Collaborative Testing Services, Inc.

# Hemp Industry Interlaboratory Program

## Summary Report #2-Winter 2022

Introduction to the Hemp Program

Key for Web Summary Report

| Analysis | Analysis Name |
|---|---|
| | **Hemp: Cannabinoids** |
| 9601 | ∆9-Tetrahydrocannabinol (THC) |
| 9602 | ∆9-Tetrahydrocannabinolic Acid (THCA) |
| 9603 | Cannabidiol (CBD) |
| 9604 | Cannabidiolic Acid (CBDA) |
| 9605 | Total ∆9-Tetrahydrocannabinol (THC) |
| 9606 | Total Cannabidiol (CBD) |
| 9607 | Cannabichromene (CBC) |
| | **Hemp: Heavy Metals** |
| 9631 | Arsenic (As) |
| 9632 | Cadmium (Cd) |
| 9633 | Lead (Pb) |
| 9634 | Mercury (Hg) |
| | **Hemp: Terpenes** |
| 9661 | Myrcene or β-Myrcene |
| 9662 | Limonene |
| 9663 | α-Pinene |
| 9664 | Humulene |
| 9665 | β-Caryophyllene |
| 9667 | α-Bisabolol |
| 9669 | β-Pinene |
| | **Hemp: Moisture Content (No Statistical Analysis Conducted)** |
| 9691 | Moisture Content |

## About the Hemp Interlaboratory Program

This interlaboratory testing program is administered and operated by Collaborative Testing Services, Inc. (CTS). The purpose of the program was to evaluate laboratory performance and assess the performance of the industry. Participants can expect to receive results that are clear, concise, and easy to understand and act upon. This program allows laboratories to compare periodically the level and uniformity of their testing with that of other laboratories in the Hemp industry.

A two-sample set of ground hemp plant material of differing THC concentration were provided to the participants. Sample materials used in this program adhere to the legal requirement of having THC concentration of 0.3% or below. In each report, there is a summary of the statistics for the analysis and a graphical representation of the data for each test. Also shown are notes concerning specific laboratory results, as well as significant findings related to other testing variation. Please refer to the section *Key for Web Summary Report* for an explanation of terms and guidelines to interpreting the results.

## About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of sectors: including ALP, rubber, plastics, fasteners and metals, containerboard, paper, wine and color, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 100 countries, currently participate in the CTS programs.

For further information concerning this report contact:

**Collaborative Testing Services, Inc.**
**21331 Gentry Drive**
**Sterling, Virginia 20166 USA**

**+1-571-434-1925**
**hemp@cts-interlab.com**

**Office Hours: 8:00 a.m. - 4:30 p.m. ET**

# Key for Web Summary Report (Page 1 of 2)

**WebCode** — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Hemp Web Summary Report published on the CTS web site. The WebCode for each analysis can be found in the Performance Analysis Report mailed to each participant.

**Lab Mean** — The average of the test results obtained by the participant.

**Grand Mean** — The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

**Difference from Grand Mean** — The difference of the LAB MEAN from the GRAND MEAN.

**Between-Lab Standard Deviation** — An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

**Comparative Performance Value** — An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

**Data Flag** — DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

| DATA FLAG | STATISTICALLY INCLUDED/EXCLUDED | ACTION REQUIRED |
|---|---|---|
| * | INCLUDED | **CAUTION** - Review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn. |
| X | EXCLUDED | **STOP** - Immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded. |
| M | EXCLUDED | **PROCEED** - Lab was unable to report data for one sample. |

**Graph** - For each laboratory, the LAB MEAN for the first sample (x-axis) is plotted against the LAB MEAN for the second sample (y-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the GRAND MEANS for each sample. When 20 or more laboratories are in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained above.

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**Common Problems Highlighted in Footnotes**

1. ***Extreme data*** - The laboratory's results for one or both samples are so inconsistent with those of the other participants that the lab mean(s) fall outside the plot. The participant is advised to immediately review his data and/or testing procedure.

