

## **Properties of Enzyme Action**

### **Purpose**

The purpose of the experiment is to understand how digestion of fat with pancreatic lipase with bile salts and to understand how emulsification works.

### **Procedures**

Litmus powder was added to container of dairy cream to produce a medium blue color. After this, 3 ml of litmus cream was poured into four (4) separate test tubes. Into two additional test tubes, 3 ml of 2% pancreatin was poured into the test tubes. After filling the test tubes, all of the test tubes were preincubated in a 37°C water bath for 5 minutes. After the incubation, the test tubes were prepared in different ways. For tube #1, 3 ml cream and 3 ml pancreatin was made. For tube #2, it was 3 ml of cream and 3 ml of distilled water while for tube #3, it was 3 ml cream, 3 ml of pancreatin, and pinch of bile salts. For the last tube, it consisted of 3 ml cream, 3 ml of distilled water, and pinch of bile salts. After the tubes were prepared, all tubes were shaken gently for about 30 seconds. The four tubes were incubated in a 37°C water bath for an hour and checked every minute for the first 5 minutes or until it changed the color, and then checked every 15 minutes for the rest of the hour. The test tubes were removed from the water bath then tested the pH using pH paper. The odor and color of each tube were listed in the entire experiment as well.

## Results

Tube	Color	pH	Odor	Time to change color
#1	Ombre color: top part is purple while the bottom part is pinkish	7	Smells like rotten egg but not that strong	30 min mark
#2	Grayish purple with purple residue at the bottom	8	Smells creamy, powdery, milky	30 min mark
#3	Top part is grayish purple while the bottom is pinkish with black residue	6	Smells like rotten egg (very strong)	15 min mark
#4	A brown foamy residue at the top then grayish purple in the middle. The bottom is dark purple with black residue	8	Smells like rotten egg (very strong)	15 min mark

## Discussion

In this experiment, the color, pH, the odor of each solution, and the time when the solution changed its color were observed. For tube #1, it had a pH of 7 which is neutral. The color ended up being an ombre with a purplish color at the top while the bottom part had a pinkish color. It smelled like a rotten egg, but it was not that strong. It changed color right after the 30 minute mark. For test #2, it had a pH of 8 which makes it a basic solution. For the color, it has a grayish purple color with purple residue at the bottom. The smell was very different from other solutions because it had a milky and creamy smell to it. It changed its color in the 30 minute mark as well. On the 3<sup>rd</sup> tube, it includes bile in it. The pH of the 3<sup>rd</sup> tube was 6 which

makes the solution a little acidic. The color was grayish purple on the top while pinkish at the bottom with black residue. The odor was rotten egg but stronger this time. It changed its color at the 15 minute mark. For the last tube, which is the 4<sup>th</sup> one, it had a pH of 8 which makes it a basic solution. The color of the solution was a little different from the other three tubes because this tube had a brown foam at the top, but the middle color was grayish purple. The bottom color was dark purple with black residue. The odor was like rotten egg as well but stronger. It changed its color at the 15 minute mark.

## **Conclusion**

In conclusion, bile improves the speed and efficiency of lipase hydrolysis of fat. This is why for the last two tubes which are tube #3 and tube #4, the color change was faster than the first two tubes which are tube #1 and tube #2. With the help of the bile in the solution, it helps the digestion of lipase faster than without the bile.