Does Exposing Lactaid Pills to Acid Impact Enzyme Activity

Yee, Gianfranco (School: Urban Science Academy)

Individuals who suffer from lactose intolerance are deficient in the digestive enzyme lactase, which breaks down lactose (sugar in dairy milk). So, they take the lactase enzyme supplement Lactaid in order to consume dairy products. However, this product's overwhelming number of negative customer reviews lead me to question its true effectiveness, thus I formulated an experiment gauging its effectiveness. My approach dealt with the pills' special coating, called an enteric coating, which is designed to remain stable in acidic environments (such as the stomach) but break down in relatively basic environments (such as the intestines). Its purpose is to protect pills' contents from stomach acid, which could denature the contents. My goal is to determine how well this coating does its job in low pH levels. In my experiment, pills were exposed to a pH 4 solution for varying times, and then combined with lactose milk to measure enzyme activity (in terms of glucose production). I hypothesized that the pills had a strong coating rather than a weaker one that would deteriorate producing a thinner coating more easily broken down. However, the evidence refuted my hypothesis by showing that the longer the pills remained submerged in the buffer, the greater the enzyme activity when placed in a lactose solution for a set time. These results indicated that the coatings were not completely effective.

Awards Won: