Collaborative Testing Services, Inc.

Hemp Industry Interlaboratory Program

Summary Report #1-Summer 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
9666	Caryophyllene Oxide
9667	α-Bisabolol
	Hemp: Moisture Content
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 below 0.3%. 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:

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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.

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.

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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		0.1272	-0.0460	-1.39	0.1132	-0.0204	-1.24
DH3DL2		0.1616	-0.0115	-0.35	0.1250	-0.0086	-0.52
J9FHZC		0.2100	0.0368	1.12	0.1450	0.0113	0.69
NFJV8H		0.1670	-0.0062	-0.19	0.1300	-0.0037	-0.22
TL92U8		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
XX8NMY		0.2000	0.0268	0.81	0.1550	0.0213	1.29

Summary Statistics

	Sample CB01	Sample CB02
Grand Means	0.1732 Percent (%)	0.1337 Percent (%)
Stnd Dev Btwn Labs	0.0330 Percent (%)	0.0165 Percent (%)

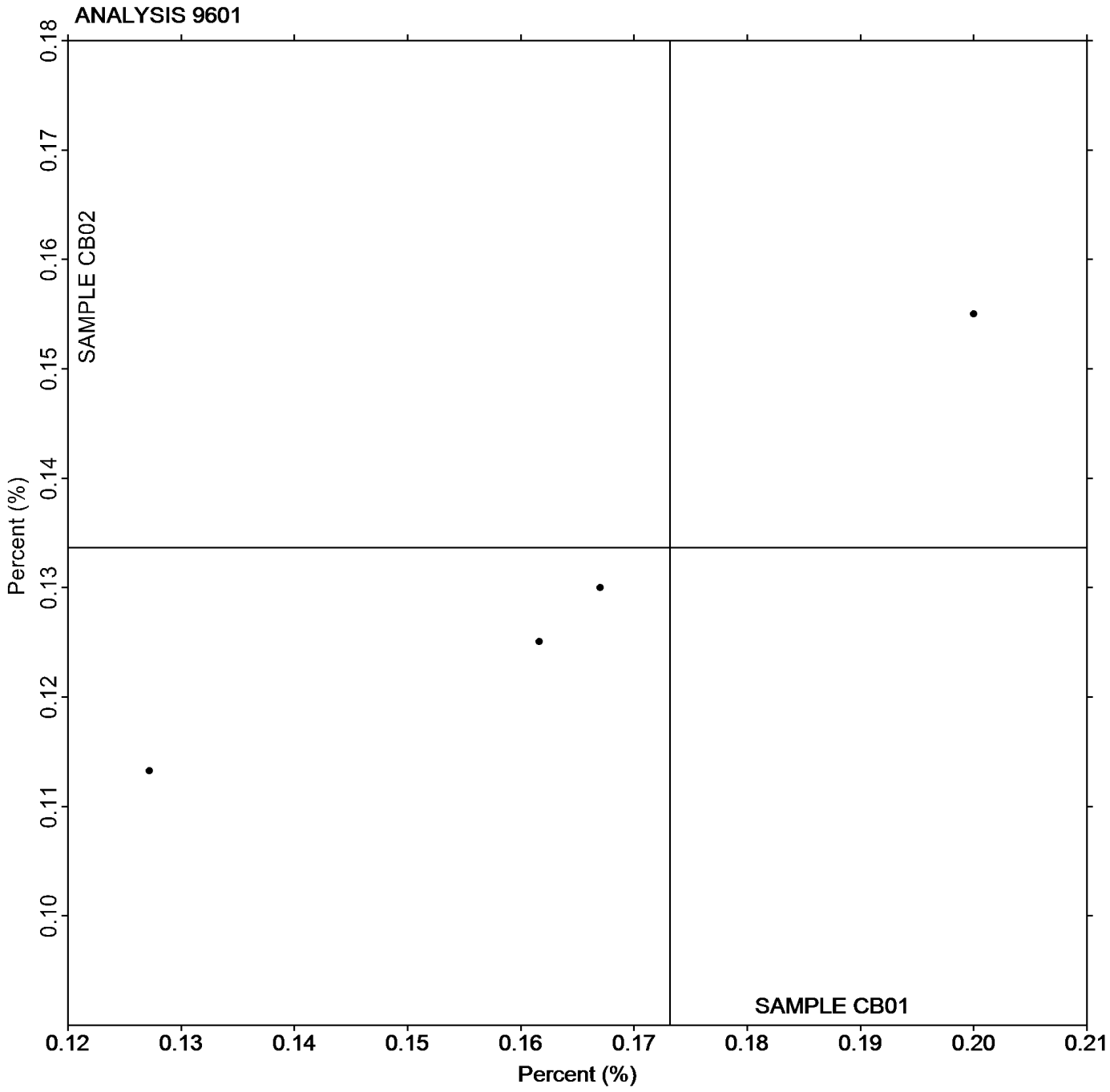
Statistics based on 5 of 7 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

3LC493	<0.01% Below Reporting limit
TL92U8	Indicative of hemp

Grand Mean Sample CB01: 0.17 Percent (%) **Grand Mean Sample CB02: 0.13 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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
DH3DL2		0.0731			0.0336		
NFJV8H		0.0603			0.0251		

Reporting Limit

3LC493	<0.01% Below Reporting limit
CQDF73	<LOQ

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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		26.40	-5.11	-1.49	27.57	-2.50	-1.07
CQDF73		33.03	1.52	0.44	30.72	0.66	0.28
DH3DL2		32.79	1.29	0.37	28.98	-1.09	-0.46
NFJV8H		33.80	2.30	0.67	33.00	2.93	1.25
TL92U8		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		

Summary Statistics

	CB01	CB02
Grand Means	31.50 mg/g	30.07 mg/g
Stnd Dev Btwn Labs	3.43 mg/g	2.34 mg/g

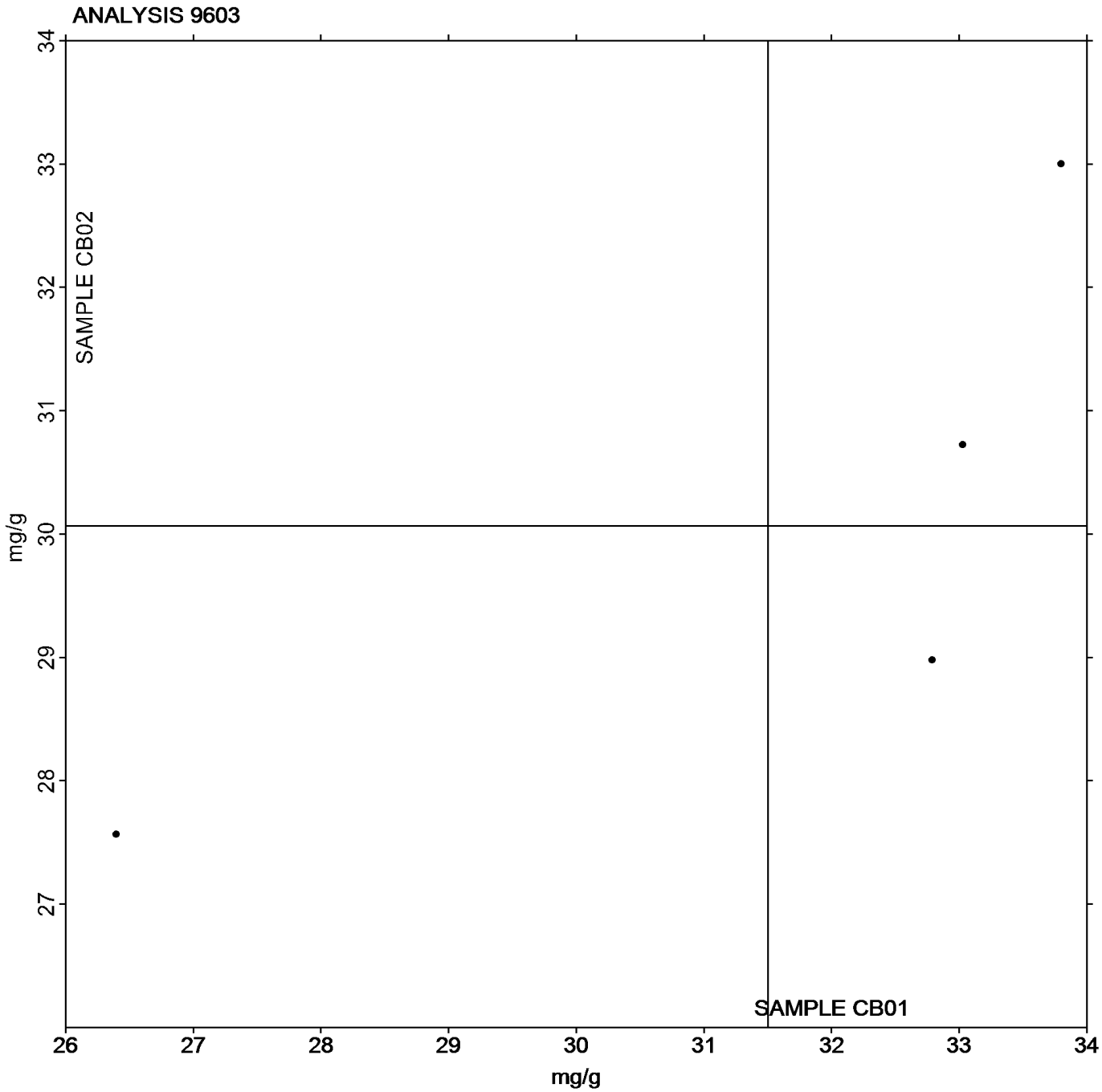
Statistics based on 4 of 5 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

TL92U8	Indicative of hemp

Grand Mean Sample CB01: 31.50 mg/g Grand Mean Sample CB02: 30.07 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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		43.68	-3.06	-0.98	32.11	0.98	1.06
CQDF73		50.84	4.09	1.31	31.71	0.59	0.64
DH3DL2		47.36	0.61	0.20	30.24	-0.89	-0.96
NFJV8H		45.10	-1.64	-0.53	30.43	-0.69	-0.74

Summary Statistics

	Sample CB01	Sample CB02
Grand Means	46.74 mg/g	31.12 mg/g
Stnd Dev Btwn Labs	3.12 mg/g	0.93 mg/g

