



## **Quantitative Drug Analysis - Cocaine HCl**

### **Test No. 22-5061 Summary Report**

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Each sample set consisted of two items with different concentrations of cocaine HCl. Participants were asked to determine the concentration of cocaine HCl in each item. Data were returned from 69 participants and are compiled into the following tables:

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This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

## Manufacturer's Information

Each sample pack consisted of two items containing different concentrations of cocaine HCl and phenacetin. Participants were requested to analyze each item and report the quantitative determination of cocaine HCl present in the samples.

### SAMPLE PREPARATION -

The appropriate amounts of cocaine HCl and phenacetin for each Item were thoroughly mixed to ensure homogeneity.

ITEMS 1 and 2 (PREPARATION): For each Item, approximately 350 mg of the powder was weighed out and deposited into a glassine bag, which was folded and secured with a label. The folded glassine bag was placed into a small zip top bag and heat sealed closed. The heat sealed bag was then placed into a pre-labeled envelope.

SAMPLE PACK ASSEMBLY: One of each of the Item 1 and Item 2 envelopes was placed into a larger pre-labeled sample pack envelope.

VERIFICATION: Laboratories that conducted predistribution analysis of the samples reported consistent results that were comparable to the preparation concentrations of cocaine HCl. The following methods were used to examine the items: H-NMR, and GC/FID.

<u>Item</u>	<u>Preparation Cocaine HCl</u>
1	72
2	52

## **Summary Comments**

This test was designed to allow participants to assess their proficiency in the determination of cocaine HCl concentrations. Each participant was supplied with a sample set consisting of two items containing Phenacetin and different concentrations of cocaine HCl. Participants were requested to determine the cocaine HCl concentration for both items (Refer to the Manufacturer's Information for preparation details).

The results are separated into two tables: reported results and raw analytical data. The table of reported results shows the concentration that each participant would report according to their normal reporting procedures (e.g. mean, lowest result, truncated results). The table of raw data shows the results from each determination made by the laboratory to produce their reported results. The majority of participants reported using the mean of duplicate/several determinations as their reporting procedure.

The raw data was used to calculate the grand mean and the standard deviation (STD) for each item. For Item 1, four participants reported extreme data ( $\pm 3$  STD from the grand mean). These same four participants reported extreme data for Item 2. The calculated grand mean of Item 1 was 70.60% with a standard deviation of 3.720, and the grand mean of Item 2 was 51.26% with a standard deviation of 3.243.

As a supplemental examination of the raw data, Bivariate Control Analysis was also performed to analyze the measurements of both samples simultaneously. In this analysis, a comparative performance value (CPV) is provided for each participant, which is a unitless ratio indicating the number of standard deviations a participant's results are from the Grand Mean. The closer a participant's CPV is to zero, the more consistent their results are with the other participants' data. For the graphical portion, an ellipse was drawn so that 95% of the time a randomly selected participant was inside of it. Three participants, whose results fell outside of the 95% ellipse, but within the 99% control limit, were marked with an "\*" and were included in the calculations. Eight participants, whose results fell outside of the 99% control limit, were marked with an "X" and also excluded from the calculations. For more information regarding Bivariate Control Analysis, please see the supplemental section at the end of this report.

Participants used a variety of methods to examine the samples. The most common method of analysis utilized was GC/FID, followed by LC.

# Reported Results

What is the concentration of cocaine HCl in each of the samples?

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>72%</b>	<b>52%</b>	
23HDAK	70.3 ± 1.9	52.1 ± 1.1	2
2NZQZM	244 ± 29 (milligrams)	169 ± 20 (milligrams)	12%
39YDXV	76.2 ± 4.0 (%)	53.9 ± 4.0 (%)	2
3CYHWA	74.5 ± 5.7 (%)	53.8 ± 4.2 (%)	2.65
3DRHRZ	604 (µg/mg)	463 (µg/mg)	
3DWX6Z	72.8 ± 6.4 (%)	52.8 ± 4.6 (%)	3
3RCXVY	70.66885 ± 1.7 (%)	52.70605 ± 1.7 (%)	2
3UXWUF	70.2 ± 9.3 (% w/w)	50.7 ± 6.7 (% w/w)	2
4B2Q2F	71.24 ± 3.18	51.61 ± 3.18	2
68YA4C	63.3 ± 8.9 (%)	45.4 ± 6.4 (%)	3.07
6A39CJ	95.6 ± 5 (%)	76.9 ± 5 (%)	2
7CKMFJ	71.4 (%)	51.1 (%)	
9HLL4E	228 ± 27 (milligrams)	161 ± 19 (milligrams)	12%
9Z4KAC	67.2 ± 4.5 (%)	49.8 ± 4.5 (%)	2
A4GLR2	70.6 ± 6.2 (%)	52.3 ± 4.6 (%)	3
A8GXM2	74.2 ± 6.5 (%)	52.2 ± 4.6 (%)	3
B3MFNF	71.3 ± 5.6 (% w/w)	52.1 ± 4.1 (% w/w)	2
B9BX7X	65.5 ± 9.2 (%)	47.5 ± 6.7 (%)	3.07
CLDNNW	69.5 ± 9.8 (%)	48.5 ± 6.8 (%)	3.07

