

Mini-Lab: Diffusion Across a Semi-Permeable Membrane (10 marks)

Your body is made of trillions of cells and most of these cells contain between 75-85% water. Therefore, an understanding of **diffusion** (movement of substances from high concentration to low concentration) across a semi-permeable membrane is important.

A **semi-permeable membrane** is a special type of barrier that allows certain molecules or substances to pass through, but not others. What is able to pass through depends on its size.

Objective: *To observe how certain substances diffuse across a permeable membrane.*

Where to Start:

First of all, gather the following materials:

- Two 20 cm long dialysis tubing (semi-permeable membrane)
- 4 pieces of dental floss or string
- 2 medium beakers
- 2 Petri dishes

Procedure: (Part 1)

How does phenolphthalein react with NaOH?

- 1) Pour a bit of NaOH (about 5 mL) into the Petri dish.
- 2) Add a couple of drops of phenolphthalein in the Petri dish.

What was the colour change?

How does starch react with iodine solution?

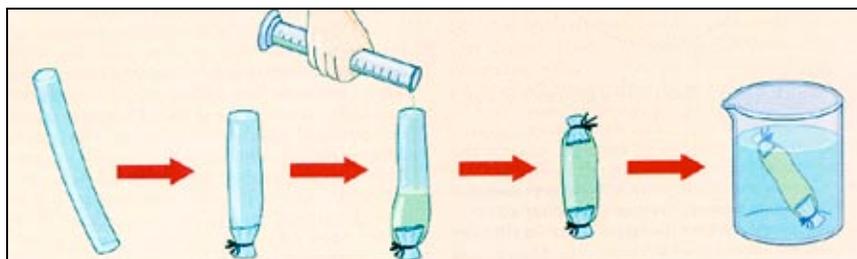
- 3) Pour a bit of iodine solution (5 mL) into the second Petri dish.
- 4) Add a bit of starch into the Petri dish.

What was the colour change?

(Part 2)

Preparing the semi-permeable membrane:

- 1) Soak both dialysis tubing in a beaker of water for several minutes.
- 2) Using the string or dental floss, **tie off the bottom** of the tubing (about 1-2 cm away from the bottom)—see diagram A.



(Part 3)

Phenolphthalein and NaOH dialysis:

- 1) Fill one of the tubes with **phenolphthalein** and **tightly** tie off the other end. (Be careful.)
- 2) Rinse off the **outside** of the tube with water and then **lightly dry** it with a paper towel.
- 3) Put some NaOH (about 150 mL) into one of the beakers.
- 4) Place the sealed off tubing into the NaOH.
- 5) Record the initial observations on **Table A**. Wait for about 30 minutes and then record any changes.

(Part 4)

Starch and iodine dialysis:

- 6) Fill the other tube with a **scoop of starch** and **tightly** tie off the other end. (Be careful.)
- 7) Rinse off the **outside** of the tube with water and then **lightly dry** it with a paper towel.
- 8) Put some **iodine solution** (about 150 mL) into the second beaker.
- 9) Place the sealed off tubing into the iodine solution.
- 10) Record the initial observations on **Table A**. Wait for about 30 minutes and then record any changes.

Data:

Table A. Experimental Observations of Dialysis Tubing

	Initial Colour		Final Observations	
	In tube	In beaker	In tube	In beaker
Phenolphthalein & NaOH				
Starch & Iodine				

