

20220729 S4 Chemistry Extended Learning Activity

Colorimetric determination of nitrite content in daily life sample

Group No: _____

Google Drive File Collection

<https://drive.google.com/drive/folders/1HWg0EkYEjbZrLvFEEDFjK-jITcoxA0xE?usp=sharing>



Grouping

	Group 1	Group 2	Group 3	Group 4	Group 5
Part A					
Part B					

Grouping List

Apparatus for each group

Items	Quantity
Quartz vial	2
50 ml beaker	4
250 ml beaker	1
Auto pipette (2-10 ml)	1, with 2 plastic tips
Auto pipette (0.1-1 ml)	1, with 4 plastic tips
Volumetric flask (100 ml)	1
Volumetric flask (50 ml)	6
dropper	4
Plastic gloves	1 pair for each student

Reagent provided

Part A – Construction of calibration curve	Part B - Measurement of absorbance with daily life samples
<p>Standard aqueous solution of sodium nitrite (NaNO_2), with concentration of 1000 ppm. This is the stock solution (NaNO_2) [from supply table]</p>	<p>Authentic samples</p> <ul style="list-style-type: none">a. 1 kg of Choi Sum immersed into 2L of water for 20 minutesb. water from Sun Kei Fish Pond
<p>Colouring reagent, a mixture of H_3PO_4, sulfonamides, and N-(1-naphthyl)-ethylenediamine-dihydrochloride [from supply table]</p>	<p>Colouring reagent a mixture of H_3PO_4, sulfonamides, and N-(1-naphthyl)-ethylenediamine-dihydrochloride [from supply table]</p>

Part A – Construction of calibration curve

Procedures

1. Pipette **1 ml** of the **stock solution** into a **100 ml** volumetric flask and add distilled water to the graduation mark. This is the **Solution I**. Concentration **Solution I** is _____ ppm

2. Prepare a series of **working standard solutions** with 50 ml volumetric flasks according to the table below:

	Blank	Standard solution A	Standards solution B	Standards solution C	Standards solution D
Volume of Solution I /ml	0	[ANS]	[ANS]	[ANS]	[ANS]
Volume of distilled water added	Add distilled water until the graduation mark of 50 ml volumetric flask				
Concentration of the standard formed / ppm	0	[ANS]	[ANS]	[ANS]	[ANS]

3. Add 2 ml of colour reagent into four working standards above and mix well. Leave them 10 minute for colour development.

Part A – Construction of calibration curve

Results

Part A: Preparation of calibration curve

	Sample	2nd measurement	3 rd measurement	4 th measurement	5 th measurement
Vial in reference cartridge	Blank	Blank	Blank	Blank	Blank
Vial in sample cartridge	Blank	Standard solution A	Standards solution B	Standards solution C	Standards solution D
Absorbance	[ANS]	[ANS]	[ANS]	[ANS]	[ANS]

The equation for the calibration curve obtained is _____ **[ANS]**
with $R^2 =$ **[ANS]**

Part B - Measurement of absorbance with daily life samples

Part B: Measurement of absorbance with daily life samples

	1 st measurement
Vial in reference cartridge	Blank
Vial in sample cartridge	Name of Sample: <u>[ANS]</u>
Absorbance	[ANS]

Based on the calibration curve, the concentration of nitrite ions in the sample was found to be [ANS]

Take a picture of your discussion result on this page

Question to be discussed

1. Why is it necessary to construct a calibration curve if we want to determine the concentration of an analyte with colorimetric experiment?

2. If the absorbance of a sample is found to be higher than 1, what should be done to the procedure of the experiment?

Take a picture of your discussion result on this page

3. Suggest ONE assumption in this experiment.

4. Suggest some advantages of using colorimetry over tradition test-tube scale experimental analysis, such as titration.

Some reminders during the procedure

- Handle the vials with great care. ***Your fingers should NOT touch the “smooth wall” of the vial.***
- Rinse the vial with distilled water before you switch into a another solution. Whenever you need to dry the vials (both inside or outside), use ***lens tissue***.
- ***Label the solutions clearly*** to avoid mixing up.
- Take pictures with iPad for important observation and the calibration curve