2. ***Systematic bias*** - The laboratory's results are either consistently high or low for both samples when compared to the other participants (the plotted point falls near the top or bottom of the ellipse). This indicates that the participant is performing the test with a constant bias. Causes of systematic errors include improper calibration, the particular make/model of equipment or a modification to the testing procedure.

3. ***Inconsistency in testing between samples/sample sets*** - The laboratory's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the CPVs for the two samples, such as a +1.5 CPV for sample A and a -2.2 CPV for sample B. CTS also will specify if the laboratory's data for one sample are high/low compared to the other participants. If this inconsistency is slight, the lab's plotted point will be an * that falls on the edge of the ellipse.

4. ***Inconsistency in testing within a sample*** - The laboratory's within-lab standard deviation for a specified sample is high when compared to the other participants, often causing the lab's plotted point to fall outside of the ellipse.

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Labs flagged with an * are not typically included in the footnotes of a data table. These labs may locate their position in the control ellipse and use the definitions above to help identify the type of testing error. An * should serve as a caution flag, a "yellow light", to a lab. If this error is repeated in future rounds, a lab may need to stop and review its testing procedures. The initial data flag is not cause for alarm. Interlaboratory tests conducted at regular intervals permit a lab to recognize trends in testing.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 0.2200 | 0.0683 | 1.48 | 0.3400 | 0.0777 | 1.25 |
| 9HMAKL | | 0.1400 | -0.0117 | -0.25 | 0.1950 | -0.0673 | -1.08 |
| NC82E2 | | 0.1268 | -0.0249 | -0.54 | 0.2341 | -0.0282 | -0.45 |
| ZRL43R | | 0.1200 | -0.0317 | -0.68 | 0.2800 | 0.0177 | 0.28 |

**Summary Statistics**

| | CB03 | CB04 |
|---|---|---|
| **Grand Means** | 0.1517 Percent (%) | 0.2623 Percent (%) |
| **Stnd Dev Btwn Labs** | 0.0463 Percent (%) | 0.0624 Percent (%) |

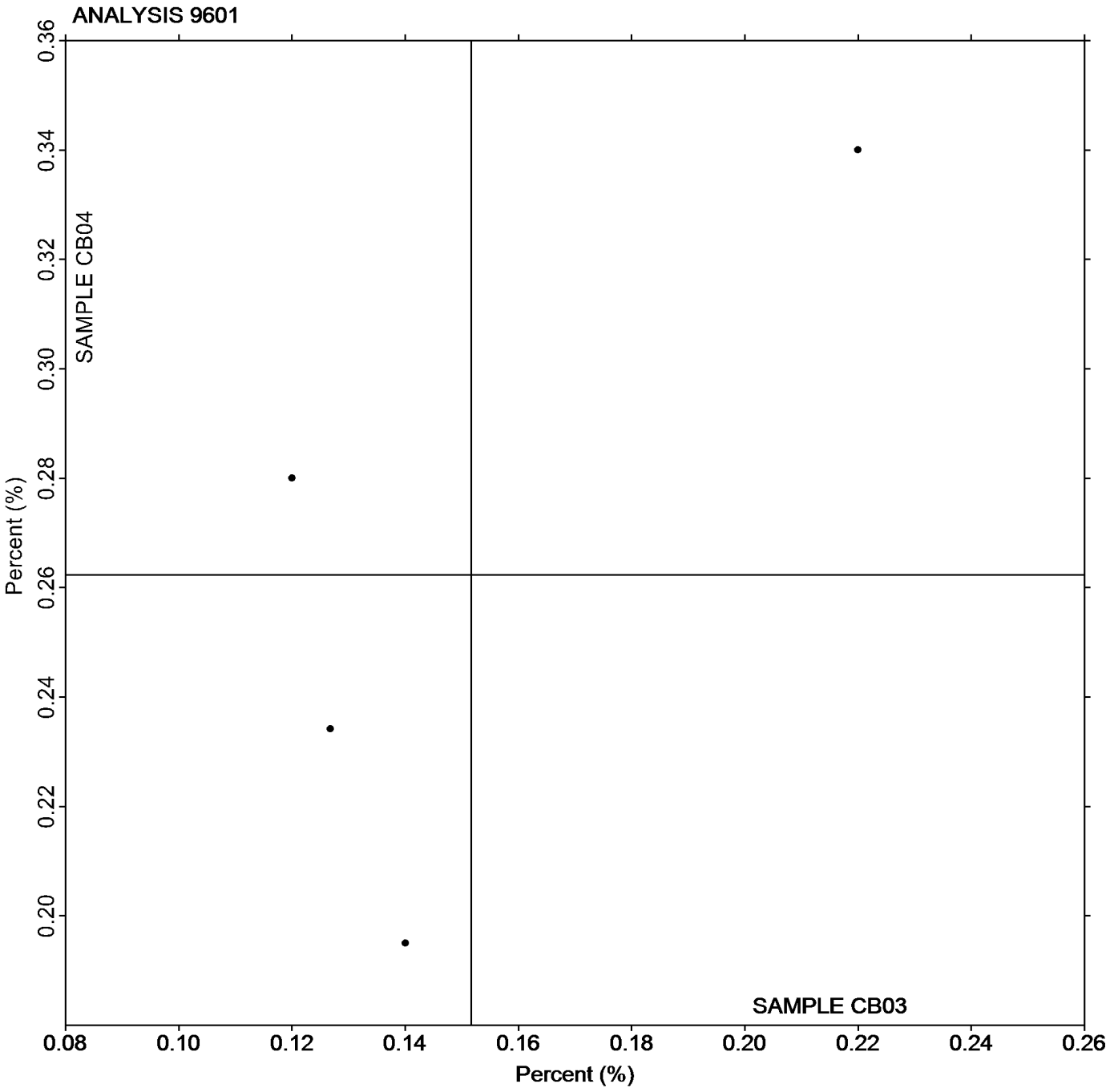
**Statistics based on 4 of 4 reporting participants**

