Chemistry Jeopardy

Calibration	QA/QC 1	QA/QC 2	Method validation	Internal Standard
200	200	200	200	200
400	400	400	400	400
600	600	600	600	600
800	800	800	800	800
1000	1000	1000	1000	

200

When would you select to use the standard addition method rather than a calibration curve?

- Matrix effects

400

When would you select a calibration curve instead of standard addition?

Easier, faster

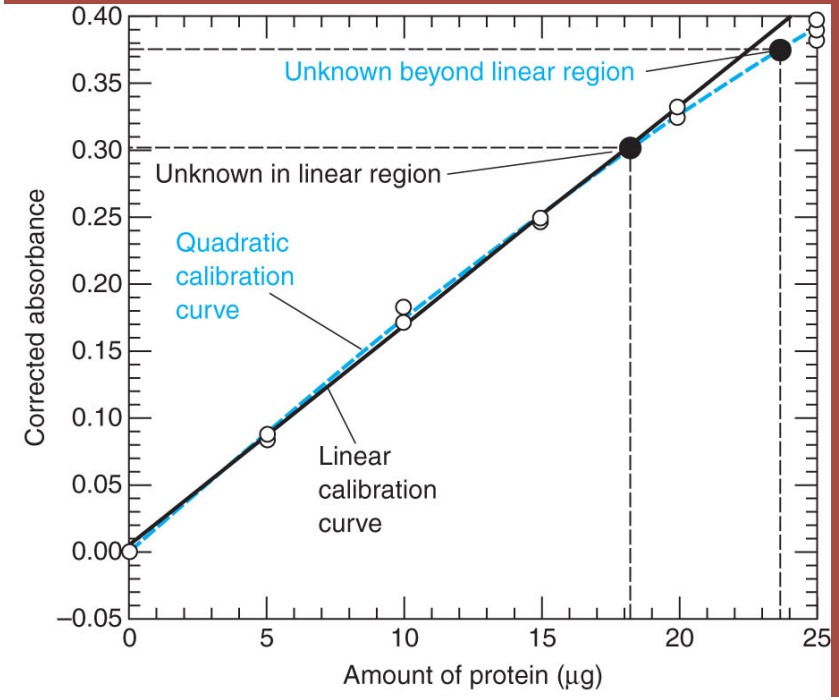
No matrix effects



600

Calculate the concentration protein for A= 0.73, using the calibration curve below, with the formula:

A= 0.0613 [protein] + 0.005



- Outside calibration curve, can't use the data!

800

Which of the following is the largest for a typical instrument:

Dynamic range

Linear range

Range

- Dynamic range- this is the range of concentration that generates a measurable response.

1000

Arrange the following in the proper order:

A: use equation of line of best fit to determine the concentration of unknowns.

B: subtract the average blank absorbance from the measurements.

C: Prepare a series of standards of known concentration and measure the absorbance.

D: make a graph of absorbance vs concentration

- C, B, D, A



200

Which of the following are NOT concerns of quality assurance:

Getting the right data
Getting the data right
Keeping the data right
Keeping the method right

Keeping the method right



400

Clarifying and communicating what you will use the data for are:

Use objectives
Specifications
Selectivity concerns
Method validation concerns

Use objectives

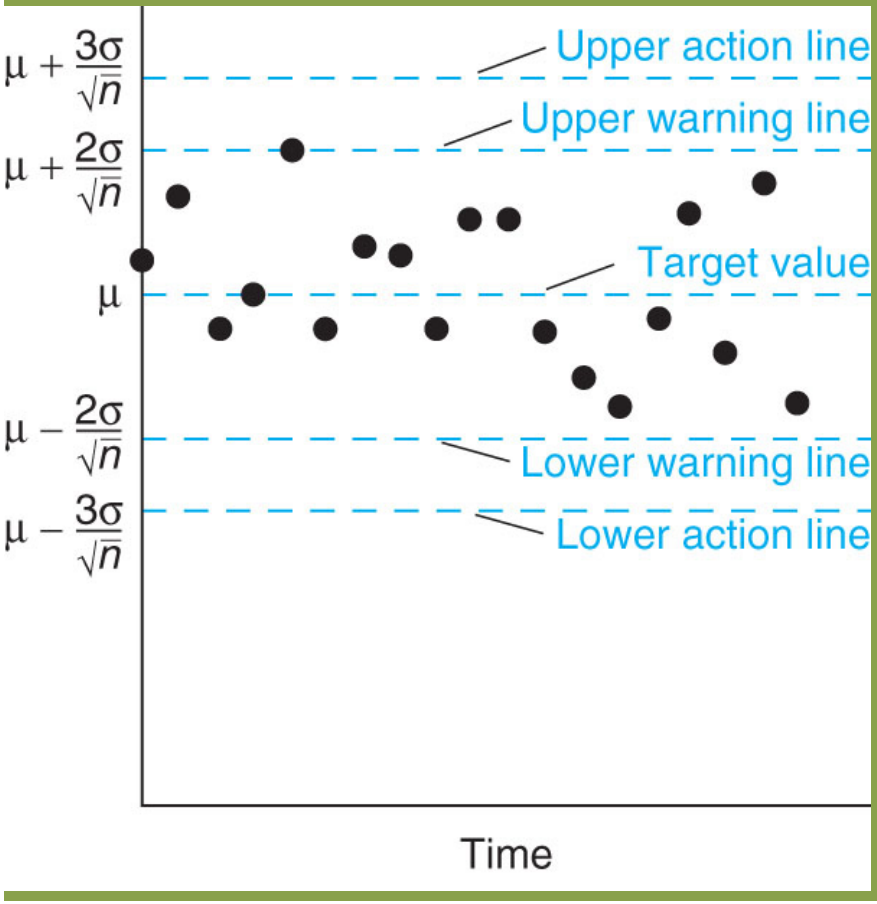
This helps you decide how good your data need to be.

