

## Lab Report

### Part One: Osmosis and Diffusion through Dialysis Tubing

#### Solute Identification Test

| Sample                     | Test Water Result                                           | Conclusion          |     |    |
|----------------------------|-------------------------------------------------------------|---------------------|-----|----|
| Water Bath<br>(0 minutes)  | Chloride ion test<br>After adding 10 drops<br>no ppt occurs | Present?            | Yes | No |
|                            |                                                             | Cl <sup>-</sup> ion |     | ✓  |
|                            | Starch test<br>After adding 10 drops there<br>is no ppt     | Present?            | Yes | No |
|                            |                                                             | Starch              |     | ✓  |
| Water Bath<br>(30 minutes) | Chloride ion test                                           | Present?            | Yes | No |
|                            |                                                             | Cl <sup>-</sup> ion | ✓   |    |
|                            | Starch test<br>The solution remain orange                   | Present?            | Yes | No |
|                            |                                                             | Starch              |     | ✓  |
| Dialysis Bag<br>contents   | Chloride ion test                                           | Present?            | Yes | No |
|                            |                                                             | Cl <sup>-</sup> ion | ✓   |    |
|                            | Starch test<br>the color turned dark<br>green               | Present?            | Yes | No |
|                            |                                                             | Starch              | ✓   |    |

#### Dialysis Bag Mass Data

|                                       | Mass (g)     | Changes in Mass (±g) |
|---------------------------------------|--------------|----------------------|
| Initial Dialysis Bag Mass (0 minutes) | 2.1867g      | 2.465g               |
| Dialysis Bag Mass after 30 minutes    | 25.051 grams | 0.407 grams          |

### Part Two: Factors Affecting Solvation Rates

#### Mass of NaCl sample

|          |             |
|----------|-------------|
| Sample 1 | 0.603 grams |
| Sample 2 | 0.607 grams |

|          |             |
|----------|-------------|
| Sample 3 | 0.609 grams |
| Sample 4 | 0.603 grams |

**Solvation Time**

|                                           | Time to Complete Solvation |
|-------------------------------------------|----------------------------|
| Room Temperature with NaCl crystals       | 185.5 sec                  |
| Ice Water Temperature with NaCl crystals  | 300 sec                    |
| Warm Water Temperature with NaCl crystals | 110 sec                    |
| Room Temperature with NaCl powder         | 45.23 sec                  |

**QUESTIONS**

- Given the results of the identification tests performed in part one, describe the ability of chloride ions and starch molecules to pass the semipermeable membrane of the sealed dialysis bag.
- Are the changes to the weight of the dialysis bag after 30 minutes consistent with osmosis occurring with the water? Cite your data to support your answer.
- Using your data as support, explain (a) the effect on solvent temperature on the rate of solvation and (b) the effect on surface area of solute (NaCl crystals vs powder) on the rate of solvation.

4. Based upon the mass of the NaCl used in Part Two, Calculate the moles of NaCl used, the % concentration and molarity (M) for each of the solution created in each of the test tubes.

| Sample | Moles of Solute NaCl | Volume of Solvent (H <sub>2</sub> O) | Concentration ( <i>show your work</i> ) |
|--------|----------------------|--------------------------------------|-----------------------------------------|
| 1      |                      | 20.0 mL                              | % concentration                         |
|        |                      |                                      | Molarity                                |
| 2      |                      | 20.0 mL                              | % concentration                         |
|        |                      |                                      | Molarity                                |
| 3      |                      | 20.0 mL                              | % concentration                         |
|        |                      |                                      | Molarity                                |
| 4      |                      | 20.0 mL                              | % concentration                         |
|        |                      |                                      | Molarity                                |

5. Explain why it is necessary to have the dialysis bag completely sealed from the water bath. How might a "leak" in the dialysis bag change your results and conclusions in Part I?