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Osmosis Lab

## **Benedict's Test Showing Osmosis and Diffusion in Sugar and Salt**

### **Intro:**

This experiment shows the difference between osmosis and diffusion. In the stage of osmosis, there's a change in the solute. The dialysis sac goes through osmosis causing the movement in a solvent across the semipermeable membrane. In this experiment the particles move from a high area of concentration to a lower concentration until equilibrium is attained. Diffusion differs from osmosis because in the process, a substance moves from a level of high concentration to low. It all comes down to the molecules that are hydrophobic V. hydrophilic. The difference between these two molecules is that hydrophilic love water and hydrophobic don't like it and move away from the water.

### **Materials:**

1. Four beakers (250mL)
2. Four dialysis sacs
3. Distilled water
4. Salt (NaCl)
5. 40% Glucose solution
6. Graduated cylinder (25mL)
7. Twine or dialysis tubing clamps
8. Pencil
9. 10% sodium chloride
10. 40% sucrose solution
11. Laboratory scale
12. Eight test tubes
13. Test tube holder
14. Hot plate

### **Method**

In this experiment you need four beakers filled halfway with solution, label each of them from 1-4. In the beaker labeled 1 it will be filled half with distilled water. In the beaker labeled 2 it will be halfway filled with 40% glucose solution. In the beaker labeled 3 it will be half filled with distilled water and in the beaker 4 will be half filled with distilled water. Now take each dialysis sac and label them 1-4. Sac 1 should be filled with 20mL of 20% glucose solution. Sac 2 should be filled with 20mL of 40% of glucose solution. Sac 3 should be filled with 20mL of 10% NaCl solution. Sac 4 should be filled with 20mL of 40% sucrose solution. All your sacs should be weighed and recorded before submerging them into beakers with solution. Each sac labeled with a number goes into the designated beaker with that number. Each sac should be left in the beaker for 45 minutes, after the time is up, take them out and weigh them again.

Beaker	Sac	Initial weight	Final Weight	Weight Change	Beaker fluid	Sac Fluid
Beaker 1 ½ filled of distilled water	Sac 1 40% Glucose 20mL	7.1 mg	8.0 mg	+0.9	positive	positive
Beaker 2 ½ filled of distilled water	Sac 2 40% Glucose 20mL	6.9gm	6.9gm	No change	positive	positive
Beaker 3 ½ filled of distilled water	Sac 3 10% NaCl 20mL	7.2 gm	6.9gm	+0.6	AgNO3 Test positive	positive
Beaker 4 ½ filled of distilled water	Sac 4 40% Sucrose 20mL	7.1gm	8.0gm	+0.9	Benedict's Test negative	positive

## **Results**

When the 45 minutes are up and the sacs are reweighed, you see that sacs 1,3, and 4 increased in weight. Osmosis has taken place in these sacs causing them

to go up in weight. Sac 2 stayed the same in weight because the environment inside the sac was the same as the environment outside the sac. These positive results show that the dialysis sac is selectively permeable and diffusion occurred. Benedict's solution started light blue and changed to a yellow/brownish color when exposed to sugar. The silver nitrate which is brown produces a milky white substance when exposed to salts. The negative result for beaker 4 is due to the fact that sucrose is too large of a molecule to permeate through the sac membrane.