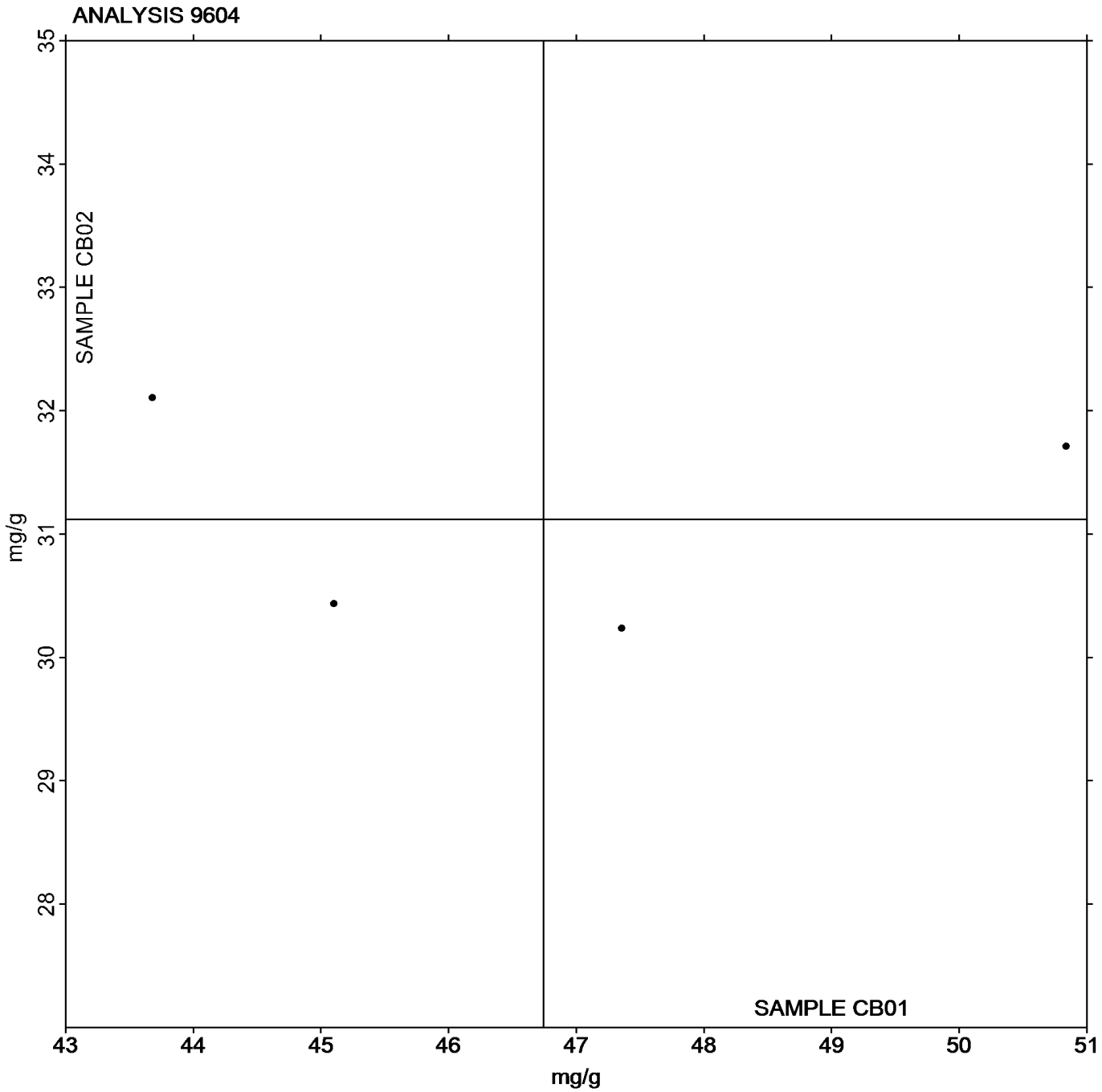
Statistics based on 4 of 4 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

No labs reported data indicating the Detection or Quantification limit

Grand Mean Sample CB01: 46.74 mg/g Grand Mean Sample CB02: 31.12 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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
BYE3YL		0.2000	0.0078	0.20	Numeric data not provided, see Reporting Limit section		
CQDF73		0.1272	-0.0650	-1.65	0.1132	-0.0141	-0.58
DH3DL2		0.2258	0.0336	0.85	0.1545	0.0272	1.11
DQX78K		0.2000	0.0078	0.20	0.1000	-0.0274	-1.12
FAYBAZ		0.1880	-0.0042	-0.11	0.1170	-0.0104	-0.42
NFJV8H		0.2200	0.0278	0.71	0.1520	0.0246	1.01

Summary Statistics

	CB01	CB02
Grand Means	0.1922 Percent (%)	0.1274 Percent (%)
Stnd Dev Btwn Labs	0.0394 Percent (%)	0.0245 Percent (%)