**Hemp tested:** CB03: Cherrywine CB04: Culver Cherry

## Reporting Limit

No labs reported data indicating the Detection or Quantification limit

**Grand Mean Sample CB03: 0.15 Percent (%)** **Grand Mean Sample CB04: 0.26 Percent (%)**




If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | Numeric data not provided, see Reporting Limit section | | | 0.1067 | | |
| NC82E2 | | 0.0247 | | | 0.0479 | | |

## Reporting Limit

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 36.67 | | | 46.47 | | |
| NC82E2 | | 35.53 | | | 38.39 | | |

**Reporting Limit**

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 24.97 | | | 46.00 | | |
| NC82E2 | | 33.02 | | | 39.63 | | |

**Reporting Limit**

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 0.2200 | 0.0511 | 1.15 | 0.4300 | 0.1050 | 1.15 |
| DUJ9YK | | 0.1383 | -0.0306 | -0.69 | 0.2689 | -0.0561 | -0.62 |
| NC82E2 | | 0.1484 | -0.0205 | -0.46 | 0.2762 | -0.0489 | -0.54 |

**Summary Statistics**

| | Sample CB03 | Sample CB04 |
|---|---|---|
| **Grand Means** | 0.1689 Percent (%) | 0.3250 Percent (%) |
| **Stnd Dev Btwn Labs** | 0.0445 Percent (%) | 0.0910 Percent (%) |