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>72%</b>	<b>52%</b>	
CZDPYC	238 ± 29 (milligrams)	166 ± 20 (milligrams)	12%
DDB4QT	49.97 (%)	70.81 (%)	
ENVMR6	72.0 ± 0.9	52.3 ± 0.9	2
FP478R	69,9 ± 7,0 (%)	55,3 ± 5,5 (%)	2
G2TMCJ	73.6 ± 4.0 (%)	52.6 ± 4.0 (%)	2
GLXXKT	75 ± 12 (%)	56 ± 8.6 (%)	2.576
GXTCFJ	70.1 ± 4.0 (%)	47.7 ± 4.0 (%)	2
H944JJ	72.8 ± 1.7 (%)	52.8 ± 1.7 (%)	2
HK3ZKL	71.4 ± 6.2 (percent)	53.6 ± 4.7 (percent)	3
HKGJ84	72.5 ± 2.8 (%)	53.7 ± 4.5 (%)	2
HKXK9K	75.2 ± 1.7% (%)	54.8 ± 1.7% (%)	2
HLAAGP	66.0 ± 9.3 (%)	46.8 ± 6.6 (%)	3.07
JCMHMJ	73.5 ± 1.7 (%)	52.2 ± 1.7 (%)	2
JU3UDP	76.1 ± 4.7 (%)	55.3 ± 4.7 (%)	2
K3BYKZ	59.8 ± 2.3 (%)	42.9 ± 3.2 (%)	2
KGTTWP	74.2 ± 6.5 (%)	54.0 ± 4.7 (%)	3
KGVGFN	68.2 ± 9.6 (%)	48.5 ± 6.8 (%)	3.07
KH8ZFL	70.35 ± 0.73 (%)	51.13 ± 1.91 (%)	2
KHMGBE	75.0 ± 4.0 (%)	56.6 ± 4.0 (%)	2
KVU33K	72.9 ± 3.2 (%w/w)	51.1 ± 2.7 (%w/w)	2
KZ3T2J	65.58 ± 1.43 (%)	45.94 ± 0.55 (%)	2.954

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>72%</b>	<b>52%</b>	
LEENUK	28.486 ± 2.4 (%)	23.698 ± 2.4 (%)	2
LJUWLQ	72.8 ± 6.4 (%)	53.0 ± 4.6 (%)	3
LMBJVP	72.4 ± 6.3 (%)	52.5 ± 4.6 (%)	3
NZTQ8G	75.4 ± 2.2 (percent)	56.9 ± 2.2 (percent)	3
P3EW6J	74 ± 14 (%)	55 ± 11 (%)	2.576
P4RJQ	68.8 ± 9.7 (%)	51.5 ± 7.3 (%)	3.07
PEPMKZ	64 ± 14.30 (%)	43 ± 14.30 (%)	2
PFLZ9R	71.7 ± 4.0 (%)	51.5 ± 2.9 (%)	2
PT8CJ2	71.3 ± 6.0 (% w/w)	52.1 ± 4.4 (% w/w)	
Q2WKJJ	243 ± 8 (mg)	171 ± 8 (mg)	4.3
QL7KND	72.8 ± 10.6 (%)	55.2 ± 8.1 (%)	2
QP34UH	67.8 ± 9.5 (%)	48.3 ± 6.8 (%)	3.07
RAQQDK	70.6 ± 6.1 (%)	50.9 ± 4.0 (%)	
RMFRPK	75.5 ± 6.6 (%)	53.7 ± 4.7 (%)	3
RTLHXH	63.56 ± 6.2 (%)	43.84 ± 4.28 (%)	2
V2JHYE	68.06 ± 10.52 (%)	46.48 ± 8.61 (%)	2.0
V3CHU6	69.1 ± 1.7	51.6 ± 1.7	2
VTPERC	71.8 ± 8.8	53.7 ± 5.4	2.65
WFFWXN	73.4 ± 1.4 (%)	52.7 ± 0.2 (%)	2
WHMC7E	87.0 ± 6.9 (%)	62.9 ± 4.9 (%)	2.65
WYBPHL	72.7 ± 5.7 (% w/w)	55.1 ± 4.4 (% w/w)	2

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>72%</b>	<b>52%</b>	
X762A9	61.9 (%)	46.4 (%)	
XGNTGH	68.0 ± 9.6 (%)	50.7 ± 7.1 (%)	3.07
XHHGXT	68.7 ± 4.7 (% w/w)	51.7 ± 3.5 (% w/w)	
XUBZEJ	237 ± 13 (mg)	170 ± 13 (mg)	2
YG67KL	71.8 ± 0.2 (% by weight)	52.3 ± 0.2 (% by weight)	2
YK7AC9	69.8 ± 9.8 (%)	49.7 ± 7.0 (%)	3.07
YWVA2P	71.2 ± 6.5 (% w/w)	51.7 ± 4.7 (% w/w)	2
YWXY89	69.3 ± 9.8 (%)	47.7 ± 6.7 (%)	3.07

# Reporting Procedures

TABLE 2

WebCode	Reporting Procedures
23HDAK	Integral 6-
2NZQZM	The mean of duplicate/several determinations.
39YDXV	The mean of duplicate/several determinations.
3CYHWA	The mean of duplicate/several determinations.
3DRHRZ	The mean of duplicate/several determinations.
3DWX6Z	single sample
3RCXVY	The mean of duplicate/several determinations.
3UXWUF	The mean of duplicate/several determinations.
4B2Q2F	The mean of duplicate/several determinations.
68YA4C	The mean of duplicate/several determinations.
6A39CJ	The mean of duplicate/several determinations.
7CKMFJ	The mean of duplicate/several determinations.
9HLL4E	The mean of duplicate/several determinations.
9Z4KAC	The mean of duplicate/several determinations.
A4GLR2	Single sample
A8GXM2	single sample
B3MFNF	The mean of duplicate/several determinations.
B9BX7X	The mean of duplicate/several determinations.
CLDNNW	The mean of duplicate/several determinations.
CZDPYC	The mean of duplicate/several determinations.
DDB4QT	The mean of duplicate/several determinations.