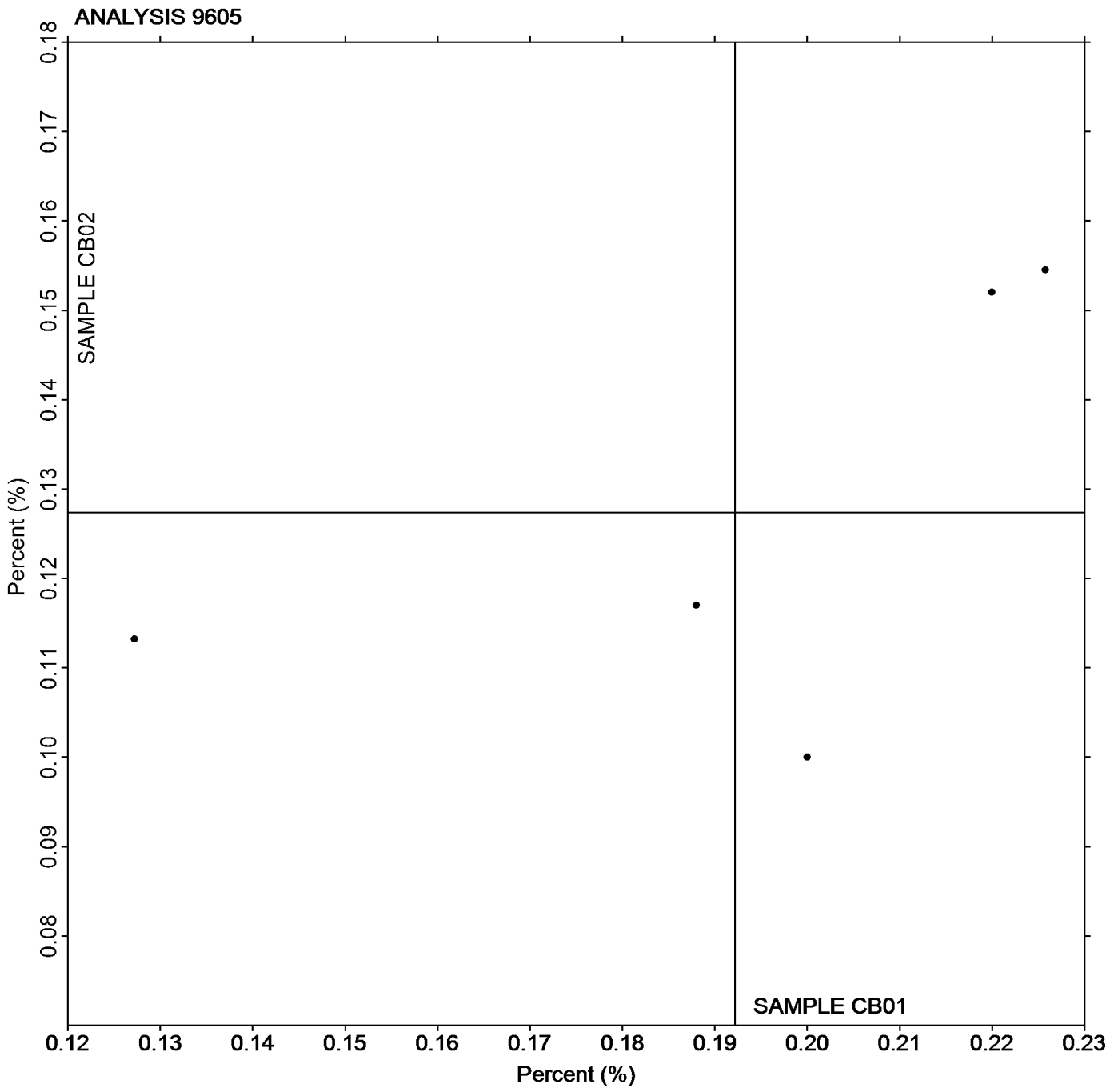
Statistics based on 5 of 7 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

3LC493	<0.01% Below Reporting limit
BYE3YL	CB02: Below LLOQ

Grand Mean Sample CB01: 0.19 Percent (%) **Grand Mean Sample CB02: 0.13 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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		64.71	-4.25	-0.46	55.72	0.44	0.09
CQDF73		77.61	8.65	0.94	58.53	3.25	0.65
DH3DL2		74.32	5.36	0.58	55.49	0.21	0.04
FAYBAZ		54.79	-14.17	-1.53	46.98	-8.30	-1.67
NFJV8H		73.37	4.41	0.48	59.70	4.41	0.89

Summary Statistics

	CB01	CB02
Grand Means	68.96 mg/g	55.29 mg/g
Stnd Dev Btwn Labs	9.24 mg/g	4.98 mg/g

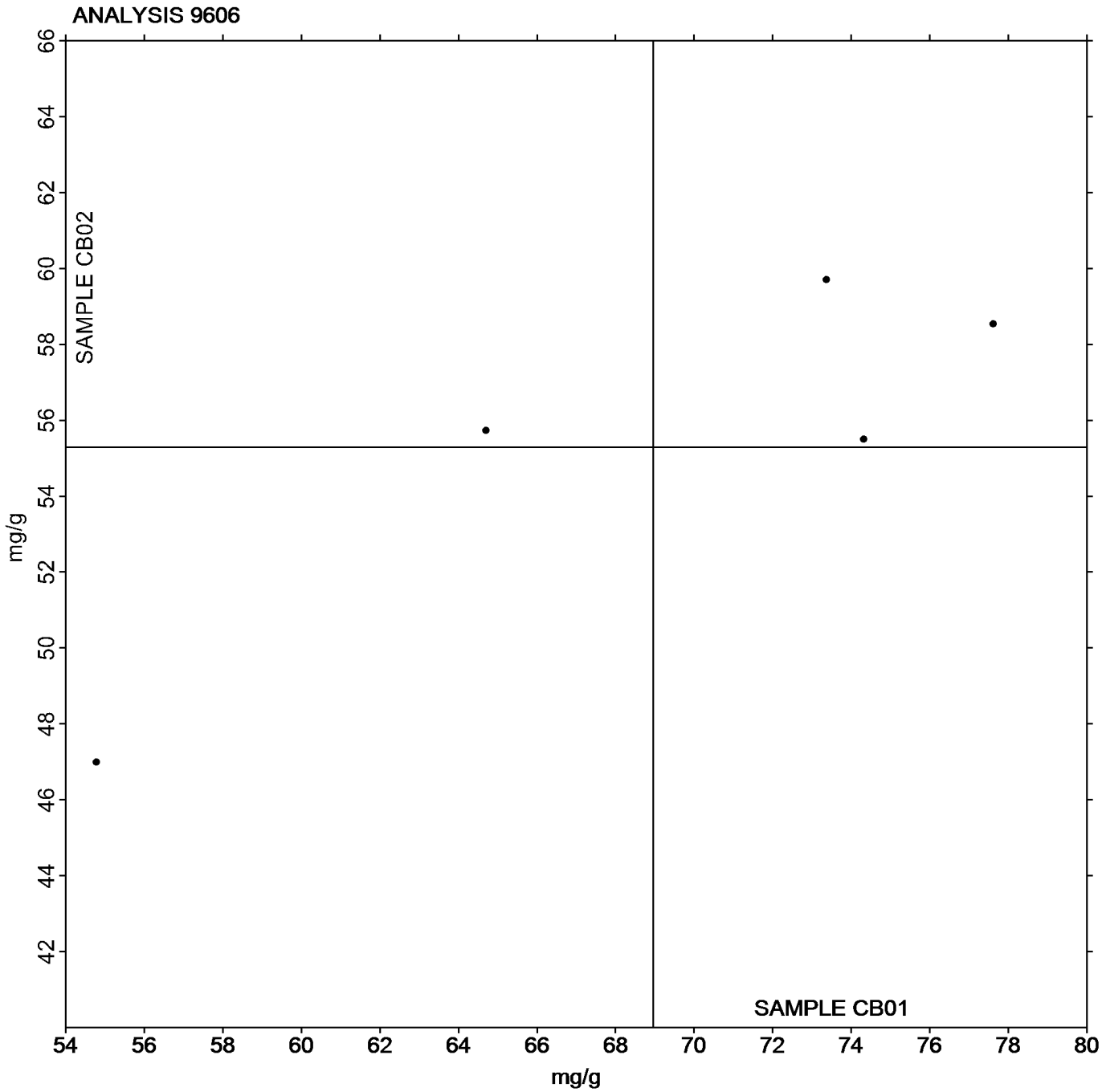
Statistics based on 5 of 5 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

