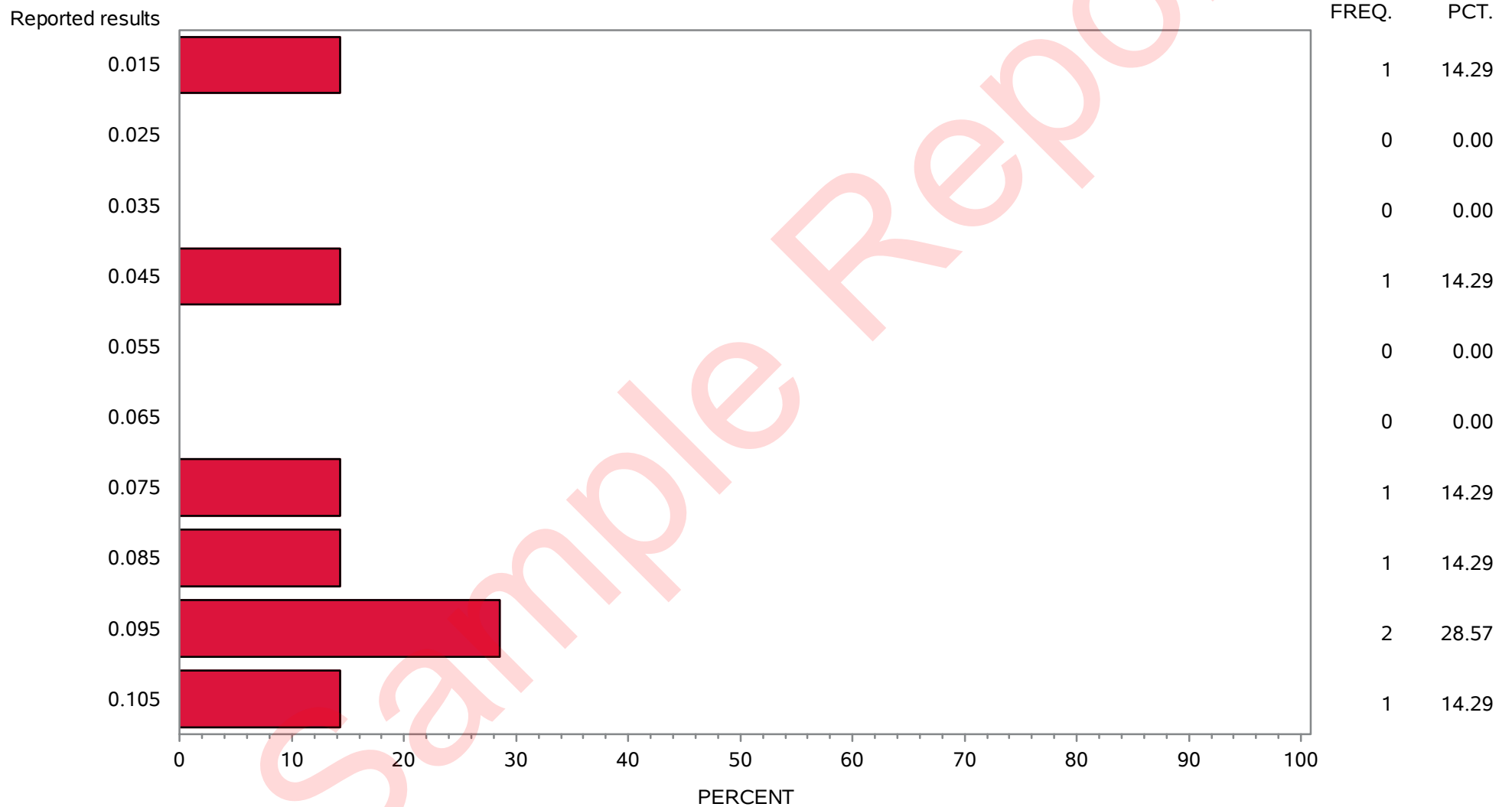
Group=Pesticides ug/g (ppm) Test=Acetamiprid



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

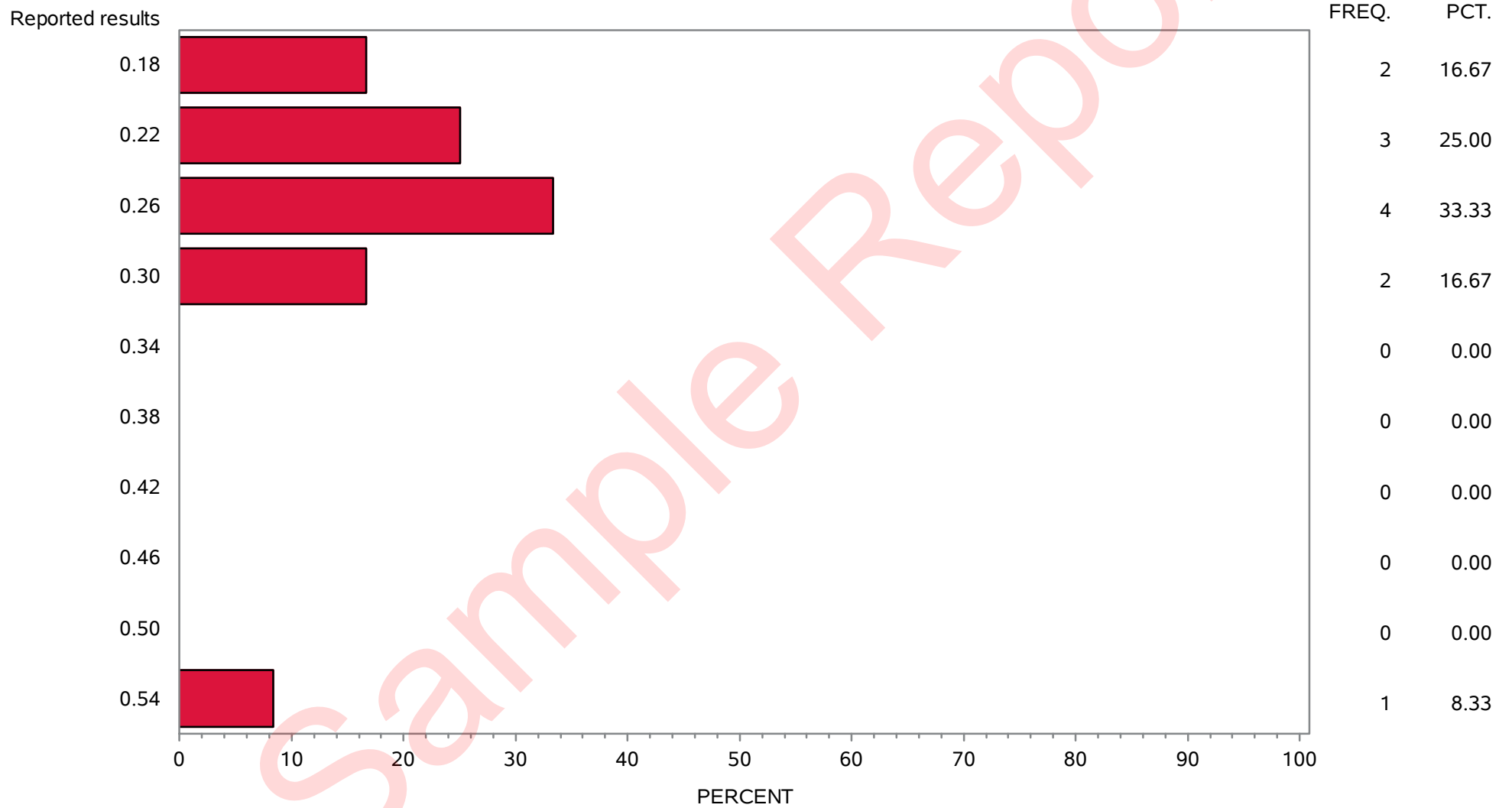
Group=Pesticides ug/g (ppm) Test=Coumaphos



