

Lab 1: Osmosis and Diffusion

ZhuoYing Tan

BIO2311

Section# OL26

Niloufar Harque

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Objective:

In this laboratory we will be learning about how to determine the differences between osmosis and diffusion by testing the sugar with benedict's solution. Then we will be observing diffusion with sodium chloride.

Purpose:

How do we identify osmosis and diffusion by using glucose solution ?

Hypothesis:

Equipment:

The equipment we will be using in the laboratory is:

1. Test tube
2. Beakers
3. Insulated gloves
4. Test tube holders
5. Weight
6. Bunsen burner or electric heater

Procedures:

1. In the beginning of the lab, we have four different levels of glucose solution in a test tube such as 20% glucose solution, 40% glucose solution, 10% NaCl solution, and 40% sucrose solution.
2. Then we will pour 20 ml of these four different levels of glucose solutions in four different sacks. So the first sack we pour 20 ml of 20% glucose solution, second sack we pour 20 ml of 40% glucose solution, third sack we pour 20 ml of 10% NaCl solution, and fourth sack we pour 40% sucrose solution.
3. Next we have four beakers, for the first beakers we fill half way of distilled water, second beakers we fill half way of 40% glucose solution, third beakers we fill half way of distilled water, and the fourth beakers we fill half way of distilled water also.

4. Then we will pour the solution from the beaker to the representative sack. So the first sack will end up with a 20% glucose solution with distilled water (s1), second sack is 40% glucose solution with 40% of glucose solution (s2), third sack we have 10% NaCl solution with distilled water (s3), and fourth sack we have 40% sucrose solution with distilled water (s4).
5. After we mix the solutions together for different sacks, we tie it up, wipe and clean the sacks a little bit, then we take the weight of each sack.
6. After we take the weight for each sack and record it down to our table, then we put the sacks into the representative beaker and let it sit for 45 minutes.
7. Then we wait for 45 minutes, and we take the sacks out from each representative beaker and we weigh each sack again.
8. Last is to calculate the difference of the weight for each sack in zero minute and after 45 minutes.
9. Then we start another experiment to test for sodium chloride by using the solution in tube# 3 which is the 10% NaCl and beaker #3 which is distilled water.
10. Later we start another experiment that is testing for sugar. Same thing, we take the samples from each test tube and some samples from the beaker.
11. Then we will mix the up the samples, such as sample from tube #1 will mix with sample from beaker #1 and this step will be repeated for tube and beaker number 2 to number 4. But we only do the testing of the sugar experiment for mixture number 1, 2, and 4 because mixture number 3 is sodium chloride and we will do a testing for sodium chloride for this specific mixture. At the end we will have another 4 mixture solutions that are the same as the mixture solution from the sacks.
12. Next we will add benedict solution into the mixture solutions and pour it inside of the new test tube.
13. Then we will place the test tube inside of boiling water and observe the color change.
14. Lastly, we will mark down the color change of each test tube, color yellow, green, and brown will be the result of positive sugar.
15. Now we are up with the last experiment which is testing for sodium chloride. So we will be testing tube number 3.
16. In test tube number 3, we will add silver nitrate solution into the test tube mixture from both samples. If milky white precipitate is formed at the junction then it is positive for sodium chloride.
17. Lastly, we record our results.

Data Analysis:

Sack	S1	S2	S3	S4
Weight of sack at time "zero"	7.1 gm	6.9gm	7.2gm	7.1gm
Weight of sack after 45 minutes	8.0gm	6.9gm	7.8gm	8.0gm
Change in weight	+0.9gm	0	+0.6gm	+0.9gm

- In the first experiment, when we observe the weight for each sack, only s1, s3, and s4 weight have increased after 45 minutes. s2 are remaining the same.
- The reason why s1, s2, and s3 have increased its weight is because the glucose dissolves in water and it gains weight. s2 is mixed with 40% glucose with 40% glucose, so the same amount of solution won't make any changes in the result of weight.

Testing for sugar

Test tube #1a - Change in color: positive sugar

Test tube #1b - Change in color: positive sugar

Test tube #2a - Change in color: positive sugar

Test tube #2b - Change in color: positive sugar

Test tube #4a - Change in color: positive sugar

Test tube #4b - No color change: Negative sugar

- The reason why only test tube #4b is tested for negative sugar is because test tube# 4 is a mixture with sucrose and sucrose is very large that cannot be dissolved.

Testing for sodium chloride

Formula we used in this experiment

NaCl (colorless) + AgNO_3 (brown)



AgCl (milky white) + NaNO_3

Test tube #3a - Positive sodium chloride

Test tube #3b - Positive sodium chloride

- Test tube# 3a is testing positive for sodium chloride is because the mixture in test tube #3a is already 10% of NaCl solution.
- Test tube #3b is testing positive for sodium chloride because the mixture is distilled water and is only with one molecule.

Conclusion:

In conclusion throughout all three experiments we understand how the size of the molecule and the different types of mixture will affect the results.