No labs reported data indicating the Detection or Quantification limit

Grand Mean Sample CB01: 68.96 mg/g Grand Mean Sample CB02: 55.29 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 CB01 Lab Mean	Sample CB01 Diff from Grand Mean	Sample CB01 CPV	Sample CB02 Lab Mean	Sample CB02 Diff from Grand Mean	Sample CB02 CPV
3LC493		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		0.1724	-0.0470	-1.15	0.1628	-0.0178	-1.11
DH3DL2		0.2431	0.0237	0.58	0.1851	0.0045	0.28
NFJV8H		0.2427	0.0233	0.57	0.1940	0.0133	0.83

Summary Statistics

	CB01	CB02
Grand Means	0.2194 Percent (%)	0.1807 Percent (%)
Stnd Dev Btwn Labs	0.0407 Percent (%)	0.0161 Percent (%)

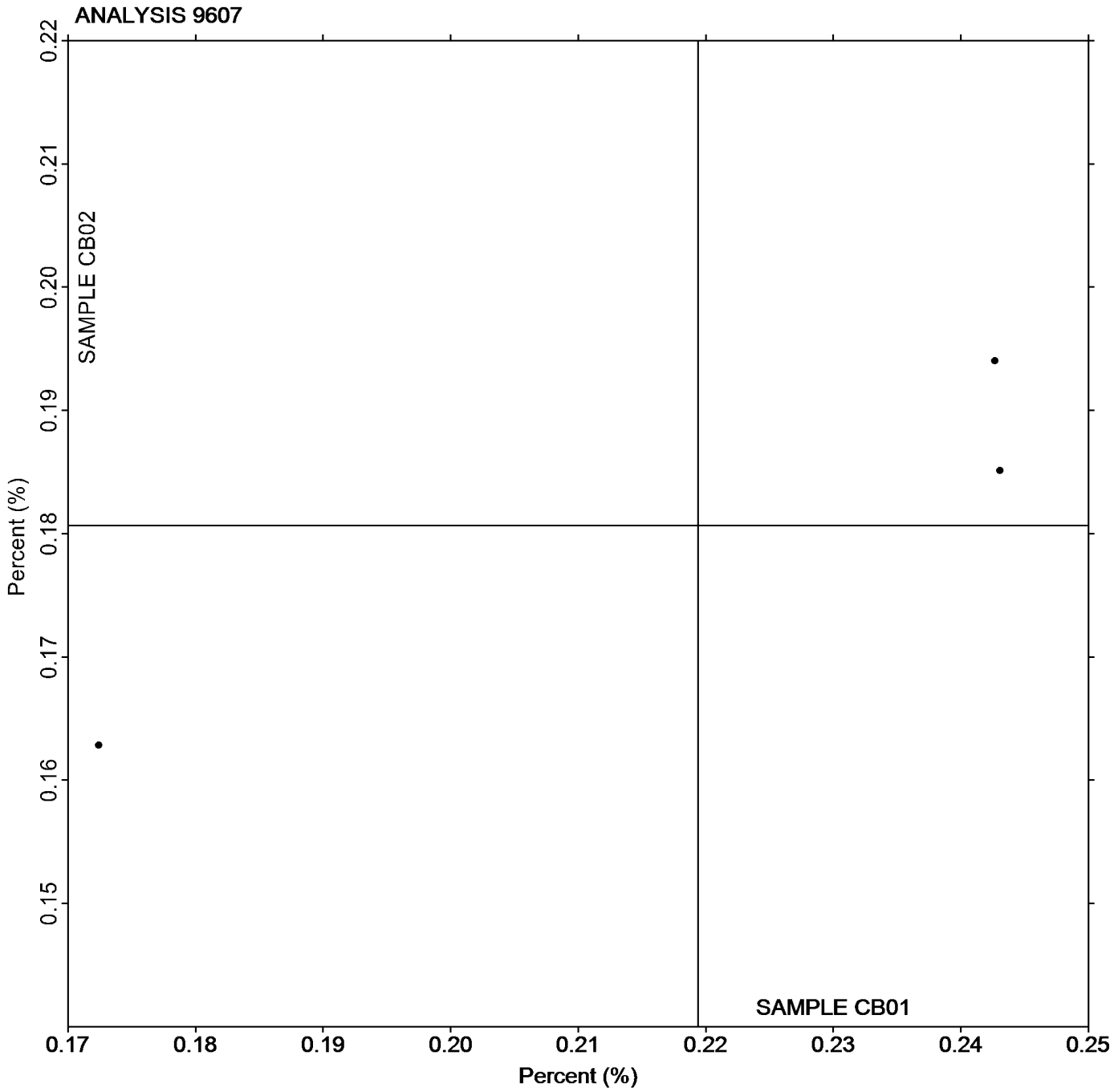
Statistics based on 3 of 4 reporting participants

