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Intro to Biology  
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## **Diffusion and Osmosis Tested with Glucose, Starch, IKI, and Sucrose**

### **Purpose:**

The purpose of this lab was to test osmosis, diffusion, and permeability. Osmosis being the diffusion of molecules through a semipermeable membrane from a place of higher concentration to a place of lower concentration. Diffusion is the process of movement of a substance from an area of high concentration of that substance to an area of lower concentration. (Holtzclaw) Permeability is the property of something that can be invaded by a liquid. In this case the property of cell membrane is the softened dialysis bag being tested to see if it is permeable and how permeable the dialysis bag is.

### **Hypothesis:**

The dialysis bag will have a positive reaction and the beaker will have a negative reaction. Then in the second half of the experiment the dialysis bag's mass will slightly increase at most by 5-10%.

### **Materials:**

- Seven 25cm pieces of dialysis tubing
- Distilled water
- 15mL of 15% glucose/1% starch solution
- 250mL beakers
- 4mL of Lugol's solution (IKI)
- Sucrose molar solution
- Scale

**Procedure:**

For the first half of the lab (the diffusion experiment), presoak a dialysis bag in distilled water to soften it and then tie off one end securely. Open the other end of the dialysis bag and fill it with 15mL of 15% glucose/1% starch solution and record the color of the solution inside of the bag. Add 4mL of IKI to the distilled water. Then place the dialysis bag in the beaker of solution. Keep the bag submerged for 20-30min and record the final color of the substances in the dialysis bag and the beaker.

For the second half of the experiment (Osmosis Experiment) presoak 6 dialysis bags and tie off one end of each of the bags. Meanwhile, fill six beakers with distilled water. Then label the bags 0.0M, 0.2M, 0.4M, 0.6M, 0.8M, and 1.0M and place the correct amount of sucrose molar solution in the correctly labeled bag. Weigh each bag and record the weights of each bag. Then, simultaneously, place all the bags in a beaker of distilled water and allow the bags to sit in the distilled water for 20-30min. Simultaneously remove the bags from the beakers when the time is up and blot off the remaining water on the bags. Next, weigh each bag of solution and record the final results.

**Data:**

Diffusion Experiment

Time	Color		Glucose Content	
	Dialysis Bag	Beaker	Dialysis Bag	Beaker
0min	White	Yellow-brown	Positive	Negative
30min	Yellow-brown	Yellow-brown	Positive	Slightly Positive

