



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Kate H. Williamson	Project Number J0416
Project Title The Effect of Enzyme Concentration on Apple Juice Production	
Abstract Objectives/Goals The goal of this project is to measure the amount of juice released when apples are exposed to different concentrations of the enzyme pectinase. The hypothesis is if a more concentrated enzyme solution is used, then the cell walls in the apples will break down faster and produce more juice. Methods/Materials The top items needed for this experiment were 20 apples, pectinase, 100 mL graduated cylinders and beakers, a cooler, and a water thermometer. The apples were prepared and treated with various concentrations of pectinase. After sitting for 40 minutes in a 104 degree bath, the apples were filtered through a funnel and coffee filter and the juice was measured in a graduated cylinder. This process was repeated 15 times, and the results supported the hypothesis, but only to a certain point. Results The groups with pectinase definitely produced more juice than the group without any added pectinase. The ½ tsp. solution produced more juice than the 0 tsp. solution, but not as much as the 1 tsp. solution. Also, the 2 tsp. solution was too much, and it actually hindered production of the juice. In higher concentrations, more pectinase did not necessarily mean more juice. The results showed that there is an optimal level of enzyme that should be used to get the best juice yield. In the 15 trials, the highest juice producer was consistently the apples treated with a 1 tsp. per gal. of distilled water solution. Conclusions/Discussion Using the optimal level of enzymes in juice production helps manufacturers produce more juice from their fruit, and reduce the amount of food waste left after processing.	
Summary Statement This project measures the amount of juice released when apples are exposed to different concentrations of the enzyme pectinase.	
Help Received Jennifer Barber, from BioSun Flavors and Food Ingredients, provided me with a free sample of Rohapect pectinase enzyme. My mom helped me obtain the necessary supplies and assisted in removing apple samples from the water bath at exactly the same time. My sister helped me chop many apples!	