Hemp tested: CB01: Cherrywine CB02: The Grand

Reporting Limit

3LC493	<0.01% Below Reporting limit

Grand Mean Sample CB01: 0.22 Percent (%) **Grand Mean Sample CB02: 0.18 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 HM01 Lab Mean	Sample HM01 Diff from Grand Mean	Sample HM01 CPV	Sample HM02 Lab Mean	Sample HM02 Diff from Grand Mean	Sample HM02 CPV
3LC493		0.1067	-0.0277	-1.02	0.0333	-0.0445	-1.14
BCHQNV		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		0.1610	0.0267	0.98	0.1057	0.0278	0.71
DH3DL2		0.1353	0.0010	0.04	0.0946	0.0167	0.43

Summary Statistics

	HM01	HM02
Grand Means	0.1343 µg/g	0.0779 µg/g
Stnd Dev Btwn Labs	0.0272 µg/g	0.0390 µg/g

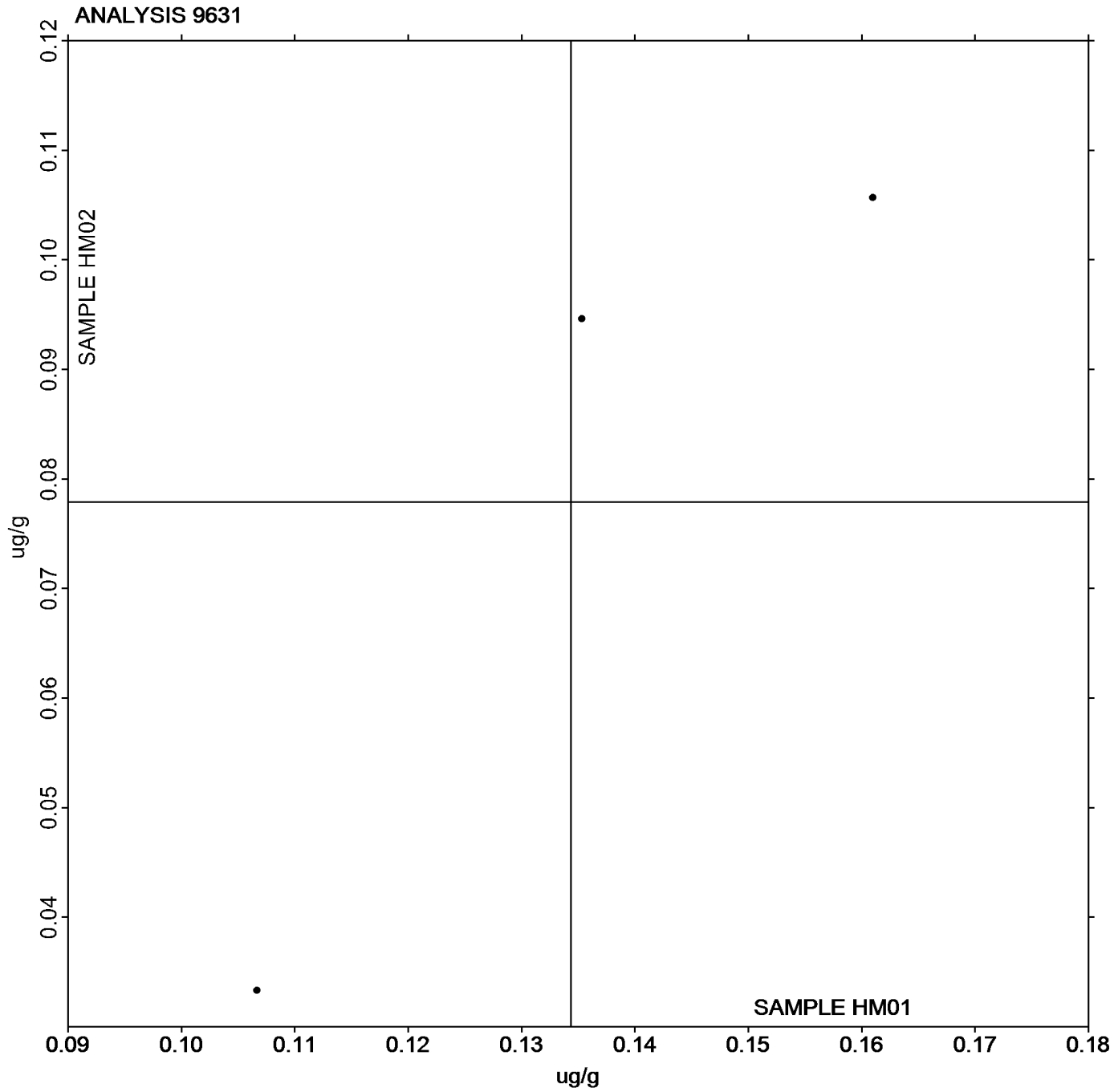
Statistics based on 3 of 4 reporting participants

Hemp tested: HM01: Cherrywine HM02: The Grand

Reporting Limit

BCHQNV 0.020 [All data reported as <0.020]

Grand Mean Sample HM01: 0.13 µg/g Grand Mean Sample HM02: 0.08 µg/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 HM01 Lab Mean	Sample HM01 Diff from Grand Mean	Sample HM01 CPV	Sample HM02 Lab Mean	Sample HM02 Diff from Grand Mean	Sample HM02 CPV
3LC493		0.2267	-0.0967	-0.37	0.0700	-0.1343	-0.52
BCHQNV		0.6157	0.2923	1.13	0.5023	0.2980	1.15
CQDF73		0.1803	-0.1430	-0.55	Numeric data not provided, see Reporting Limit section		
DH3DL2		0.1278	-0.1956	-0.76	0.0407	-0.1637	-0.63

