***Rubi Rodriguez***

***Lab 3***

***Sept 05 ,2023***

***Purpose:*** *The purpose of this lab is to understand that the pancreatic lipase has a major role in fat digestion, but by itself, lipase is ineffective because it is water-soluble enzyme trying to act on large lipid droplets, which are water insoluble. I also found out that bile salts help overcome this problem by acting as emulsifying agents, which break the fat into smaller droplets so that the lipase has a larger surface area for its hydrolysis of fats. The pancreas also aids digestion of lipids by secreting sodium bicarbonate. This compound provides pH of around 7.8 in the small intestine, which is optimal for the action of the pancreatic enzymes.*

***Procedures:***

*#1) Add just enough litmus powder to a container of dairy cream to produce a medium blue color. Pour 3 ml of the litmus cream into 4 separate test tubes. Into two additional test tubes pour 3ml of 2% pancreatin. Preincubate the litmus cream and the pancreatin separately in a 37\*C water bath for 5 minutes.*

*#2) Gently shake each tube for 30 seconds to mix in the bile salts. Incubate all four tubes in a 37\*C water bath for 1 hour, checking every 15 minutes for the first 5 minutes or until the first tube changes color, then every 15 minutes for the rest of the hour. Record the time and number of the tube. Continue checking for the remainder of the hour.*

*#3) Remove the tubes from the water bath. Test the pH of each tube using pH paper and note the odor and color of each tube. Know that blue litmus will turn pink in an acid environment.*

*#4) Summarize the results.*

*#5) Explain how the digestion of fat affects the pH of the solution and how bile affects the rate of digestion.*

***Results:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***TUBE*** | ***COLOR*** | ***pH*** | ***Odor*** | ***Time to change color*** |
| *#1* | *Lavender/Pink* | *7* | *Sweet* | *30 minutes* |
| *#2* | *Lavender/Purple* | *8* | *Shaved metal* | *30 minutes* |
| *#3* | *Light Purple* | *7* | *Stinky smell* | *30 minutes* |
| *#4* | *Dark Purple* | *8* | *Charcoal* | *30 minutes* |

***Discussion:*** *The first thing I did was I added litmus powder to a container of dairy cream to produce a medium blue color. We than poured 3 ml of litmus cream into 4 separate tube and in 2 we only poured 3ml of 2% pancreatin, we than took them to the water bath and left them for 5 minutes. Then we shook each tube for 30 seconds to mix in the bile salts and we incubated all four tubes again into the 37\*C water for 30 minutes. After that, I took my tubes to my desk and we tested pH of each tube using pH paper and we also wrote down the odor and color of each tube. I followed each step as shown on our lab Manuel to get the results that i got in which I included on this lab report.*

***Conclusion:*** *In conclusion, during this lab I was able to see how this all works. Once pancreatin and bile salts are introduced into the solution, the lipids start breaking down into fatty acids. The breakdown will result in a low pH, which is why we tested to observe the pH changes. Like all other catalysts, enzymes are characterized by two fundamental properties. First, they increase the rate of chemical reactions without themselves being consumed or permanently altered by the reaction. Second, they increase reaction rates without altering the chemical equilibrium between reactants and products. I learned that raising temperature generally speeds up a reaction, and lowering temperature slows down a reaction. Emulsification is a process of dissolving fats into smaller fat droplets with the use of bile, which digestion involves the conversion of biomolecules into their simpler form with the use of enzymes. A buffer is a solution that can resist pH change upon the addition of an acidic or basic components. It can neutralize small amounts of added acid or base, thus maintaining the pH of the solution relatively stable. This is important for processed and/ or reactions which require specific and stable pH ranges.*