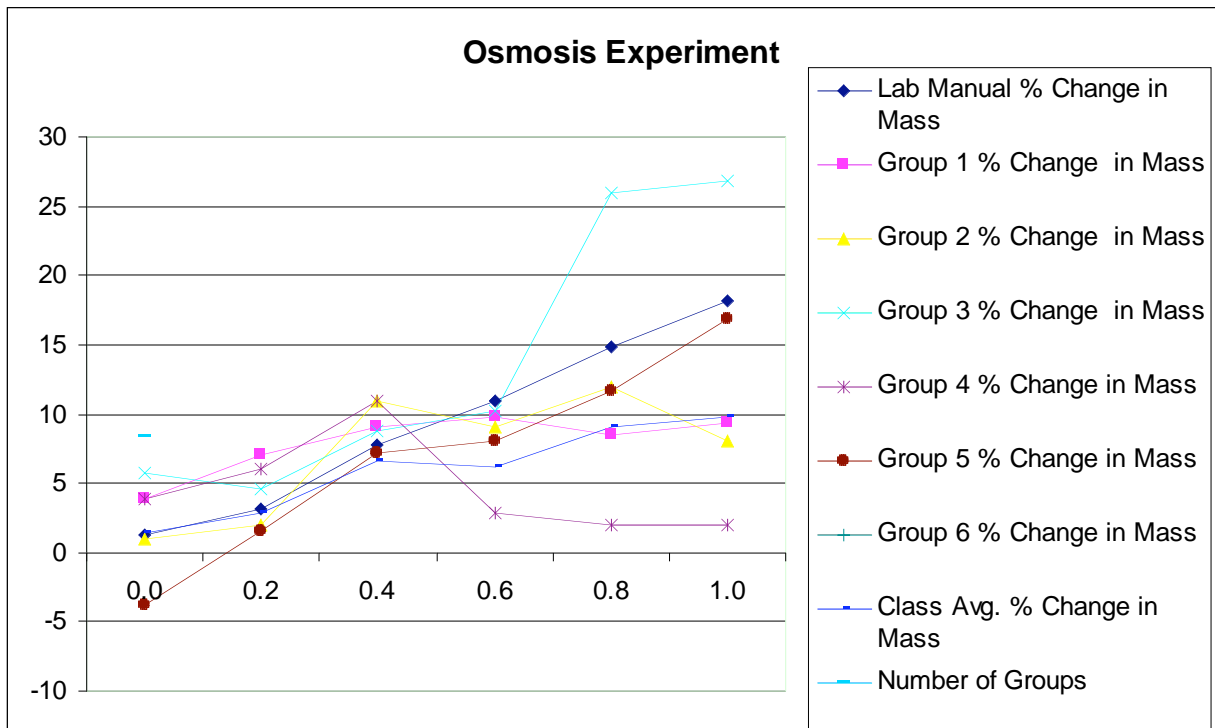
### Osmosis Experiment

Solution	Dialysis Bag Initial Mass (g)	Dialysis Bag Final Mass (g)	Dialysis Bag % Change in Mass
0.0M	26.00g	27.50g	5.77%
0.2M	26.40g	27.60g	4.55%
0.4M	27.30g	29.70g	8.79%
0.6M	25.40g	28.00g	10.24%
0.8M	26.20g	33.00g	25.95%
1.0M	26.10g	33.10g	26.82%

### Class Osmosis Experiment Data

Sucrose Molarity in Beaker	Lab Manual % Change in Mass	Group 1 % Change in Mass	Group 2 % Change in Mass	Group 3 % Change in Mass	Group 4 % Change in Mass	Group 5 % Change in Mass	Group 6 % Change in Mass	Class Avg. % Change in Mass	Number of Groups
0.0	1.2	3.88	1	5.77	3.88	-3.85		1.435071472	8.278333
0.2	3.1	7.08	2	4.55	5.97	1.49		2.922085766	
0.4	7.7	9.13	11	8.79	10.93	7.22		6.616066036	
0.6	11	9.85	9	10.24	2.9	8.01		6.160660359	
0.8	14.8	8.49	12	25.95	2.04	11.65		9.051338837	
1.0	18.2	9.34	8	26.82	2	16.89		9.814777532	

## Analysis and Calculations:



## Conclusion:

For the diffusion experiment, after the experiment was performed IKI was somewhat present in the dialysis bag creating a reaction that has caused the color of the contents in the bag to change from a white to a yellowish brown. Then the IKI present in the beaker that did not change color much, however, the color was slightly darker so it had a slightly positive reaction. So, the dialysis bag is semipermeable the IKI could pass through the dialysis bag and some of the starch was able to leave the bag giving the beaker a slightly positive result. Only some of the compounds could pass through, because some molecules are too large to pass through the dialysis bag. More, because the dialysis bag has small holes in it small enough for the water molecules to pass through.

In the Osmosis experiment, the mass of the dialysis bag changed, because water was entering the dialysis bag. This has to do with the fact that the water is traveling to a

place of high concentration to a place of low concentration, there is a low concentration of water in the dialysis bag so that is where the water molecules traveled. The solution is hypertonic, because the water is going to the solution. So, if the beaker contained sucrose instead of distilled water then the results would be very different, because there is a high concentration of sucrose in the bag as it is.

**References:**

- (1) Holtzclaw, Theresa Knapp. "Diffusion and Osmosis." The Biology Place: Lab Bench Activity. 2009. Pearson Education Inc. 9 Jan 2009  
<[http://www.phschool.com/science/biology\\_place/labbench/lab1/intro.html](http://www.phschool.com/science/biology_place/labbench/lab1/intro.html)>.