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

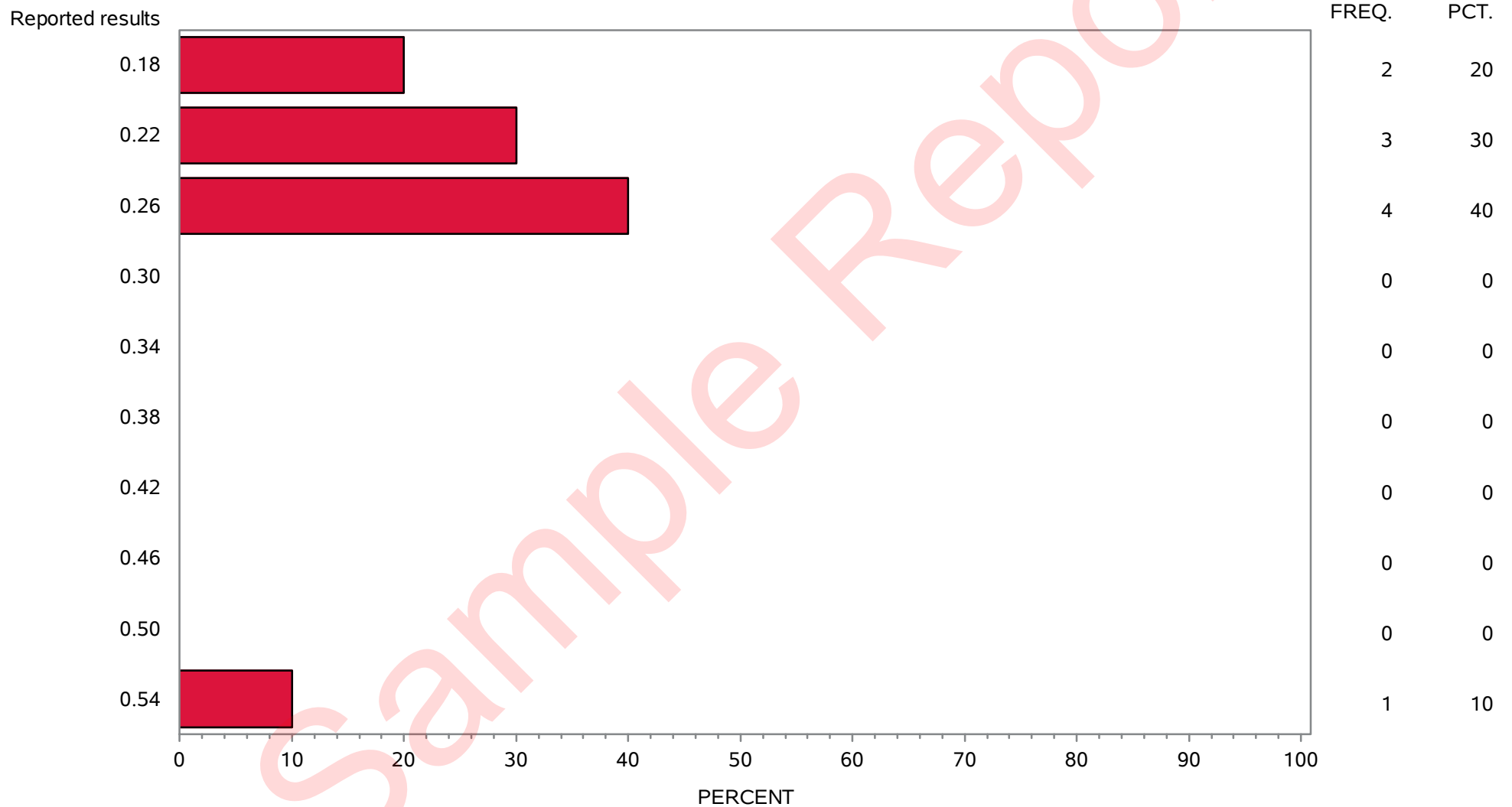
Group=Pesticides ug/g (ppm) Test=Diazinon