Summary Statistics

	Sample HM01	Sample HM02
Grand Means	0.3234 µg/g	0.2043 µg/g
Stnd Dev Btwn Labs	0.2579 µg/g	0.2585 µg/g

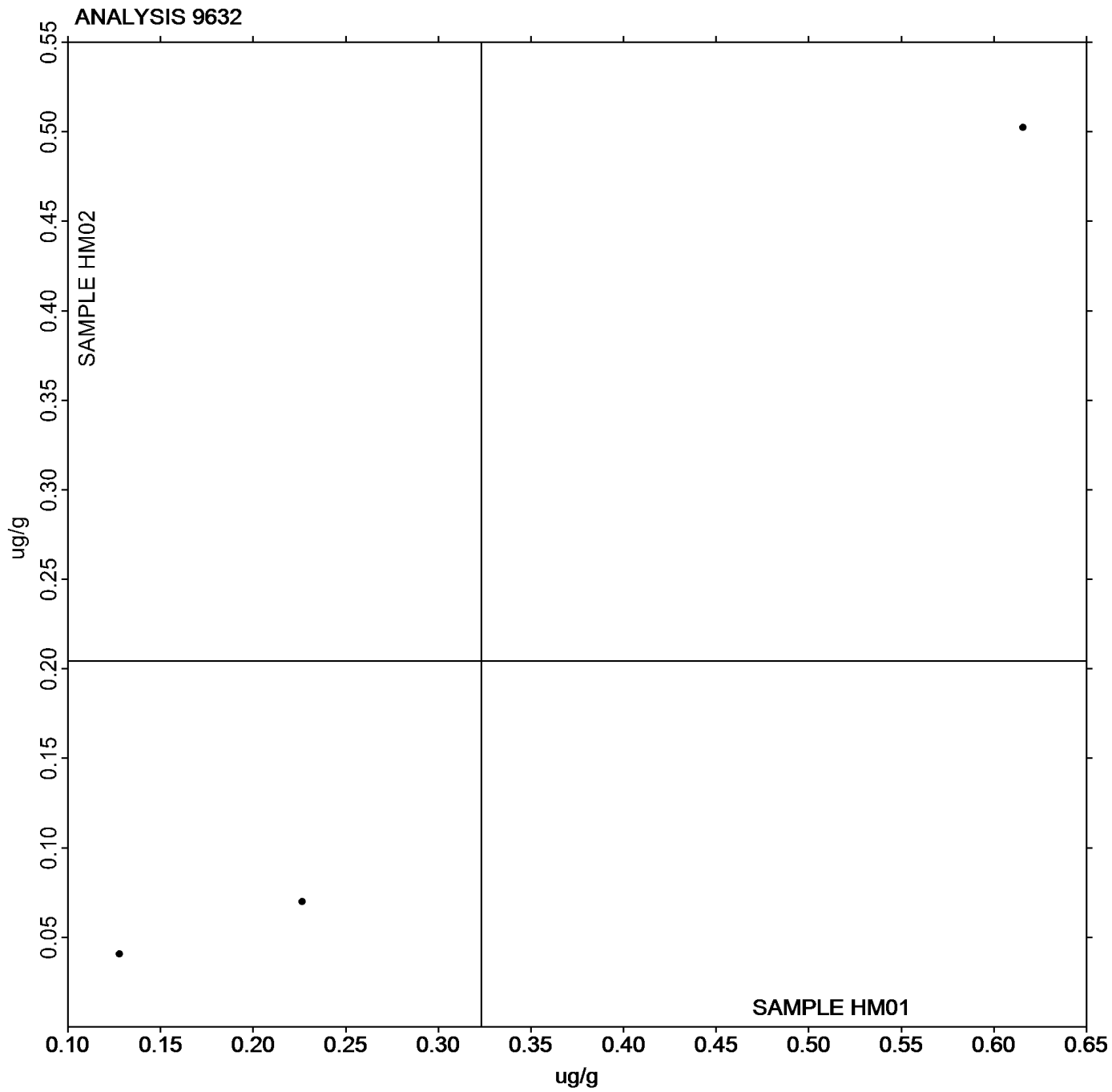
Statistics based on 3 of 4 reporting participants

Hemp tested: HM01: Cherrywine HM02: The Grand

Reporting Limit

CQDF73 HM02: <LOQ

Grand Mean Sample HM01: 0.32 µg/g Grand Mean Sample HM02: 0.20 µg/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 HM01 Lab Mean	Sample HM01 Diff from Grand Mean	Sample HM01 CPV	Sample HM02 Lab Mean	Sample HM02 Diff from Grand Mean	Sample HM02 CPV
3LC493		0.7000	-0.0267	-0.57	0.2303	-0.0379	-0.88
BCHQNV		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		0.7803	0.0537	1.15	0.3153	0.0471	1.09
DH3DL2		0.6997	-0.0270	-0.58	0.2590	-0.0092	-0.21

Summary Statistics

	Sample HM01	Sample HM02
Grand Means	0.7267 µg/g	0.2682 µg/g
Stnd Dev Btwn Labs	0.0465 µg/g	0.0432 µg/g