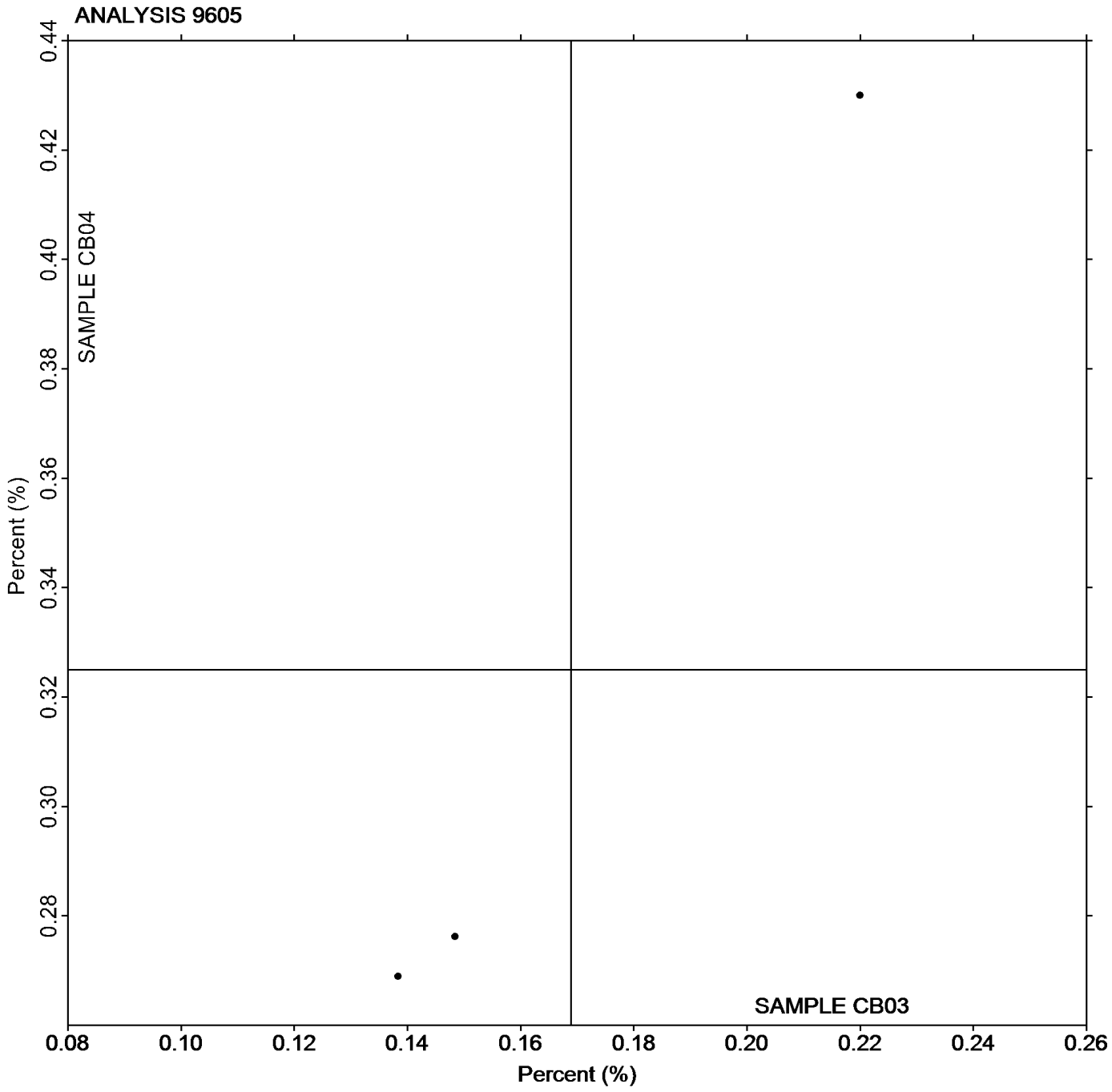
**Statistics based on 3 of 3 reporting participants**

**Hemp tested:** CB03: Cherrywine CB04: Culver Cherry

## Reporting Limit

No labs reported data indicating the Detection or Quantification limit

**Grand Mean Sample CB03: 0.17 Percent (%)** **Grand Mean Sample CB04: 0.33 Percent (%)**




If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 58.60 | -0.84 | -0.18 | 86.77 | 13.49 | 1.00 |
| DUJ9YK | | 55.21 | -4.22 | -0.90 | 59.92 | -13.36 | -1.00 |
| NC82E2 | | 64.49 | 5.06 | 1.08 | 73.15 | -0.13 | -0.01 |

**Summary Statistics**

| | Sample CB03 | Sample CB04 |
|---|---|---|
| **Grand Means** | 59.44 mg/g | 73.28 mg/g |
| **Stnd Dev Btwn Labs** | 4.70 mg/g | 13.42 mg/g |