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

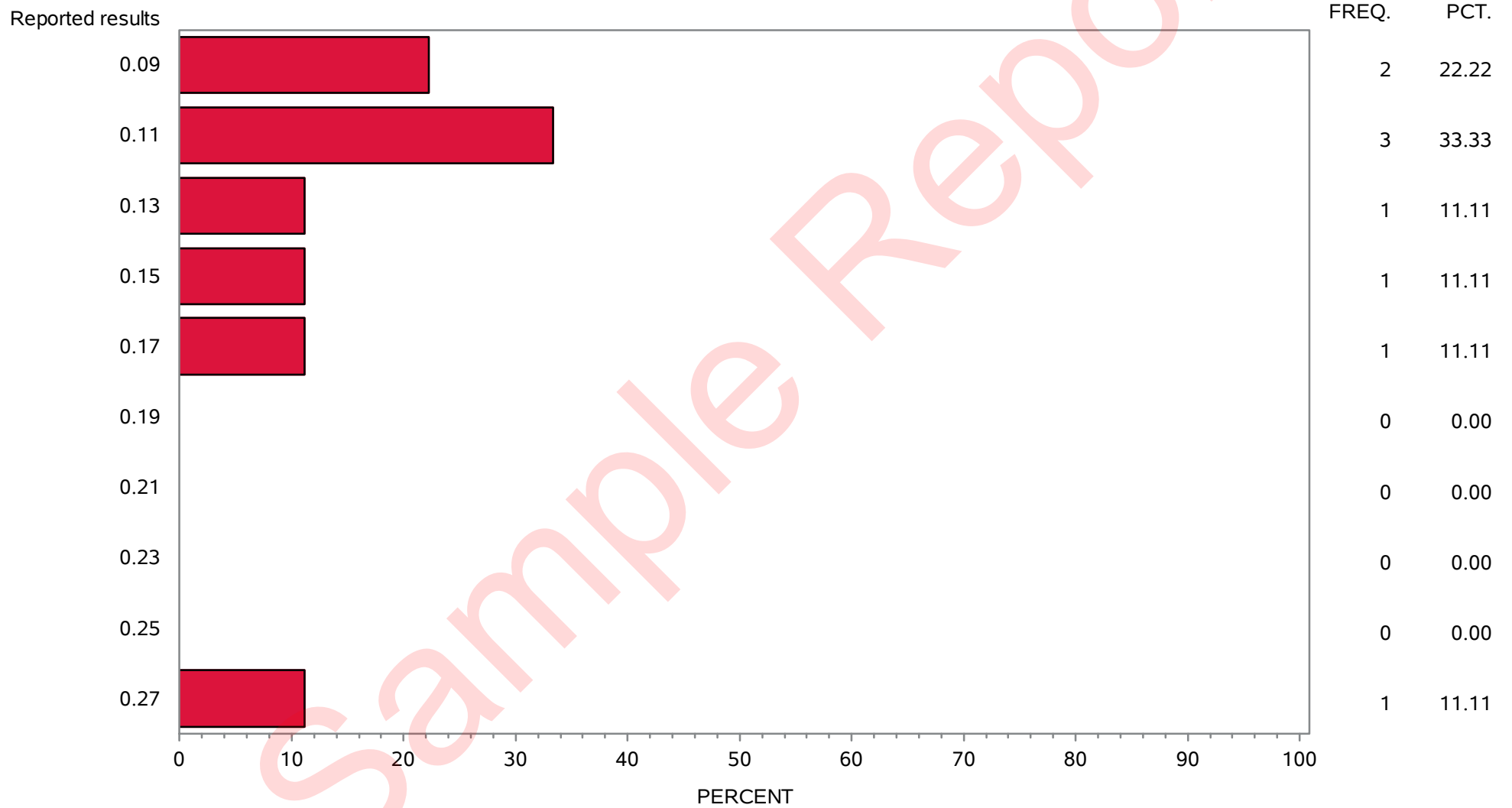
Group=Pesticides ug/g (ppm) Test=Fenpyroximate (mix of isomers)