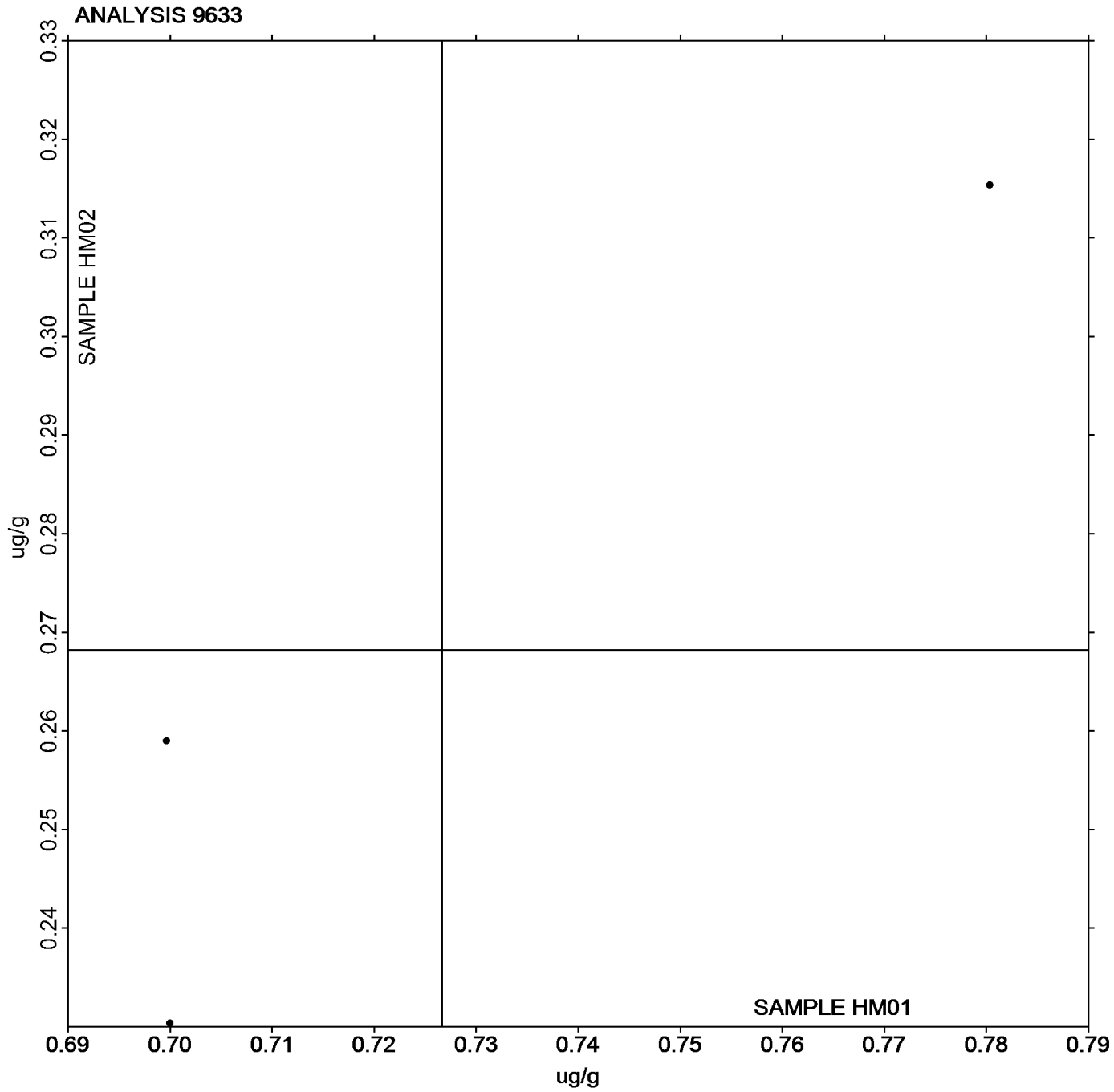
Statistics based on 3 of 4 reporting participants

Hemp tested: HM01: Cherrywine HM02: The Grand

Reporting Limit

BCHQNV 0.030 [All data reported as <0.030]

Grand Mean Sample HM01: 0.73 µg/g Grand Mean Sample HM02: 0.27 µg/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 HM01 Lab Mean	Sample HM01 Diff from Grand Mean	Sample HM01 CPV	Sample HM02 Lab Mean	Sample HM02 Diff from Grand Mean	Sample HM02 CPV
3LC493		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
DH3DL2		0.0197			0.0246		

Reporting Limit

3LC493	0.05 mg/kg
CQDF73	<LOQ

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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
XEFHF9		0.0740			Numeric data not provided, see Reporting Limit section		

Reporting Limit

CQDF73	<LOQ
XEFHF9	TP02: LOQ<.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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
XEFHF9		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		

Reporting Limit

CQDF73	<LOQ
XEFHF9	LOQ <.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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
XEFHF9		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		

Reporting Limit

CQDF73	<LOQ
XEFHF9	LOQ<.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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		Numeric data not provided, see Reporting Limit section			Numeric data not provided, see Reporting Limit section		
XEFHF9		0.3300			0.1800		

Reporting Limit

CQDF73	<LOQ

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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		0.5097			0.2617		
XEFHF9		0.6900			0.3500		

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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
XEFHF9		0.6600			0.3700		

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 TP01 Lab Mean	Sample TP01 Diff from Grand Mean	Sample TP01 CPV	Sample TP02 Lab Mean	Sample TP02 Diff from Grand Mean	Sample TP02 CPV
CQDF73		0.4467			0.4143		
XEFHF9		0.6700			0.5600		

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 MC01 Lab Mean	Sample MC01 Diff from Grand Mean	Sample MC01 CPV	Sample MC02 Lab Mean	Sample MC02 Diff from Grand Mean	Sample MC02 CPV
CQDF73		7.1567			6.1467		
DH3DL2		9.8200			9.3033		

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.

-End of Report-