CH9: titrations using calibration

1. Spectrophotometry : using a calibration curve

**DOCUMENT 1: BSA protein**

Source: Wikipedia

**Bovine serum albumin** (also known as **BSA** or **"Fraction V"**) is a [serum albumin](https://en.wikipedia.org/wiki/Serum_albumin) protein derived from cows. It is often used as a protein concentration standard in lab experiments.



[**www.wikimediacommons.org**](http://www.wikimediacommons.fr)

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**DOCUMENT 2: Spectrophotometry measurements with proteins using Brilliant Blue dye (Bradford method)**

Source: Wikipedia

The dye (Bradford reagent) associated with BSA portein has an absorption spectrum maximum at 595 nm. The increase of absorbance at 595 nm is proportional to the amount of bound dye, and thus to the concentration of protein present in the sample.

The procedure for Bradford protein assay is very easy and simple to follow. It is done in one step where the Bradford reagent is added to a test tube along with the sample. After mixing well, the mixture almost immediately changes to a blue color and the absorbance can be read at 595 nm using a spectrophotometer.

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**DOCUMENT 3: Procedure for standard assay**

Source: Wikipedia

**Procedure** (Standard Assay, 20-150 µg protein; 200-1500 µg/mL)

- Prepare a series of protein standards diluted with 0.15 M NaCl to final concentrations of 0 (blank = NaCl only), 250, 500, 750 and 1500 µg/mL. Also prepare serial dilutions of the unknown sample to be measured.

- Add 100 µL of each of the above to a separate test tube

- Add 5.0 mL of dye to each tube and mix by vortex, or inversion.

- Adjust the spectrophotometer to a wavelength of 595 nm, and blank using the tube which contains no protein.

- Wait 5 minutes and read each of the standards and each of the samples at 595 nm wavelength.

- Plot the absorbance of the standards vs. concentration.

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**DOCUMENT 4: BSA protein calibration curve**



**Figure: Calibration curve - generated from BSA samples measured at 595nm**

Source: Wikipedia

**Vocabulary**

Using the previous documents, fill in the blanks:

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| **French** | **English** |
|  | lab experiments |
|  | wavelength |
| une mesure |  |
| un essai |  |
| un échantillon |  |
| un colorant |  |
|  | (protein) bound dye |
|  | the process |
| absorbance |  |
| une courbe d’étalonnage |  |
|  | reagent |

**Presentation**

Prepare a short 2min presentation :

Using the knowledge acquired in chemistry class and document 3, recap the procedure carried out during spectrophotometry measurements?

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**Questions**

At which wavelength were measurements carried out on BVA protein? Explain.

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According to **document 2**, how was this value chosen?

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An unknown sample has an absorbance of A = 0,3, work out the BSA concentration in the sample

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Activity summary

What you must remember:

* vocabulary associated with spectrophotometry mesasurements
* how to explain spectrophotometry measurements
* how to calculate a concentration using a calibration curves

Skills linked to the curriculum:

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| --- | --- |
| **Compétences** | **Capacités à maitriser** |
| * COM
* APP
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| * Savoir expliquer un protocole
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| * APP
* ANA
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| * Savoir exploiter une courbe d’étalonnage
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