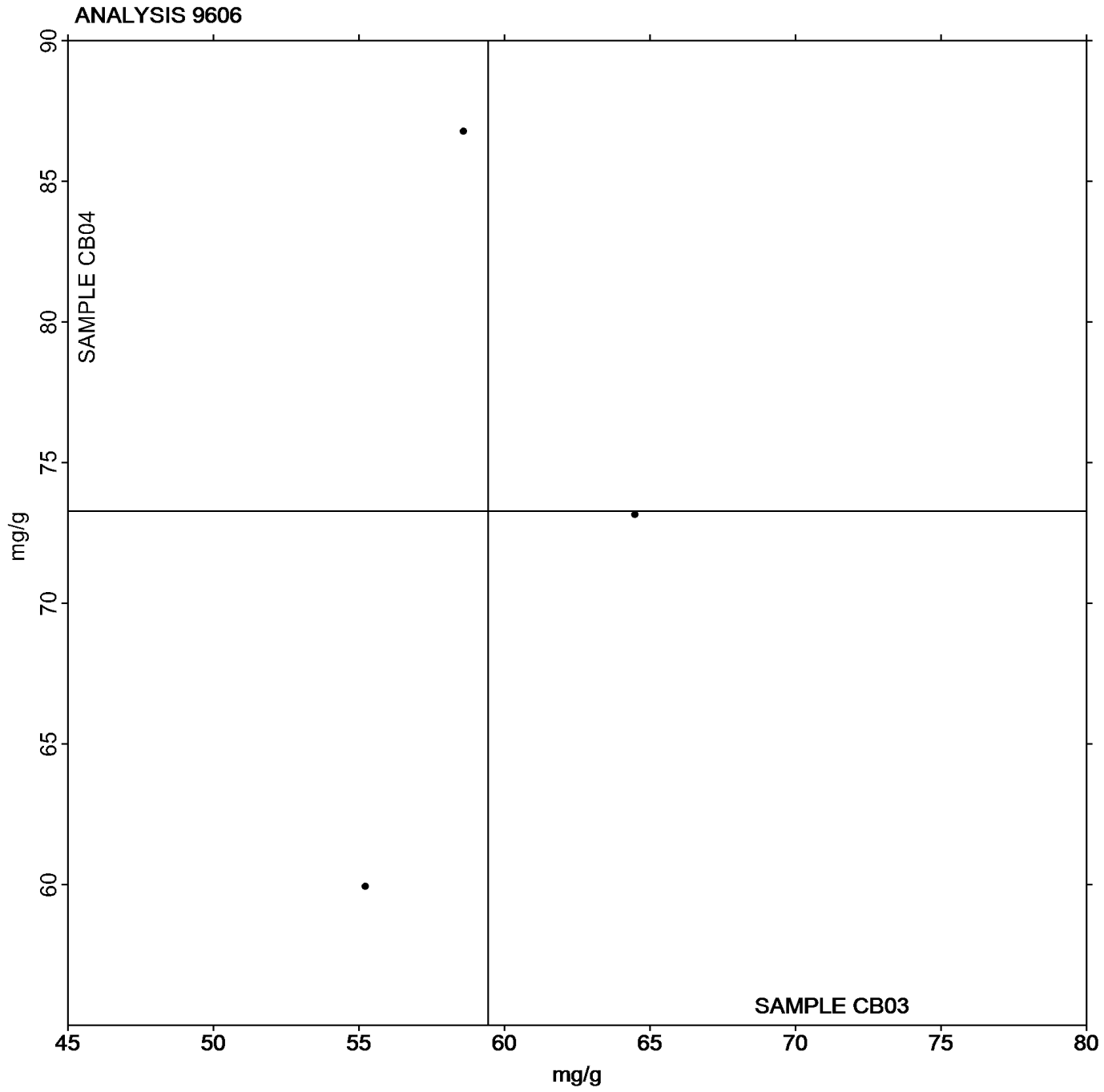
**Statistics based on 3 of 3 reporting participants**

