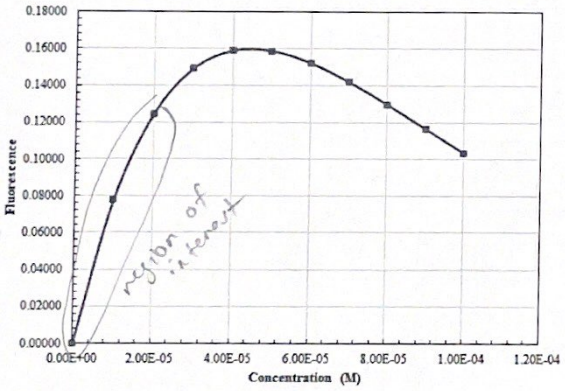
| Exp. No. 5 | Experiment/Subject CHEM 438 (DQF) | Date 10/11/2021 | |
|---|---|---|---|
| Name Abdul Fayeed | Lab Partner Justin M | Locker/ Desk No. | Course & Section No. 021L |

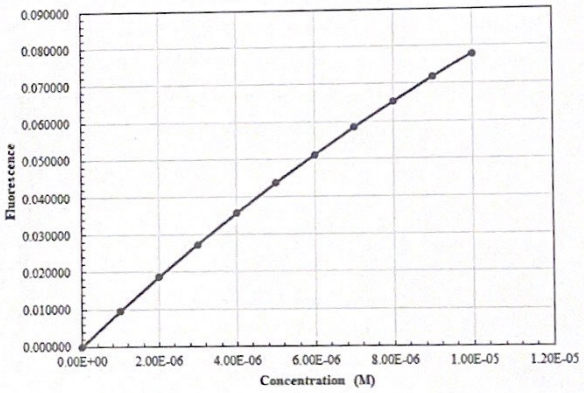
## PRE-LAB Questions

1. $\lambda_{ex}$ = 340nm (peak @ 3400 Å) → no peak for toluene @ this λ.
   $\lambda_{em}$ = 460nm (peak @ 4600 Å)

2. $\varepsilon = 9750\ M^{-1}cm^{-1}$ (from the graph @ $\lambda_{abs}$ = 340nm)
   $\Omega = 2$, $P_o = 0.5$, $b = 1cm$



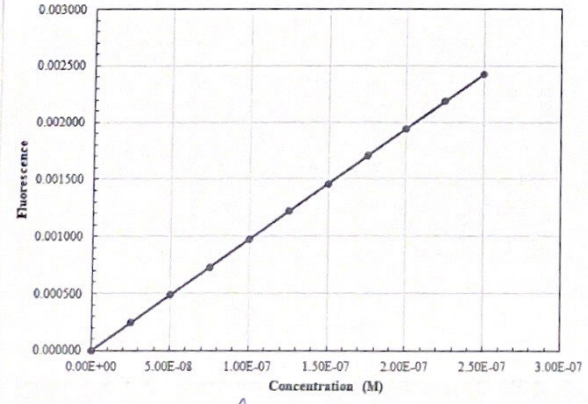

(The specified conc. range)




(10-fold dilution range)

⇒ should dilute the quinine sample to get linear range of calib. curve.

3. Tonic water should be diluted. 40-dilution factor ~~should~~ can be used.




4. Take average of blank values then use the standard deviation to calculate the limit of detection.

| itness/TA | Date |
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## Objective

Purpose of this lab is to determine the concentration of quinine in tonic water by fluorescence.

## Introduction

Fluorescence is ~~effective~~ selective to one or 2 compounds in a mixture Tonic water has both quinine and benzoate. Appropriate $\lambda_{ex}$ and $\lambda_{em}$ have to be picked to ensure that only one compound can be fluorescese at a time. Fluorescence spectrum also has its limit where it reaches a maximum fluorescence then drop down as concentration increases.

## Procedure

1. Determine $\lambda_{ex}$ and $\lambda_{em}$.
   $\lambda_{ex} = 340nm$, $\lambda_{em} = 450nm$

2. Set non-scanned (excitation) wavelength to appropriate $\lambda_{ex}$ value.

3. Measue fluorescence excitation ~~of~~ spectrum of quinine once, using the highest concentration, using $\lambda_{em}$ to scan the excitation wavelength.

4. Measure the fluorescence emission spectra of quinine by fixing $\lambda_{ex}$ and scanning over emission wavelength

5. Prepare a set of fluorescence calibration standards to determine the diluted tonic

mass of quinine sulfate (g) =

stock concentration =

| Sample | Vol of stock (mL) | conc (M) | $F_1$ |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| Tonic | | | |
| Blank | 0 | 0 | |

| Sample | $F_2$ | $F_3$ |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| Tonic | | |
| Blank | | |

(water 'unknown'. Dilute solution w/ 0.05M $H_2SO_4$.

6. Make measurement to determine the LOD of fluorescence. (10 times?)

## Conclusions

Quinine can be detected and measured based on its concentration by fluorescence. Fluorescence is selective to only one or 2 compounds, so it can save time to separate the compound from mixture.

| Signature | Date 10/11/2024 | Witness/TA | Date |
|---|---|---|---|

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LOD Data

| Run # | Response |
|---|---|

| Signature | Date 10/11/2024 | Witness/TA | Date |
|---|---|---|---|