



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Christopher D. Johnson</b>	<b>Project Number</b> <b>J0412</b>
<b>Project Title</b> <b>Is Saliva More than Just Spit?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project was to determine if the pH of any common breakfast drink will stop the breaking down action of starch into maltose by the enzyme salivary amylase found in saliva.</p> <p><b>Methods/Materials</b> Nine test tubes were set up in test tube racks. A pea-sized amount of cornstarch was placed into each one. Then five milligrams of water and four milligrams of saliva were added as well into each test tube. Then moving from test tube one to test tube eight the following liquids were added: water, apple juice, orange juice, milk, tea, coffee, 1M of NaOH, and 1M of HCL. No beverage was added to the final test tube as it served as a control. After sitting for an hour, a Benedict's Test was completed on each tube to determine if sugar was present. Due to apple juice and orange juice having sugar present in the beverage previous to the experiment, a retest was done. Two test tubes and another tube as the control were set up. In the test tubes was a pea-sized amount of cornstarch, five milligrams of water, and four milligrams of saliva. Then, to the first two test tubes, NaOH and HCl were mixed to create a solution at a pH of five#that of both apple juice and orange juice. Another Benedict#s Solution test was completed to determine if the sugar in apple juice and orange juice had affected the amount of sugar produced from the reaction of starch breaking down into maltose.</p> <p><b>Results</b> No breakfast beverage in the experiment had stopped the production of maltose. Several drinks showed that they resulted in lower amounts of sugar having been produced than others. Only the solutions with extreme pH levels (1 and 11) had stopped the reaction completely by having denatured the salivary amylase. The warmer drinks (tea and coffee) had seemed to speed up the reaction due to creating a warmer environment, and causing the enzyme run reaction to go faster, thus producing more sugar as supported by the Benedict's Solution test color result. If a drink were to be too hot, the enzyme would be denatured.</p> <p><b>Conclusions/Discussion</b> This experiment resulted in the rejection of my hypothesis. No common breakfast beverage tested stopped the breaking down action of starch into maltose by salivary amylase. Only a solution with very high temperature and/or one with an extreme pH level, either low or high, will denature the enzyme and prevent the reaction from occurring.</p>	
<b>Summary Statement</b> This project is to find out if any breakfast drinks will inhibit the breaking down action of starch into maltose, thus reducing the amount of natural sugars in the digestive system..	
<b>Help Received</b> Used lab equipment at Central high School under the supervision of B. Johnson.	