**Hemp tested:** CB03: Cherrywine CB04: Culver Cherry

## Reporting Limit

No labs reported data indicating the Detection or Quantification limit

**Grand Mean Sample CB03: 59.44 mg/g  Grand Mean Sample CB04: 73.28 mg/g**




If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

| WebCode | Data Flag | Sample CB03 Lab Mean | Sample CB03 Diff from Grand Mean | Sample CB03 CPV | Sample CB04 Lab Mean | Sample CB04 Diff from Grand Mean | Sample CB04 CPV |
|---|---|---|---|---|---|---|---|
| 6696KU | | 0.2933 | | | 0.2900 | | |
| NC82E2 | | 0.2061 | | | 0.2102 | | |

## Reporting Limit

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample HM03 Lab Mean | Sample HM03 Diff from Grand Mean | Sample HM03 CPV | Sample HM04 Lab Mean | Sample HM04 Diff from Grand Mean | Sample HM04 CPV |
|---|---|---|---|---|---|---|---|
| JC6LE8 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |
| NC82E2 | | 0.0313 | | | 0.2057 | | |

**Reporting Limit**

| | |
|---|---|
| JC6LE8 | < 0.020 |
| NC82E2 | 0.01 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample HM03 Lab Mean | Sample HM03 Diff from Grand Mean | Sample HM03 CPV | Sample HM04 Lab Mean | Sample HM04 Diff from Grand Mean | Sample HM04 CPV |
|---|---|---|---|---|---|---|---|
| JC6LE8 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |
| NC82E2 | | 0.0683 | | | 0.0510 | | |

**Reporting Limit**

| | |
|---|---|
| JC6LE8 | < 0.003 |
| NC82E2 | 0.01 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample HM03 Lab Mean | Sample HM03 Diff from Grand Mean | Sample HM03 CPV | Sample HM04 Lab Mean | Sample HM04 Diff from Grand Mean | Sample HM04 CPV |
|---|---|---|---|---|---|---|---|
| JC6LE8 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |
| NC82E2 | | 0.2717 | | | 0.1680 | | |

**Reporting Limit**

| | |
|---|---|
| JC6LE8 | < 0.030 |
| NC82E2 | 0.01 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample HM03 Lab Mean | Sample HM03 Diff from Grand Mean | Sample HM03 CPV | Sample HM04 Lab Mean | Sample HM04 Diff from Grand Mean | Sample HM04 CPV |
|---|---|---|---|---|---|---|---|
| NC82E2 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |

**Reporting Limit**

| | |
|---|---|
| NC82E2 | < 0.05 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | Numeric data not provided, see Reporting Limit section | | | 0.0905 | | |

**Reporting Limit**

| | |
|---|---|
| H7YPV8 | TP03: < 50 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |

**Reporting Limit**

| | |
|---|---|
| H7YPV8 | < 50 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | Numeric data not provided, see Reporting Limit section | | | 0.1080 | | |

**Reporting Limit**

| | |
|---|---|
| H7YPV8 | TP03: < 50 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | 0.2875 | | | 0.6085 | | |

**Reporting Limit**

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | 0.5495 | | | 1.285 | | |

**Reporting Limit**

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | 0.8240 | | | 0.9865 | | |

**Reporting Limit**

No labs reported data indicating the Detection or Quantification limit

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

| WebCode | Data Flag | Sample TP03 Lab Mean | Sample TP03 Diff from Grand Mean | Sample TP03 CPV | Sample TP04 Lab Mean | Sample TP04 Diff from Grand Mean | Sample TP04 CPV |
|---|---|---|---|---|---|---|---|
| H7YPV8 | | Numeric data not provided, see Reporting Limit section | | | Numeric data not provided, see Reporting Limit section | | |

**Reporting Limit**

| | |
|---|---|
| H7YPV8 | < 50 |

Please note: Statistical Analysis has not been provided due to the low population of participants reporting numeric data.

No graph is available due to the low population of participants reporting numeric data.

-End of Report-