TABLE 2

WebCode	Reporting Procedures
ENVMR6	The mean of duplicate/several determinations.
FP478R	The mean of duplicate/several determinations.
G2TMCJ	The mean of duplicate/several determinations.
GLXXKT	The mean of duplicate/several determinations.
GXTCFJ	The mean of duplicate/several determinations.
H944JJ	The mean of duplicate/several determinations.
HK3ZKL	single sample
HKGJ84	The mean of duplicate/several determinations.
HKXK9K	The mean of duplicate/several determinations.
HLAAGP	The mean of duplicate/several determinations.
JCMHMJ	The mean of duplicate/several determinations.
JU3UDP	The mean of duplicate/several determinations.
K3BYKZ	The mean of duplicate/several determinations.
KGTTWP	single sample
KGVGFN	The mean of duplicate/several determinations.
KH8ZFL	The mean of duplicate/several determinations.
KHMGBE	The mean of duplicate/several determinations.
KVU33K	The mean of duplicate/several determinations.
KZ3T2J	The mean of duplicate/several determinations.
LEENUK	The mean of duplicate/several determinations.
LJUWLQ	Single Sample
LMBJVP	single samples

TABLE 2

WebCode	Reporting Procedures
NZTQ8G	The mean of duplicate/several determinations.
P3EW6J	The mean of duplicate/several determinations.
P4RJJQ	The mean of duplicate/several determinations.
PEPMKZ	The result from a single determination
PT8CJ2	The mean of duplicate/several determinations.
Q2WKJJ	The mean of duplicate/several determinations.
QL7KND	The mean of duplicate/several determinations.
QP34UH	The mean of duplicate/several determinations.
RAQQDK	The mean of duplicate/several determinations.
RMFRPK	single sample
RTLHXH	The mean of duplicate/several determinations.
V2JHYE	The mean of duplicate/several determinations.
V3CHU6	The mean of duplicate/several determinations.
VTPERC	The mean of duplicate/several determinations.
WFFWXN	The mean of duplicate/several determinations.
WHMC7E	The mean of duplicate/several determinations.
WYBPHL	The mean of duplicate/several determinations.
X762A9	The mean of duplicate/several determinations.
XGNTGH	The mean of duplicate/several determinations.
XHHGXT	The mean of duplicate/several determinations.
XUBZEJ	The mean of duplicate/several determinations.
YK7AC9	The mean of duplicate/several determinations.

TABLE 2

WebCode	Reporting Procedures
YWVA2P	The mean of duplicate/several determinations.
YWXY89	The mean of duplicate/several determinations.

Response Summary	Participants: 67
The mean of duplicate/several determinations:	57 (85.1%)
The lowest value of duplicate/several determinations:	0 (0.0%)
Single determination:	9 (13.4%)
Other:	1 (1.5%)

# Raw Data & Statistical Analysis

List of raw data determinations in percent.

TABLE 3 - Item 1

WebCode	Preparation target concentration : 72%								Mean
23HDAK	70.80	69.50	71.80	69.20					70.33
2NZQZM	72.00	74.00							73.00
39YDXV	74.99	75.01	74.98	77.38	77.28	77.67			76.22
3CYHWA	74.38	74.35	74.33	74.30	74.84	74.58			74.46
3DRHRZ	58.30	62.50							60.40
3DWX6Z	72.81								72.81
3RCXVY	71.74	71.98	69.51	69.45					70.67
3UXWUF	68.50	69.50	71.10	71.50					70.15
4B2Q2F	71.16	71.06	71.42	71.32					71.24
68YA4C	64.50	62.20							63.35
6A39CJ	95.50	95.50	97.60	94.60	96.60	97.10	93.50	95.60	95.75 X
7CKMFJ	71.46	71.41							71.44
9HLL4E	70.00	69.00							69.50
9Z4KAC	66.19	66.22	66.23	66.28	68.13	68.15	68.16	68.18	67.19
A4GLR2	70.69								70.69
A8GXM2	74.27								74.27
B3MFNF	71.10	71.50	71.40						71.33
B9BX7X	65.50	65.50							65.50
CLDNNW	70.10	68.80							69.45
CZDPYC	71.00	71.00							71.00
DDB4QT	49.81	50.12							49.97 X
ENVMR6	71.95	72.19	72.22	71.70					72.02
FP478R	69.90	70.10							70.00
G2TMCJ	74.89	74.87	74.84	72.22	72.30	72.26			73.56

TABLE 3 - Item 1

WebCode	Preparation target concentration : 72%								Mean
GLXXKT	77.01	75.70	74.71						75.81
GXTCFJ	70.98	71.09	71.05	69.12	69.15	69.19			70.10
H944JJ	72.09	72.19	73.49	73.46					72.81
HK3ZKL	71.46								71.46
HKGJ84	73.76	71.83	72.29	71.67	75.69	69.77	72.89	72.05	72.49
HKXK9K	75.59	75.43	74.99	74.96					75.24
HLAAGP	66.70	65.30							66.00
JCMHMJ	73.59	73.34	73.64	73.64					73.55
JU3UDP	76.50	76.10	75.70						76.10
K3BYKZ	59.69	60.83	60.42	59.03	60.27	59.87	57.80	59.10	59.63
KGTTWP	74.24								74.24
KGVGFN	68.40	68.00							68.20
KH8ZFL	69.93	70.20	70.92						70.35
KHMGBE	75.10	74.84	74.65	74.73	74.66	74.68			74.78
KVU33K	73.10	72.86							72.98
KZ3T2J	64.00	65.34	67.48	65.48					65.58
LEENUK	28.69	28.59	29.52	27.84	27.50	27.29	28.70	29.76	28.49 X
LJUWLQ	72.89								72.89
LMBJVP	72.41								72.41
NZTQ8G	75.00	75.90							75.45
P3EW6J	75.12	74.08	72.93						74.04
P4RJJQ	68.80	68.90							68.85
PEPMKZ	64.00								64.00
PFLZ9R	73.42	74.13	70.57	69.01					71.78
PT8CJ2	71.30	71.20							71.25
Q2WKJJ	73.00								73.00

TABLE 3 - Item 1

WebCode	Preparation target concentration : 72%							Mean
QL7KND	72.60	73.00						72.80
QP34UH	68.00	67.60						67.80
RAQQDK	69.31	71.39	70.51	71.74	69.32	71.13		70.57
RMFRPK	75.52							75.52
RTLHXH	63.64	63.47						63.56
V2JHYE	69.76	66.37						68.07
V3CHU6	68.85	68.91	69.57	69.37				69.17
VTPERC	68.32	72.20	70.72	76.33	71.89	71.59		71.84
WFFWXN	74.49	72.63	72.53	73.89	73.80	73.68	73.60 73.13	73.47
WHMC7E	86.72	87.37	87.65	87.53	86.22	86.30		86.97 X
WYBPHL	72.40	72.80	72.80	72.70				72.68
X762A9	57.96	65.93						61.95
XGNTGH	67.30	68.80						68.05
XHHGXT	68.70	67.70						68.20
XUBZEJ	70.09	71.25	71.98	71.76	71.92	71.44		71.41
YG67KL	71.80	71.80	71.70	72.00				71.83
YK7AC9	69.90	69.70						69.80
YWVA2P	70.90	71.40						71.15
YWXY89	69.20	69.50						69.35

Statistical Analysis for Item 1		Participants: 69
Preparation Concentration:	<b>72%</b>	Number of Participants Included: <b>65</b>
Grand Mean:	<b>70.60</b>	Number of Participants Excluded: <b>4</b>
Standard Deviation:	<b>3.720</b>	Number of Participants without Raw Data: <b>0</b>

TABLE 3 - Item 2

WebCode	Preparation target concentration : 52%								Mean
23HDAK	52.40	51.10	52.70	52.40					52.15
2NZQZM	52.00	53.00							52.50
39YDXV	54.56	54.67	54.73	53.07	53.27	53.11			53.90
3CYHWA	53.69	54.13	53.77	54.23	54.06	53.19			53.85
3DRHRZ	43.70	48.80							46.25
3DWX6Z	52.88								52.88
3RCXVY	51.61	51.31	53.82	53.95					52.67
3UXWUF	50.80	51.20	51.80	49.20					50.75
4B2Q2F	51.64	51.56	51.47	51.78					51.61
68YA4C	46.50	44.30							45.40
6A39CJ	77.10	74.30	79.30	77.70	78.00	75.00	77.00	76.50	76.86 X
7CKMFJ	50.81	51.41							51.11
9HLL4E	49.00	50.00							49.50
9Z4KAC	49.22	49.23	49.26	49.31	50.24	50.28	50.30	50.33	49.77
A4GLR2	52.39								52.39
A8GXM2	52.30								52.30
B3MFNF	52.10	52.10							52.10
B9BX7X	47.60	47.40							47.50
CLDNNW	48.60	48.50							48.55
CZDPYC	51.00	50.00							50.50
DDB4QT	70.63	70.98							70.81 X
ENVMR6	52.25	52.63	52.04	52.32					52.31
FP478R	54.20	56.40							55.30
G2TMCJ	51.58	51.61	51.55	53.49	53.63	53.61			52.58
GLXXKT	56.95	56.50	56.52						56.66
GXTCFJ	48.64	48.40	48.57	46.99	46.96	46.86			47.74

TABLE 3 - Item 2

WebCode	Preparation target concentration : 52%								Mean
H944JJ	53.60	53.62	51.96	52.07					52.81
HK3ZKL	53.64								53.64
HKGJ84	57.28	55.00	52.42	50.94	52.78	52.06	53.72	53.88	53.51
HKXK9K	54.54	54.64	55.19	55.19					54.89
HLAAGP	47.10	46.50							46.80
JCMHMJ	51.64	52.06	52.77	52.65					52.28
JU3UDP	56.60	54.50	54.70						55.27
K3BYKZ	44.47	41.03	42.72	43.21	43.95	42.45	42.70	42.06	42.82
KGTTWP	54.03								54.03
KGVGFN	48.30	48.70							48.50
KH8ZFL	50.10	52.03	51.27						51.13
KHMGBE	54.98	54.79	54.61	58.39	58.51	58.28			56.59
KVU33K	50.60	51.66							51.13
KZ3T2J	46.30	46.46	45.25	45.76					45.94
LEENUK	26.19	24.82	24.12	23.64	22.99	23.88	22.12	21.84	23.70 X
LJUWLQ	53.07								53.07
LMBJVP	52.52								52.52
NZTQ8G	57.40	56.40							56.90
P3EW6J	52.82	58.63	54.16						55.20
P4RJJQ	51.70	51.40							51.55
PEPMKZ	43.00								43.00
PFLZ9R	52.53	52.54	49.10	52.19					51.59
PT8CJ2	52.60	51.50							52.05
Q2WKJJ	53.00								53.00
QL7KND	55.30	55.00							55.15
QP34UH	47.70	48.90							48.30