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

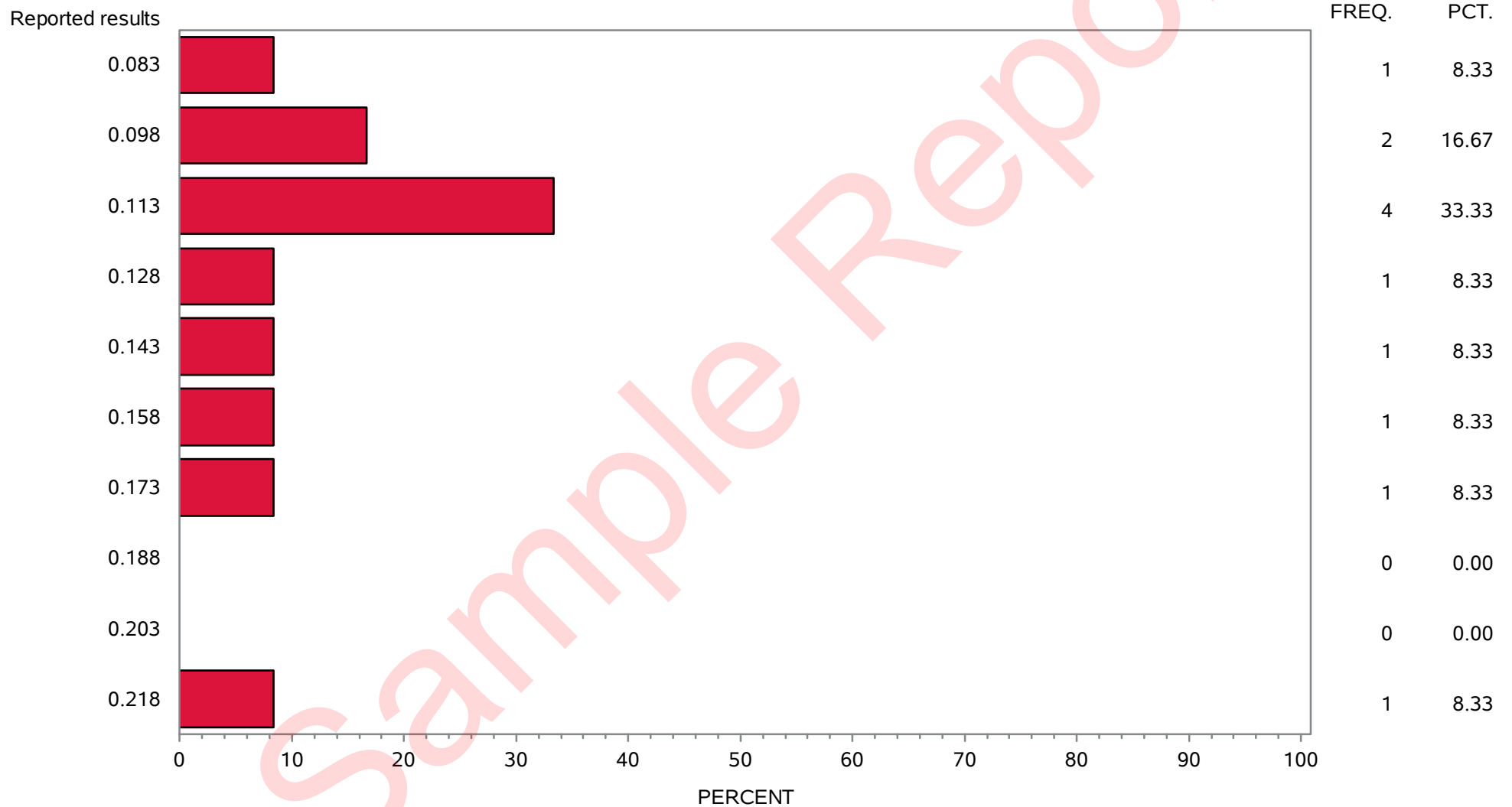
Group=Pesticides ug/g (ppm) Test=Hexythiazox



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

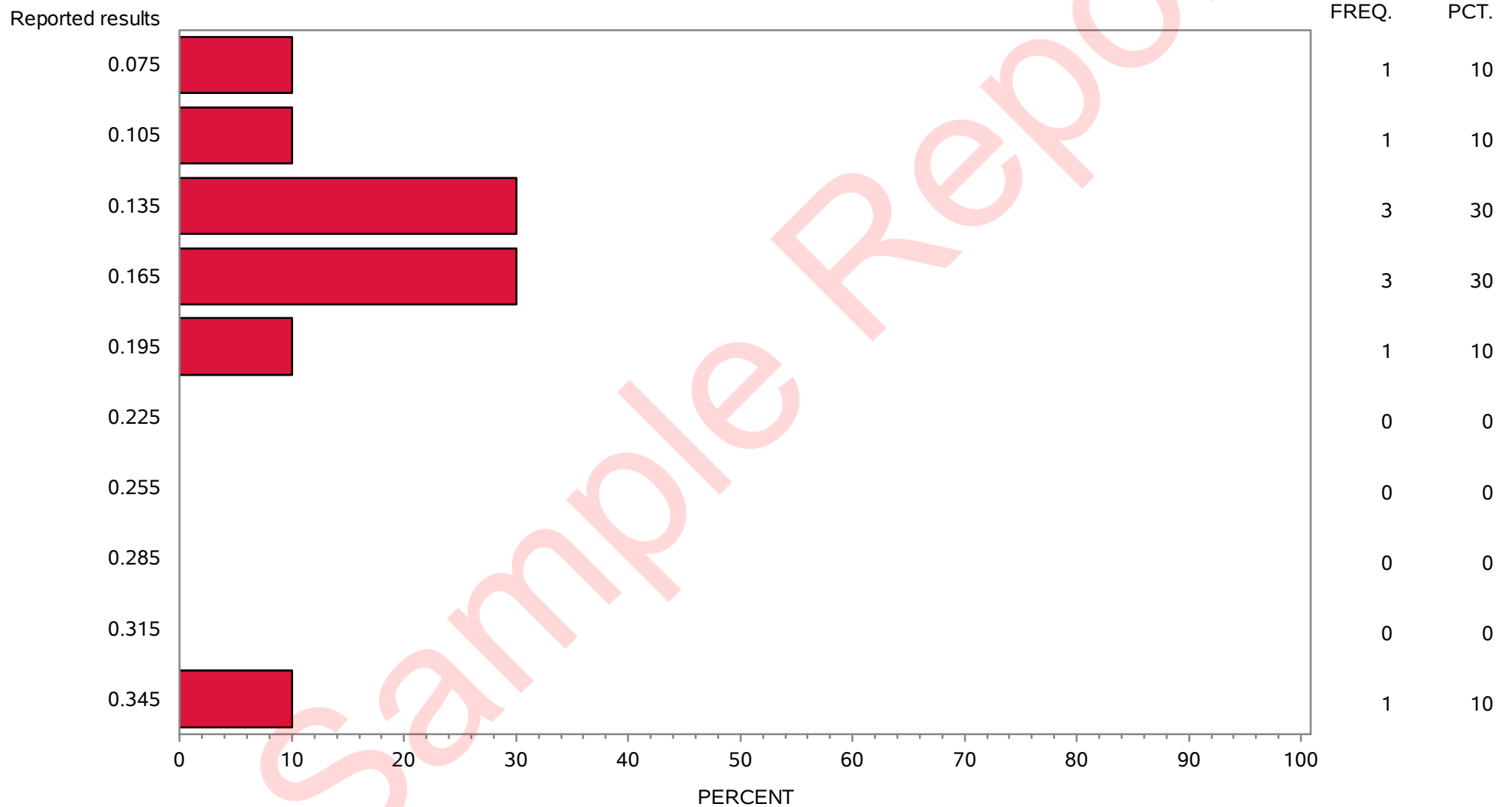
Group=Pesticides ug/g (ppm) Test=Imazalil



