How are Enzyme Reaction Rates Affected by Temperature and pH Levels?

Viesca, Princess Jazzelle (School: Fa'asao Marist High School)

Enzymes speed up chemical reactions. The purpose of this project is to determine how temperature and pH levels affect the rate at which digestive enzymes catalyze chemical reactions. To measure the enzyme reaction rates, I recorded the time in which it takes the coffee filter soaked in the solutions to float to the surface of the hydrogen peroxide. The coffee filter sinks at first due to its density, however, when the coffee filter is submerged in the hydrogen peroxide, the enzymes break it down. The bubbles make the soaked coffee filter float back to the top. I tested the speed at which enzymes speed up chemical reactions on four different solutions. These solutions were made up of beef liver, mangoes, bananas, and avocados. The enzymes in the banana and mango solution did not create a chemical reaction. The liver solution, however, reacted instantaneously no matter the temperature and pH. The enzymes in the avocado solution reacted the fastest in hot environments and in basic pH levels. The data from all my experiments show that digestive enzymes react faster at hotter temperatures and in more basic pH levels and that catalase, the enzyme found in livers, reacts instantly to hydrogen peroxide.

Awards Won: