Laboratory 3 - Properties of Enzyme Action

3-C: Digestion of fat with pancreatic lipase and bile salts

Purpose: Understanding how enzymes participate in the initiation and acceleration of specific chemical reactions without being changed or used up. Also the efficiency of enzymes with changes in temperature and pH. Ultimately, determining the range of tolerance of enzymes through pH and temperature.

Procedures:

3-C: Digestion of fat with pancreatic lipase and bile salts

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 3 ml of 2% pancreatin. Preincubate the litmus cream and the pancreatin separately in a 37 C water bath for 5 minutes. Then prepare four test tubes as follows:

Tube #1: 3 ml cream + 3 ml pancreatin
Tube #2: 3 ml cream + 3 ml distilled water
Tube #3: 3 ml cream + 3 ml pancreatin + pinch of bile salts
Tube #4: 3 ml cream + 3 ml distilled water + pinch bile salts

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 minute 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.
NOTE: Blue litmus will turn pink in an acid environment.

Results:

3-C: Digestion of fat with pancreatic lipase and bile salts

Tube	Color	pH	Odor	Time to change color
#1	Light pink	7	Spoiled milk	10min/30min
#2	Light purple	8	No odor	10min/30min

#3	pink	8	Rotten Eggs	10min/ 30min
#4	blue/purple	6	Burnt	10min/30min

Discussion: I enjoyed seeing the color change within each tube and how not only the color, but the odor change over time and with temperature. With increasing temperature it will speed up a reaction and decreasing the temperature will slow down a reaction.Each enzyme has a pH range where it works the best, and when that ph range is altered it will lower the activity of the enzyme. From my understanding emulsification is breaking down a lot of fat molecules into smaller groups of fat molecules and digestion turns things like carbohydrates, lipids, and proteins to a simpler form with the help of enzymes.

Conclusion:

- Be able to define an enzyme.
- Understand the manner in which enzymes operate.
- Understand the effect of pH and temperature on an enzyme.
- Understand the difference between digestion and emulsification.
- Understand the roles of indicators and buffers in this experiment.