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

Group=Pesticides ug/g (ppm) Test=Propiconazole (tilt)



Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

Group=Pesticides ug/g (ppm) Test=Tebuconazole

Reported results

0.02

0.06

0.10

0.14

0.18

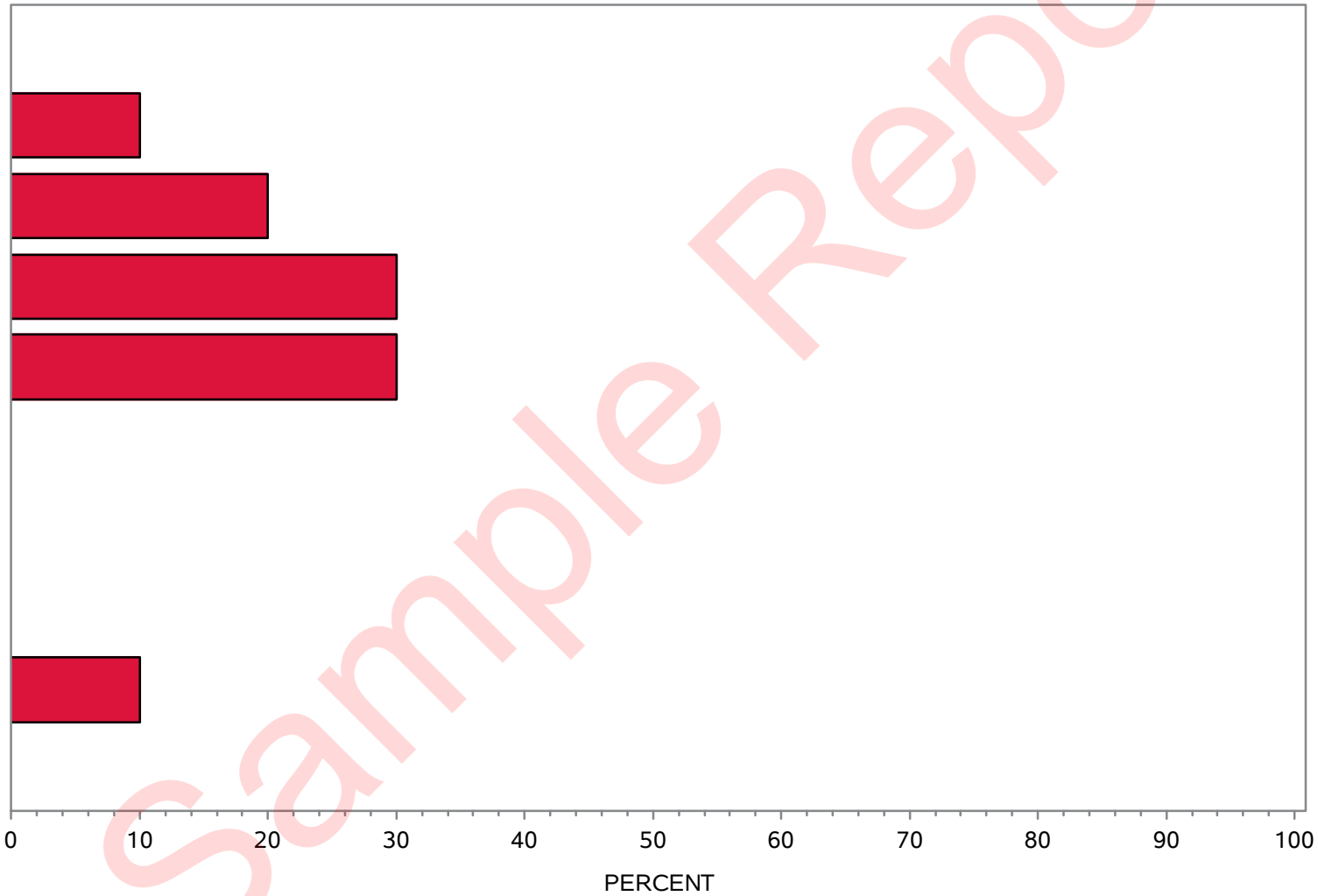
0.22

0.26

0.30

0.34

0.38



FREQ.

PCT.

0

0

1

10

2

20

3

30

3

30

0

0

0

0

0

0

1

10

0

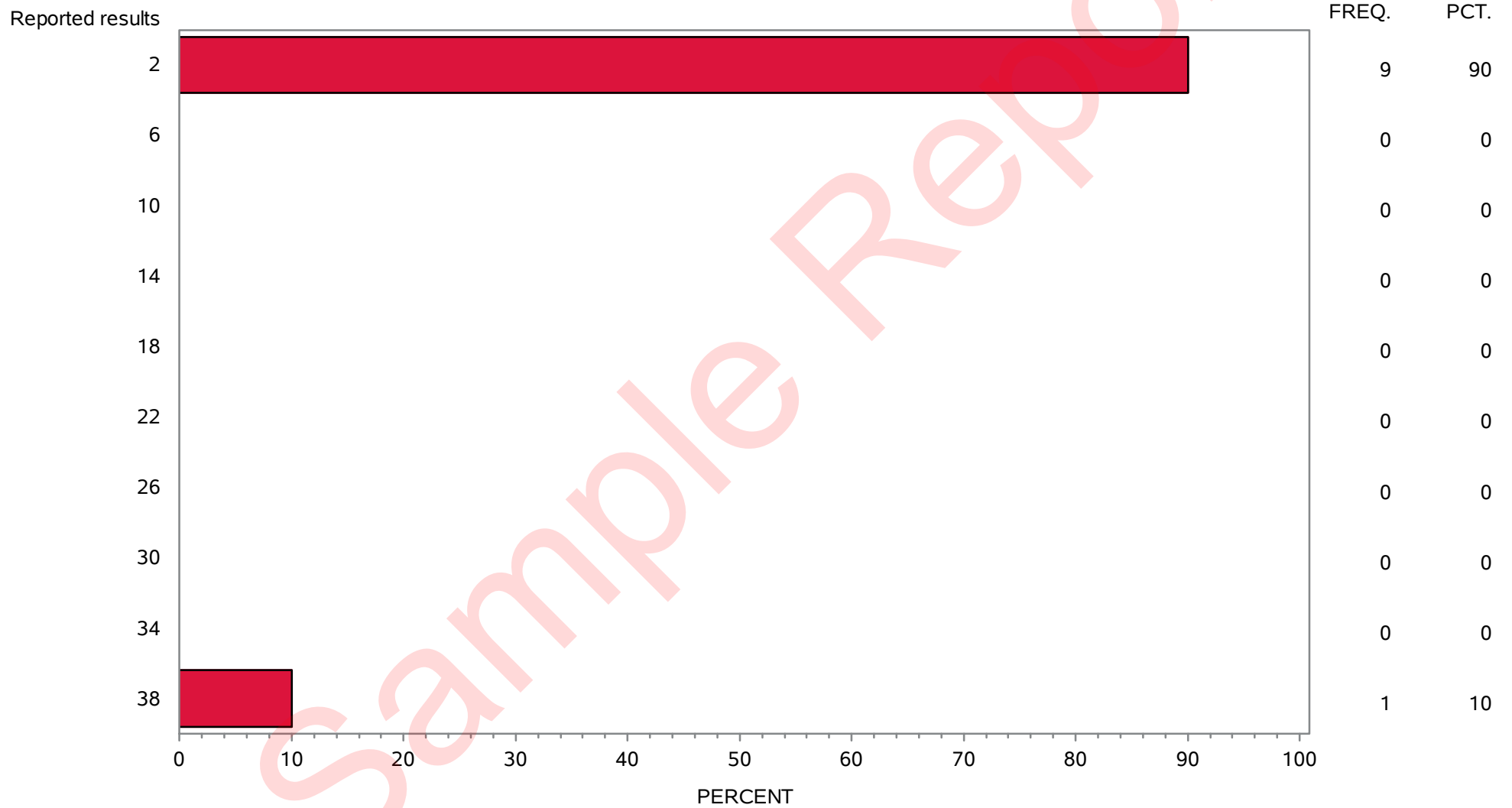
0

PERCENT

Appendix D

CH01/CH03 Hemp Red Sample
Frequency Chart of Reported Results
Site = 188050

Group=Mycotoxins ug/g (ppm) Test=Aflatoxin_B2

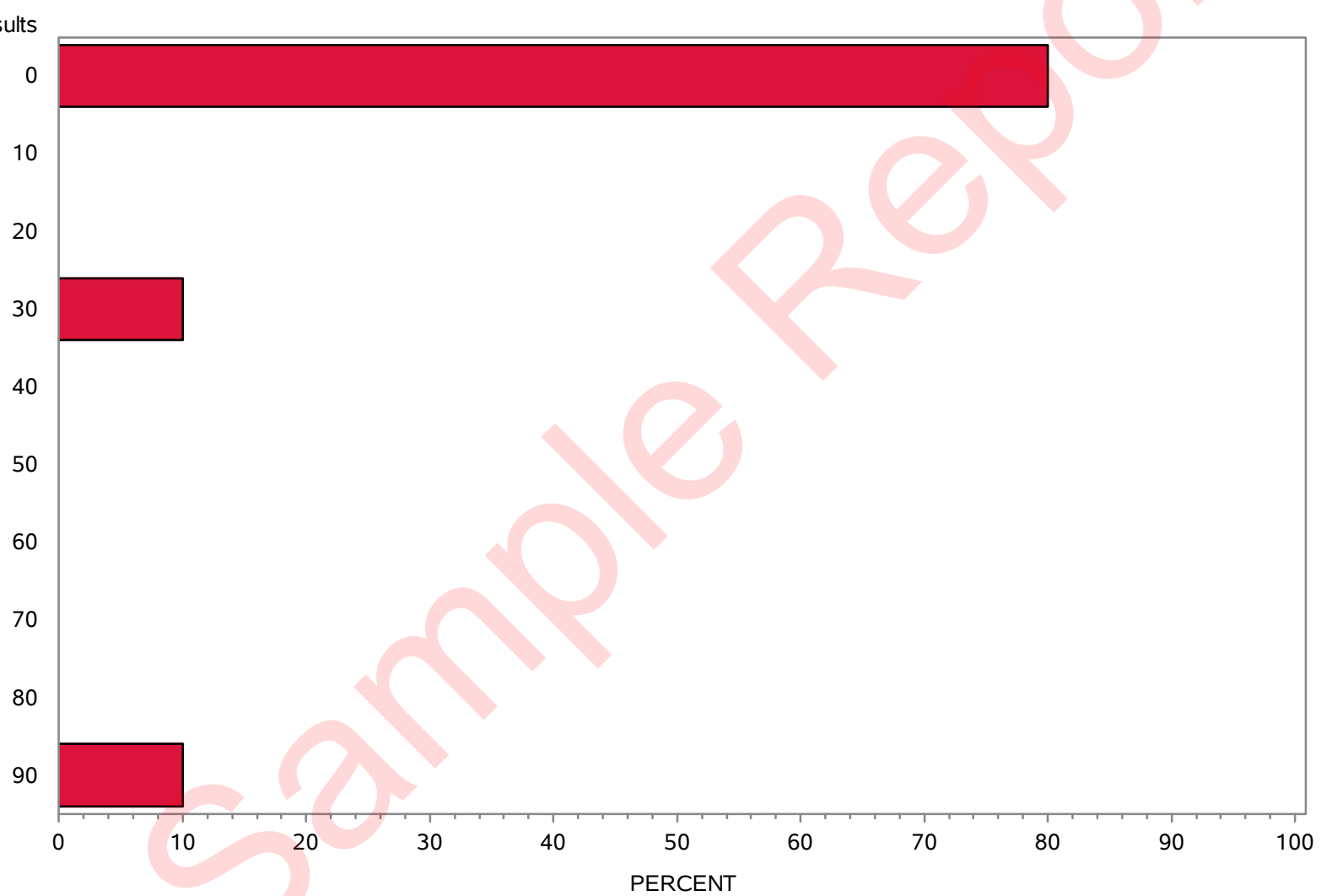


Appendix D

CH01/CH03 Hemp Red Sample Frequency Chart of Reported Results Site = 188050

Group=Mycotoxins ug/g (ppm) Test=Aflatoxin_G1

Reported results



FREQ.

PCT.

Homogeneity & Stability Report

Pesticides

Red Sample - Red samples were extracted and analyzed for spiked pesticides by Signature Science using by LC-MS/MS.

Homogeneity/Stability Testing Results								
Pesticide	Acetamiprid	Diazinon	Coumaphos	Fenpyroximate	Hexythiazox	Imazalil	Propiconazole	Tebuconazole
Theoretical Concentration (ug/g, ppm)	0.160	0.280	0.096	0.280	0.144	0.128	0.160	0.192
Homogeneity Mean (ppm)	0.164	0.268	0.090	0.248	0.138	0.126	0.163	0.198
Homogeneity Mean % Recovery	102%	96%	94%	89%	96%	99%	102%	103%
Total Homogeneity CV	4%	2%	9%	5%	7%	9%	10%	10%
Stability Mean (ppm)	0.158	0.288	0.098	0.267	0.140	0.113	0.194	0.186
Stability Mean % Recovery	99%	103%	102%	95%	97%	88%	121%	97%
Total Stability CV	7%	8%	11%	7%	6%	11%	7%	16%
Percent Difference (Stability - Homogeneity / Homogeneity)	-3%	7%	9%	8%	1%	-11%	19%	-6%
Conclusion	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Homogeneity & Stability Report

Mycotoxins

Red Sample - Red hemp samples were extracted and analyzed for spiked mycotoxins by Signature Science by LC-MS/MS.

Homogeneity/Stability Testing Results		
Mycotoxin	Aflatoxin B2	Aflatoxin G1
Theoretical Concentration (ug/g, ppm)	0.043	0.038
Homogeneity Mean (ppm)	0.048	0.040
Homogeneity Mean % Recovery	111%	105%
Total Homogeneity CV	12%	14%
Stability Mean (ppm)	0.051	0.044
Stability Mean % Recovery	119%	113%
Total Stability CV	11%	13%
Percent Difference (Stability - Homogeneity / Homogeneity)	7%	8%
Conclusion	Pass	Pass

Homogeneity - Undetected/Less than LOQ Mycotoxins

Undetected/Less than LOQ Mycotoxins	Aflatoxin B1	Aflatoxin G2	Ochratoxin A
Result (ug/g)	ND	ND	ND
LOQ (ug/g)	0.029	0.060	0.007
LOD (ug/g)	0.027	0.055	0.006

Stability - Undetected/Less than LOQ Mycotoxins

Results	Not Detected		
Mycotoxins	Aflatoxin B1	Aflatoxin G2	Ochratoxin A
LOQ (ug/g)	0.029	0.060	0.007
LOD (ug/g)	0.027	0.055	0.006
Notes	All Homogeneity and all Stability results ND		

Cannabis/Hemp Proficiency Testing (PT) Program

CHPT (Flower)

Sample 2 – Red - Hemp

PROFICIENCY TEST INSTRUCTIONS

UPON RECEIPT, inspect the integrity of the package and its contents to ensure that the samples are intact and not broken, leaking, or compromised. Each package should contain at least two glass jars. If problems are observed, contact Cannabis_PT@AOAC.org.

Sample 2 – Red Details

Number of Samples	One sample and one matrix blank per participant
Sample IDs	PT Sample: Sample 2 - Red Hemp Matrix Blank: Sample 2 - Red Hemp Blank
Sample Type (Matrix)	Ground hemp flower
Sample Amount	PT Sample: ~2.5 g Matrix Blank: ~1.0 g
Sample Temperature Upon Receipt	Satisfactory if received at $\leq 15^{\circ}\text{C}$
Sample Storage	Store samples frozen ($< -15^{\circ}\text{C}$)
Applicable Sample Testing Method(s)	pesticides, mycotoxins

READ THESE INSTRUCTIONS in their entirety before proceeding with sample preparation and analysis. These instructions contain important information about the enclosed samples and specific requirements for this proficiency test. **Failure to read these instructions may adversely impact your performance on this proficiency test.**

Samples are provided for analytical purposes only. Provided samples are not for human consumption. Refer to the provided SDS(s) for health and safety considerations.

Part 1: AOAC Website

AOAC has sent an email notification to the laboratory's contact on record, which includes a link to the secure AOAC PT Website, along with the laboratory's login and password information. Instructions for Analysis and Instructions for Reporting are included on this site.

Applicable sample details and analysis and reporting instructions are also discussed below.

Part 2: Sample 2 - Red

Sample 2 - Red contains approximately 2.5 grams of ground hemp in a 2 oz clear glass jar. A matrix blank containing approximately 1.0 gram of ground hemp of the same strain also has been provided in a 1 oz clear glass jar.

Refer to the provided SDS(s) for health, safety, and disposal considerations.

Part 3: Analysis

Sample 2 - Red is suitable for analysis for pesticide residues and/or mycotoxins. Participants can test samples for as many, or as few, of the analytes included in these methods as are relevant for each participating laboratory. Refer to the Reportable Pesticides List in Appendix A and Mycotoxins List in Appendix B .

Proficiency testing samples should be handled and analyzed in the same manner and following the same analytical standard operating procedures (SOPs) as routine samples. The participating laboratory should take appropriate action(s) to ensure a representative sample is tested (e.g., quantitative transfer, thorough mixing, other internal procedure).

The provided matrix blank can be used, if desired, for analytical purposes (e.g., to create matrix-matched solvent for calibration curve). Results for the blank sample should not be reported or used to adjust the Sample 2 - Red results.

Labs have four weeks to analyze samples and report results.