Which is key in the next step of outlining specifications.



600

What data are plotted on a control plot?



Control plots are used to plot measurements of a known standard. It is used to visually demonstrate that the method is behaving as expected.

800

Specifications may include which of the following:

Sampling requirements

Accuracy and precision

Rate of false results

Selectivity

Sensitivity

Acceptable blank values

Recovery of fortification

Calibration checks

Quality control samples

All of these



1000

When submitting samples to an external lab for analysis, it is good practice to submit a certified reference material as an unknown.

What is this called?

- Performance test samples.

200

You are sampling water. After collecting your sample, you sample a bottle of distilled water you brought with you to the field.

What type of blank is this?

- Field blank

400

After diluting my samples in 2% nitric acid for analysis, I remove an aliquot of the acid for analysis.

What type of blank is this?

Reagent blank

600

Which type of blank is used to correct absorbance measurements?

Method blank



800

During an ICP-MS analysis run to examine trace metals extracted from mine tailings, I follow the following_____.

After every tenth sample, I reanalyze a blank and preform a _____ by analyzing a known sample.

During an ICP-MS analysis run to examine trace metals extracted from mine tailings, I follow the following Standard Operating Procedure (SOP).

After every tenth sample, I reanalyze a blank and preform a calibration check by analyzing a known sample.



1000

At the end of every ICP-MS analysis run to examine trace metals extracted from mine tailings, I check the _____ of my measurements by analyzing a NIST standard.

Accuracy; replicate

In order to assess the precision of each measurement, I also run _____ samples.



200

Method validation incudes: All

Specificity

Linearity

Accuracy

Precision

Range

Limit of detection

Limit of quantification

robustness

400

Accuracy can be assessed using which the following:

Analyzing blanks

Certified reference material

Calibration curves

Accuracy can be assessed:

1. Analysis of a certified reference material
2. comparing results of different methods
3. Analyzing a spiked blank with the same matrix
4. Using standard addition

600

How is linearity most commonly measured?

And what metric is used to quantify it?

- Least squares analysis
- Measured by r-squared.

800

When baseline separation is not achieved between peaks from similar analytes in your samples, what method validation principle is being violated?

specificity



1000

State each of the following in terms of measured blank signal and standard deviation :

Signal detection

Quantification limit

Detection limit

Signal detection= $blank_{ave} + 3s_{blank}$

Quantification limit $10s_{blank}/m$

Detection limit $3s_{blank}/m$

200

An internal standard involves:

The addition of more analyte
The addition of a substance other than the analyte
recalibration between each measurement
None of these

- The addition of a substance other than the analyte



400

An internal standard is likely used

a. In chromatography or separations
b. In UV-Vis experiments
c. Instead of a calibration curve
d. to account for slight variations in flow that might shift the analyte peak
e. To account for sample lost during sample preparation

In chromatography or separations

to account for slight variations in flow that might shift the analyte peak

To account for sample lost during sample preparation

All but B and C



600

Which are required for internal standards:

1. Not contained in the sample matrix
2. Can be added in exact amounts
3. Is the same as the analyte
4. Behaves similar to analyte
5. Has relatively the same detector response over range measured

- All but 3



800

The area of the analyte and internal standard peaks are 450 and 380, respectively and F= 4. If the internal standard concentration is known to be 536 ppm, what is the concentration of the analyte in solution?

158.7 ppm

$$\frac{\text{Area of analyte signal}}{\text{Concentration of analyte}} = F\left(\frac{\text{area of standard signal}}{\text{concentration of standard}}\right)$$

$$\frac{A_X}{[X]} = F\left(\frac{A_S}{[S]}\right)$$

1000

