Objective: 1) Determine the effects of a selectively permeable membrane on diffusion and osmosis between two solutions separated by the membrane. 2) Relate osmotic potential to solute concentration and water potential.

**Experiment A: Osmosis**

In this experiment, you will use dialysis tubing to investigate the relationship between solute concentration and the movement of water through a selectively permeable membrane by the process of osmosis.

DAY 1

Procedure:

1) Obtain six 30 cm strips of presoaked dialysis tubing.

2) Tie a knot in one end of the each piece of dialysis tubing to form 6 bags. Pour or use a syringe to fill the bags with approximately 15ml of each of the following solutions into separate bags:

 a) distilled water

 b) 0.2M sucrose

 c) 0.4M sucrose

 d) 0.6M sucrose

 e) 0.8M sucrose

 f) 1.0M sucrose

Remove most of the air from each bag by drawing the dialysis bag between two fingers. Tie off the end of the bag. **Leave sufficient space for the expansion of the contents in the bag.**

3) Rinse each bag gently with distilled water to remove any sucrose spilled during the filling.

4) Carefully blot the outside of each bag and record the initial mass of each bag in the data table.

5) Place each bag in an empty beaker or cup and label with the molarity of the solution in the dialysis

 bag.

6) Let them stand overnight/48 hours max

DAY 2

1) Remove the bags form the water. Carefully blot dry and determine the mass of each bag.

2) Record your group’s data in the data table below.

Dialysis Bag Results – Group Data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Contents in dialysis bag | Initial Mass | Final mass | Mass difference | Percent change in mass\* |
| 0.0M distilled H2O |  |  |  |  |
| 0.2M sucrose |  |  |  |  |
| 0.4M sucrose |  |  |  |  |
| 0.6M sucrose |  |  |  |  |
| 0.8M sucrose |  |  |  |  |
| 1.0M sucrose |  |  |  |  |

\*Percent change in mass = (Final mass – Initial mass)/Initial Mass X 100

Dialysis Bag Results – Class data

|  |
| --- |
| Percent Change in Mass of Dialysis bags |
| Solutions | Group1 | Group2 | Group3 | Group4 | Group5 | Group6 | Group7 | Total | Class Avg. |
| 0.0M |  |  |  |  |  |  |  |  |  |
| 0.2M |  |  |  |  |  |  |  |  |  |
| 0.4M |  |  |  |  |  |  |  |  |  |
| 0.6M |  |  |  |  |  |  |  |  |  |
| 0.8M |  |  |  |  |  |  |  |  |  |
| 1.0M |  |  |  |  |  |  |  |  |  |

Graph the results for both your group’s data AND the class average on the paper given below.

Title \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Analysis Questions (Experiment A)

1) Explain the relationship between the change in mass and the molarity of sucrose within the dialysis bags.

2) Predict what would happen to the mass of each bag in this experiment if all the bags were placed in a 0.4M sucrose solution instead of distilled water. Explain your response.

3) Why did you calculate the percent change in mass rather than simply using the change in mass?

4) A dialysis bag is filled with distilled water and then placed in a sucrose solution. The bag’s initial mass is 20g and its final mass is 18g. Calculate the percent change in mass. Show your work to humor me.

5) The sucrose solution in the beaker would have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the distilled water in the bag. (isotonic/ hypertonic/ hypotonic)

**Experiment B (Osmosis and Water Potential)**

DAY 1

1) Using the same solutions from Part A. Pour about 100ml of each solution into different cups and label each cup with the molarity of the solution.

2) Using the potato borer. You will need 28 one inch potato sections with NO skin. Keep the potato a moist paper towel, covered.

3) Weigh 4 potato pieces at one time and record the initial weight in grams in the data table YOU create.

4) Place the potato pieces in the distilled water and cover with plastic wrap.

5) Repeat steps 3 and 4 until 28 potato cores have been distributed into each of the seven solutions.

Let the cores sit overnight/up to 48hours max.

DAY 2

1) Remove the cores from the beaker/cups. Blot the cores dry and weigh all 4 cores together. Record Final mass in data table.

2) Calculate percent change in mass and graph.

3) From your graph determine the molarity of the cells in the potato.