Shipping containers and artificial ice are used for one way shipping and do not need to be returned. Any unused sample should be disposed of in accordance with state and federal regulations and should not be returned.

Part 3: Reporting

Refer to the AOAC PT website for detailed reporting instructions, including significant figures, environmental conditions, and other requirements.

All results must be reported on an **as-received** basis (i.e., percent moisture should not be factored into the calculation and should be reported as a separate analysis result).

The table below provides the units for reporting the analytes of interest.

Table 1. Unit Reporting Requirements

Method	Units
Pesticides	ug/g (ppm)
Mycotoxins	ug/g (ppm)

Values below the laboratory's limit of detection (LOD) or limit of quantitation (LOQ) do not need to be reported, however if it is a requirement of your reporting, the result should be entered with a '< LOD', or '< LOQ' reported in the modifier field and the appropriate corresponding value in the 'Value' field. A value of zero should not be reported to indicate that the analyte was not detected.

Reporting of uncertainties associated with the results is not required.

Part 4: Schedule and Other Information

The table below contains the key dates for this PT round.

Table 2. Schedule

Event	Date
Sample Shipment	22 September 2025
Expected Sample Receipt	Next Day (domestic) Within 5 Days of Shipment (international)
Results Due	21 October 2025
Participant Results Released	≤ 30 days after receipt of all participant results

Questions and Comments

If you have questions, please contact Cannabis_PT@AOAC.org.

Test Material Provider:

signature
science LLC

APPENDIX A

Reportable Pesticides

Compound	CAS Number	Compound	CAS Number
Abamectin (Avermectins: B1a & B1b)	71751-41-2	Flonicamid	158062-67-0
Acephate	30560-19-1	Fludioxonil	131341-86-1
Acequinocyl	57960-19-7	Fluopyram	658066-35-4
Acetamiprid	135410-20-7	Flurprimidol	56425-91-3
Aldicarb	116-06-3	Hexythiazox	78587-05-0
Allethrin	584-79-2	Imazalil	35554-44-0
Ancymidol	12771-68-5	Imidacloprid	138261-41-3
Azadirachtin	108168-76-9	Iprodione	36734-19-7
Azoxystrobin	131860-33-8	Kinoprene	37882-31-8
Benzovindiflupyr	1072957-71-1	Kresoxim-methyl	143390-89-0
Bifenazate	149877-41-8	Malathion	121-75-5
Bifenthrin	82657-04-3	Metalaxyl	57837-19-1
Boscalid	188425-85-6	Methiocarb	2032-65-7
Buprofezin	69327-76-0	Methomyl	16752-77-5
Captan	133-06-2	Methoprene	40596-69-8
Carbaryl	63-25-2	Methyl parathion	298-00-0
Carbofuran	1563-66-2	Mevinphos	7786-34-7
Chlorantraniliprole	500008-45-7	MGK-264	113-48-4
Chlordane	57-74-9	Myclobutanil	88671-89-0
Chlorfenapyr	122453-73-0	Naled (Systhane) (Dibrom)	300-76-5
Chlormequat chloride	999-81-5	Novaluron	116714-46-6
Chlorpyrifos	2921-88-2	Oxamyl	23135-22-0
Clofentezine	74115-24-5	Paclobutrazol	76738-62-0
Clothianidin	21088-92-5	Pentachloronitrobenzene (Quintozone)	82-68-8
Coumaphos	56-72-4	Permethrin (mix of isomers)	52645-53-1
Cyantraniliprole	736994-63-1	Phenothrin (d-phenothrin)	26002-80-2
Cyfluthrin (Baythroid)	68359-37-5	Phosmet (Imidan)	732-11-6
Cypermethrin	52315-07-8	Phosmet (oxon)	3735-33-9
Cyprodinil	121552-61-2	Piperonyl butoxide	55218
Daminozide	1596-84-5	Pirimicarb	23103-98-2
Deltamethrin	52918-63-5	Prallethrin (mix of isomers)	23031-36-9
Diazinon	333-41-5	Propiconazole (tilt)	60207-90-1
Dichlorvos	62-73-7	Propoxur (Baygon)	114-26-1

Appendix F

Reportable Pesticides

Compound	CAS Number	Compound	CAS Number
Dimethoate	60-51-5	Pyraclostrobin	175013-18-0
Dimethomorph	110488-70-5	Pyrethrin (mix of isomers)	8003-34-7
Dinotefuran	165252-70-0	Pyridaben	96489-71-3
Dodemorph	1593-77-7	Resmethrin	10453-86-8
Endosulfan I (alpha)	959-98-8	Spinetoram	187166-40-1
Endosulfan II (beta)	33213-65-9	Spinosad (mixture of A and D)	168316-95-8
Endosulfan sulfate	1031-07-8	Spirodiclofen	148477-71-8
Ethephon	16672-87-0	Spiromesifen	283594-90-1
Ethoprophos (Prophos)	13194-48-4	Spirotetramat	203313-25-1
Etofenprox	80844-07-1	Spiroxamine	118134-30-8
Etoxazole	153233-91-1	Tebuconazole	107534-96-3
Etridiazole (Terrazole)	2593-15-9	Tebufenozide	112410-23-8
Fenhexamid	126833-17-8	Teflubenzuron	83121-18-0
Fenoxycarb	79127-80-3	Tetrachlorvinphos	961-11-5
Fenpyroximate (mix of isomers)	111812-58-9	Tetramethrin	7696-12-0
Fensulfothion	115-90-2	Thiacloprid	111988-49-9
Fenthion	55-38-9	Thiamethoxam	153719-23-4
Fenvalerate (Sanmarton)	51630-58-1	Thiophanate-methyl	23564-05-8
Fipronil	120068-37-3	Trifloxystrobin	141517-21-7

APPENDIX B

Reportable Mycotoxins

Compound	CAS Number
Ochratoxin A	303-47-9
Aflatoxin B1	1162-65-8
Aflatoxin B2	7220-81-7
Aflatoxin G1	1165-39-5
Aflatoxin G2	7241-98-7

-----End of Document-----