



CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s) Malachi D. Maguregui	Project Number J0506
Project Title How Does pH Affect Glucose Production When Lactase Is Added to Lactose?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to see if there is a way for people who are lactose intolerant to better digest milk with the help of lactase.</p> <p>Methods/Materials Pre-test your experiment to make sure that regardless of the amount of lactase added it creates the same amount of glucose. Measure $\frac{1}{2}$ of a cup of additive into 5 different cups. Test the pH of the additive and make sure it matches the pH known for the substance. Add $\frac{1}{2}$ cup of milk to each of the cups. Test the pH of the milk and additive mixture. Test the glucose level to make sure that no glucose had been created by the additive. If the glucose result is a zero and the pH is at an appropriate level, add one crushed lactase tablet into every cup at the same time. Stir each glass once a minute for eight minutes. At the end of eight minutes, use glucose test strips to find the amount of glucose present in each of your 5 glasses of milk. Record and analyze data. Repeat this procedure with every additive: lemon juice, soda (Coke), tomato juice, black coffee, water, egg, baking soda, Milk Of Magnesia.</p> <p>Results The results are given as the amount of glucose in milligrams to a deciliter. Liquids with a pH of 2 had an average of 2800 mg/dL. Liquids with a pH of 3 had an average of 2560 mg/dL. Liquids with a pH of 4 had an average of 2200 mg/dL. Liquids with a pH of 5 had an average of 1870 mg/dL. Liquids with a pH of 6 had an average of 1500 mg/dL. Liquids with a pH of 7 had an average of 1200 mg/dL. Liquids with a pH of 8 had an average of 970 mg/dL. Liquids with a pH of 9 had an average of 272 mg/dL. Liquids with a pH of 10 had an average of 15 mg/dL.</p> <p>Conclusions/Discussion In the stomach and small intestines are lots of acids such as hydrochloric acid. Lactase works in your stomach and small intestines, but is not affected by the acids created in the stomach. In this experiment, when the milk's pH was lowered, it created slightly more glucose because the acids boosted glucose production. Since acids are more commonly found in the stomach, we rarely find bases in our digestive system which reduce the production of glucose. Bases are often identified with pH's above a 7, and as the results show, those liquids with pH's above 7 show a drastic reduction in glucose production. In some cases, with the baking soda and Milk of Magnesia, they completely counteract the breaking down of lactose because they damage the enzyme lactase.</p>	
Summary Statement By changing pH of milk and adding lactase, I was able to increase glucose levels in milk.	
Help Received none	