TABLE 3 - Item 2

WebCode	Preparation target concentration : 52%						Mean
RAQQDK	50.81	51.11	50.44	51.13	51.05	50.92	50.91
RMFRPK	53.77						53.77
RTLHXH	45.64	42.03					43.84
V2JHYE	46.43	46.51					46.47
V3CHU6	51.02	51.20	52.18	52.12			51.63
VTPERC	52.72	52.04	54.87	52.66	55.02	54.60	53.65
WFFWXN	52.66	52.61	52.81	52.76			52.71
WHMC7E	62.88	63.16	62.31	63.10	62.50	63.43	62.90 X
WYBPHL	55.70	55.70	54.40	54.60			55.10
X762A9	45.79	47.02					46.41
XGNTGH	51.20	50.40					50.80
XHHGXT	51.50	51.90					51.70
XUBZEJ	51.16	51.39	51.16	51.18	51.58	51.52	51.33
YG67KL	52.20	52.20	52.40	52.30			52.28
YK7AC9	49.50	50.00					49.75
YWVA2P	51.40	52.00					51.70
YWXY89	47.90	47.60					47.75

Statistical Analysis for Item 2		Participants: 69
Preparation Concentration:	52%	Number of Participants Included: 65
Grand Mean:	51.26	Number of Participants Excluded: 4
Standard Deviation:	3.243	Number of Participants without Raw Data: 0

TABLE 3 - Response Summary

<b>Response Summary</b>	<b>Item 1</b>	<b>Item 2</b>
<b>Preparation concentration</b>	<b>72%</b>	<b>52%</b>
Grand Mean	70.60	51.26
Standard Deviation	3.720	3.243

## Method of Analysis

TABLE 4

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
23HDAK								qNMR-400MHz NMR system
2NZQZM				✓				
39YDXV							✓	
3CYHWA							✓	
3DRHRZ		✓						
3DWX6Z		✓						electronic balance
3RCXVY							✓	
3UXWUF					✓			
4B2Q2F								NMR
68YA4C							✓	
6A39CJ					✓			
7CKMFJ							✓	
9HLL4E				✓				
9Z4KAC							✓	
A4GLR2		✓						
A8GXM2		✓						Balance
B3MFNF								NMR
B9BX7X				✓			✓	
CLDNNW							✓	
CZDPYC				✓				
DDB4QT					✓			
ENVMR6								NMR
FP478R								LC-MS/MS
G2TMCJ							✓	
GLXKT					✓			
GXTCFJ							✓	
H944JJ							✓	
HK3ZKL		✓						
HKGJ84							✓	
HKXK9K							✓	
HLAAGP							✓	
JCMHMJ							✓	
JU3UDP				✓				
K3BYKZ							✓	
KGTTWP		✓						
KGVGFN								GC/FID/MS

TABLE 4

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
KH8ZFL		✓				✓		
KHMGBE							✓	
KVU33K		✓						
KZ3T2J			✓	✓			✓	
LEENUK				✓			✓	
LJUWLQ		✓						
LMBJVP		✓						
NZTQ8G		✓						
P3EW6J					✓			
P4RJJQ							✓	
PEPMKZ				✓				
PFLZ9R								NMR
PT8CJ2								NMR
Q2WKJJ		✓				✓		
QL7KND							✓	
QP34UH								GC/FID/MS
RAQQDK							✓	
RMFRPK		✓						Electronic balance
RTLHXH							✓	
V2JHYE				✓				
V3CHU6							✓	
VTPERC							✓	
WFFWXN								NMR
WHMC7E							✓	
WYBPHL		✓						
X762A9							✓	
XGNTGH								GC/FID/MS
XHHGXT							✓	
XUBZEJ							✓	
YG67KL								qNMR
YK7AC9								GC/FID/MS
YWVA2P								NMR
YWXY89								GC/FID/MS

<b>Response Summary</b>							<b>Participants: 69</b>
<b>Method:</b>	<b>GC</b>	<b>LC</b>	<b>FTIR</b>	<b>GC/MS</b>	<b>LC/MS</b>	<b>UV</b>	<b>GC/FID</b>
Participants:	0	14	1	9	5	2	29
Percent:	0.0%	20.3%	1.4%	13.0%	7.2%	2.9%	42.0%

## Additional Comments

TABLE 5

WebCode	Additional Comments
2NZQZM	Cocaine purity routinely reported as base form.
9HLL4E	Cocaine purity routinely reported as base form.
9Z4KAC	12 injections made up the average. The lowest two and highest two values for each item were excluded from question 2 above.
CZDPYC	Cocaine purity routinely reported as base form.
FP478R	Results obtained by GC-MS/MS (MRM mode) : item1 = 73.4%, item2 = 56.5%. Results obtained by GC-MS (scan mode) : item1 = 86.9%, item2 = 65.5%.
HKGJ84	There was insufficient space above [Table 3: Raw Data & Statistical Analysis] to give it all the raw data replicates. They are as follows: Item 1: 73.76%, 71.83%, 72.29%, 71.67%, 75.69%, 69.77%, 72.89%, 72.05%, 72.99%, 72.16% Item 2: 57.28%, 55.00%, 52.42%, 50.94%, 52.78%, 52.06%, 53.72%, 53.88%, 56.51%, 52.67%
K3BYKZ	Additional raw data for question 2 [Table 3: Raw Data & Statistical Analysis]: Item 1: 60.73164628% & 60.35699753%. Item 2: 44.35772773% & 42.91148554%
KGTTWP	item 1: Cocaine HCl purity: 74.2% +/- 6.5%, item 2: Cocaine HCl purity: 54.0% +/- 4.7%
KH8ZFL	Item 1 additionally contains 27.84% +/- 2.23% phenacetin. Item 2 additionally contains 46.49% +/- 0.93% phenacetin.
KZ3T2J	both samples contain phenacetin
LEENUK	Les deux poudres sont coupées par la phénacétine [Requested translation was not provided by time of report publication.]
PEPMKZ	The purity results in 1a.) [Table 1: Reported Results] would be reported as purity ranges. The purity is first rounded to the nearest 5% and then reported as a 20% range. The ranges reported would be as follows: Item 1: 55% - 75%, Item 2: 35% - 55%
Q2WKJJ	Question 1a [Table 1: Reported Results] is very confusing when asking for reported concentrations. Our laboratory reports out the milligram content of the analyte of interest being quantified. CTS should either state to report the percent purity, milligram content, or a specific unit concentration.
QL7KND	Item 1 and item 2 also each contained phenacetin.

# Supplemental: Hotelling T-Squared Bivariate Control Analysis

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Hotelling T-Squared Bivariate Control Analysis is used in many other industries to examine results. Although not typically used in forensic science, CTS is presenting an introduction to this type of statistical data analysis. A laboratory may choose to delve deeper in a participant's results by studying both sets of statistics available in this report. The statistics presented in Table 3 (Raw Data) of this report examine the results of each item independently of each other. However, because the same materials are chosen for both samples, there should be a correlation of measurement performance between the two samples. A bivariate analysis technique judges measurement performance on both samples simultaneously, represented as an ellipse. For each participant, the mean of Item 1 (x-axis) is plotted against the mean of Item 2 (y-axis). The horizontal and vertical cross-hairs are the grand means for each Item. When 20 or more participants are included in the statistics, an ellipse is drawn so that 95% of the time a randomly selected participant will be included inside.

When considering your participant's position on the plot relative to the ellipse, remember that, generally speaking, if a participant's plotted point falls on the major axis outside of the ellipse, the participant is consistent in its measurements between the two samples but exhibits an offset from the grand mean (systematic difference). If a plotted point falls to the side of the ellipse, it indicates possible differences in the way that the participant tested the two samples or differences in sample behavior (consistency difference). The two-sample plot enables you to see which sample, if either, is "extreme" and to ascertain the nature of the "extreme" data.

### Systematic Difference

Bias is illustrated in the control ellipse on the two sample plot. If a particular analysis/sample combination did not show bias, the control ellipse would become a circle. Differences in procedures, conditions, instrumentation and sample preparation all contribute to the bias of a participant. When these differences become too large, a participant may receive a Data Flag. When the test results for both samples are both high or low compared to the group, a participant has a fixed set of factors on which to focus to identify a cause. Furthermore, since additional testing on similar samples should produce similar high or low results, it is possible to determine that a systematic error has been successfully corrected.

### Consistency Difference

The participant'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 Comparative Performance Values (CPV) for the two samples, such as a +1.5 CPV for Item 1 and a -2.2 CPV for Item 2. CPV is the number of standard deviations a value is from the grand mean.

Key for Data Flags		
<u>Data Flag</u>	<u>Statistically Included/Excluded</u>	<u>Explanation</u>
*	Included	Results fall outside 95% ellipse, but within a 99% control limit (ellipse) that is calculated.
X	Excluded	Results fall outside of 99% control limit.
M	Excluded	Data is missing for at least one item

## Bivariate Control Analysis

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
23HDAK		70.33	-0.770	-0.07	52.15	0.659	0.28
2NZQZM		73.00	1.905	0.65	52.50	1.009	0.38
39YDXV		76.22	5.124	1.51	53.90	2.410	0.81
3CYHWA		74.46	3.369	1.04	53.85	2.354	0.80
3DRHRZ	X	60.40	-10.695	-2.74	46.25	-5.241	-1.54
3DWX6Z		72.81	1.717	0.60	52.88	1.385	0.50
3RCXVY		70.67	-0.426	0.02	52.67	1.182	0.44
3UXWUF		70.15	-0.945	-0.12	50.75	-0.741	-0.16
4B2Q2F		71.24	0.145	0.17	51.61	0.121	0.11
68YA4C	*	63.35	-7.745	-1.95	45.40	-6.091	-1.81
6A39CJ	X	95.75	24.655	6.76	76.86	25.371	7.89
7CKMFJ		71.44	0.340	0.23	51.11	-0.381	-0.05
9HLL4E		69.50	-1.595	-0.29	49.50	-1.991	-0.54
9Z4KAC		67.19	-3.902	-0.91	49.77	-1.720	-0.46
A4GLR2		70.69	-0.404	0.03	52.39	0.899	0.35
A8GXM2		74.27	3.172	0.99	52.30	0.808	0.32
B3MFNF		71.33	0.239	0.20	52.10	0.609	0.26
B9BX7X		65.50	-5.595	-1.37	47.50	-3.991	-1.16
CLDNNW		69.45	-1.645	-0.31	48.55	-2.941	-0.83
CZDPYC		71.00	-0.095	0.11	50.50	-0.991	-0.23
DDB4QT	X	49.97	-21.130	-5.55	70.81	19.314	6.03
ENVMR6		72.02	0.920	0.38	52.31	0.819	0.32
FP478R	X	70.00	-1.095	-0.16	55.30	3.809	1.25
G2TMCJ		73.56	2.468	0.80	52.58	1.088	0.41
GLXXKT		75.81	4.712	1.40	56.66	5.166	1.66



WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
GXTCFJ		70.10	-0.999	-0.13	47.74	-3.754	-1.09
H944JJ		72.81	1.712	0.59	52.81	1.323	0.48
HK3ZKL		71.46	0.365	0.23	53.64	2.151	0.74
HKGJ84		72.49	1.399	0.51	53.51	2.019	0.69
HKXK9K		75.24	4.149	1.25	54.89	3.399	1.12
HLAAGP		66.00	-5.095	-1.24	46.80	-4.691	-1.37
JCMHMJ		73.55	2.459	0.80	52.28	0.790	0.32
JU3UDP		76.10	5.005	1.48	55.27	3.776	1.24
K3BYKZ	X	59.63	-11.469	-2.95	42.82	-8.668	-2.60
KGTTWP		74.24	3.150	0.98	54.03	2.536	0.85
KGVGFN		68.20	-2.895	-0.64	48.50	-2.991	-0.85
KH8ZFL		70.35	-0.745	-0.07	51.13	-0.358	-0.04
KHMGBE		74.78	3.682	1.12	56.59	5.102	1.65
KVU33K		72.98	1.885	0.64	51.13	-0.361	-0.04
KZ3T2J		65.58	-5.520	-1.35	45.94	-5.549	-1.64
LEENUK	X	28.49	-42.609	-11.32	23.70	-27.793	-8.50
LJUWLQ		72.89	1.798	0.62	53.07	1.579	0.56
LMBJVP		72.41	1.311	0.49	52.52	1.028	0.39
NZTQ8G		75.45	4.355	1.30	56.90	5.409	1.74
P3EW6J		74.04	2.949	0.93	55.20	3.712	1.22
P4RJJQ		68.85	-2.245	-0.47	51.55	0.059	0.09
PEPMKZ	*	64.00	-7.095	-1.77	43.00	-8.491	-2.55
PFLZ9R		71.78	0.688	0.32	51.59	0.099	0.10
PT8CJ2		71.25	0.155	0.18	52.05	0.559	0.24
Q2WKJJ		73.00	1.905	0.65	53.00	1.509	0.54
QL7KND		72.80	1.705	0.59	55.15	3.659	1.20
QP34UH		67.80	-3.295	-0.75	48.30	-3.191	-0.91

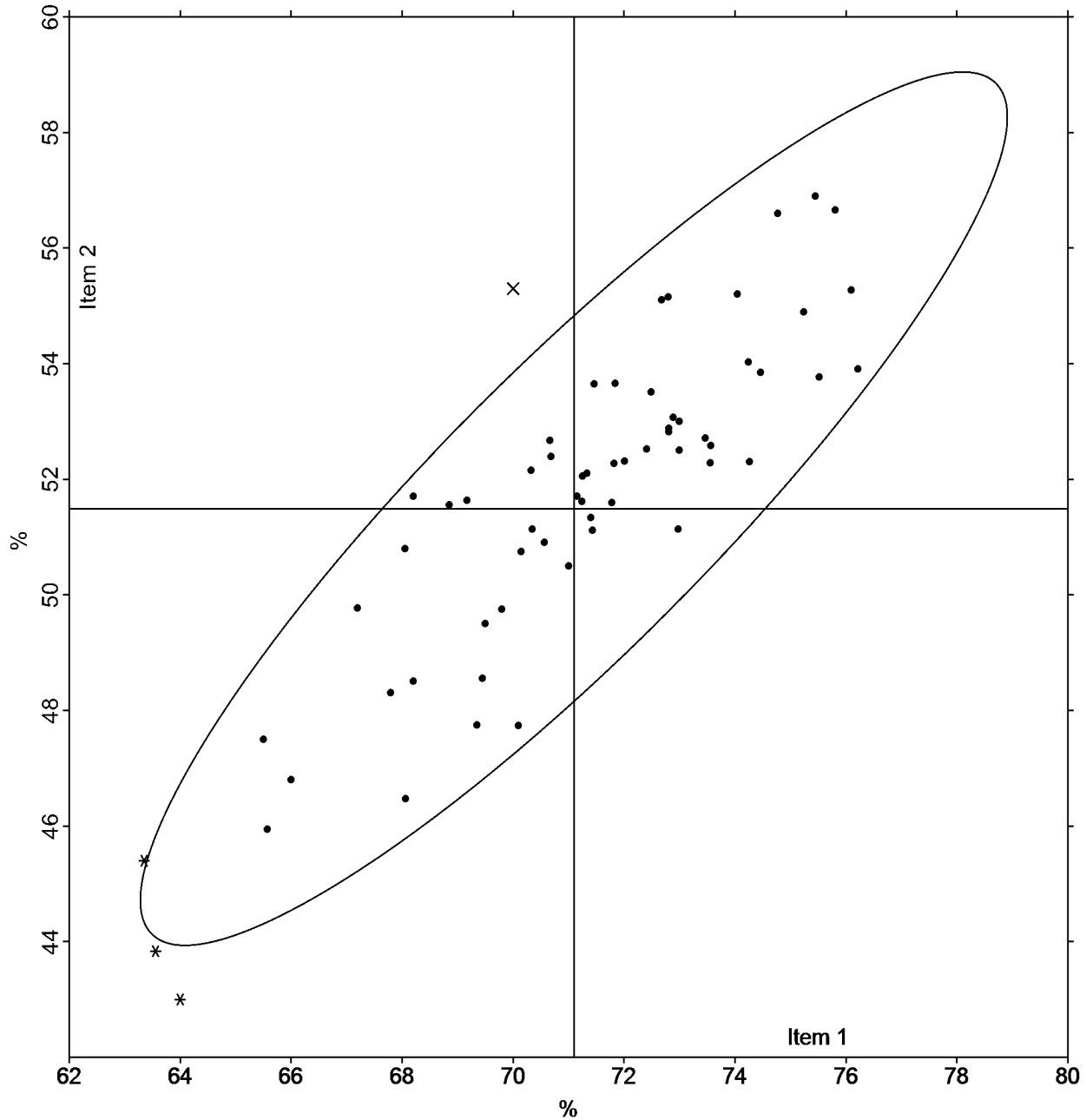
WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
RAQQDK		70.57	-0.528	-0.01	50.91	-0.581	-0.11
RMFRPK		75.52	4.422	1.32	53.77	2.278	0.77
RTLHXH	*	63.56	-7.540	-1.89	43.84	-7.656	-2.29
V2JHYE		68.07	-3.030	-0.68	46.47	-5.021	-1.48
V3CHU6		69.17	-1.920	-0.38	51.63	0.139	0.11
VTPERC		71.84	0.747	0.33	53.65	2.161	0.74
WFFWXN		73.47	2.374	0.77	52.71	1.219	0.45
WHMC7E	X	86.97	15.870	4.40	62.90	11.406	3.59
WYBPHL		72.68	1.580	0.56	55.10	3.609	1.18
X762A9	X	61.95	-9.149	-2.33	46.41	-5.086	-1.50
XGNTGH		68.05	-3.045	-0.68	50.80	-0.691	-0.14
XHHGXT		68.20	-2.895	-0.64	51.70	0.209	0.14
XUBZEJ		71.41	0.311	0.22	51.33	-0.161	0.02
YG67KL		71.83	0.730	0.33	52.28	0.784	0.31
YK7AC9		69.80	-1.295	-0.21	49.75	-1.741	-0.46
YWVA2P		71.15	0.055	0.15	51.70	0.209	0.14
YWXY89		69.35	-1.745	-0.33	47.75	-3.741	-1.08

Response Summary	Item 1	Item 2	Participants: 69
<b>Preparation Concentration</b>	<b>72%</b>	<b>52%</b>	
Grand Mean	71.09	51.49	
Standard Deviation	3.08	2.98	
Participants Included: 61	Participants Excluded: 8	Participants without Raw Data for both items: 0	

# Bivariate Control Analysis

Item 1 Grand Mean: 71.09

Item 2 Grand Mean: 51.49



Please Note: Seven participants marked as outliers (X) are not seen on the graph above due to having mean values that are outside of the x-axis or y-axis percentage ranges.

-End of Report-  
(Appendix may follow)

## Test No. 22-5061: Quantitative Drug Analysis - Cocaine HCl

DATA MUST BE SUBMITTED BY **Dec. 27, 2022, 11:59 p.m. EST** TO BE INCLUDED IN THE REPORT

Participant Code: U1234E

WebCode: CZVJYL

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

### Test Description:

Investigators have submitted two powdered cocaine HCl samples from separate cases to be quantitatively examined. Using your laboratory's procedures, analyze each sample and report the quantitative determination of cocaine HCl present in the samples.

*-Please follow your laboratory's policies and procedures for sample homogenization.*

*-This is not intended as a qualitative test but rather as a quantitative examination of the cocaine HCl present in the samples.*

### Items Submitted (Sample Pack DQ2):

Items 1 & 2: Powdered cocaine HCl samples

1a.) What is the concentration of cocaine HCl in each of the samples? (Results should be reported using your laboratory reporting criteria for decimal places, uncertainty, and units.)

Reported Concentration	Uncertainty (k= <input type="text"/> )	Units
Item 1: <input type="text"/>	± <input type="text"/>	( <input type="text"/> )
Item 2: <input type="text"/>	± <input type="text"/>	( <input type="text"/> )

1b.) Are the values listed above:

The mean of duplicate / several determinations?

The lowest value of duplicate / several determinations?

Other? (Specify):

2.) Please list your raw data determinations below in percent of cocaine HCl. (Results not reported in % will be excluded from statistical calculations.)

Item 1 (%) Item 2 (%)


3.) What methods were used to quantitatively examine the items?

GC

GC/MS

GC/FID

LC

LC/MS

Other (specify):

FTIR

UV

4.) Additional Comments

*Please note: Any additional formatting applied in the free form space below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.*

## RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA. (Accreditation Release section below must be completed.)
- This participant's data is **not** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

Have the laboratory's designated individual complete the following steps **only if your laboratory is accredited in this testing/calibration discipline** by one or more of the following Accreditation Bodies.

### **Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory.**

ANAB Certificate No.   
(Include ASCLD/LAB Certificate here)

A2LA Certificate No.

### **Step 2: Complete the Laboratory Identifying Information in its entirety.**

Authorized Contact Person and Title

Laboratory Name

Location (City/State)