CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

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Project Number
28438

Project Title
DNA Dilemma: To Modify or Not to Modify?

Abstract

Objectives/Goals
Extracting DNA is the first step in testing GMOs or genetically modified organisms. My experiment#s goal was to test the method of home-based DNA extraction by comparing the yield of DNA matter extracted through the use of different household detergents and protein-breaking enzymes. My hypothesis was that the best results would be made with the strongest detergent, which was X-14 cleaner with no enzymes added.

Methods/Materials
After blending ½ cup of peas, 1/8 tablespoon salt, and 1 cup of warm water for 15 seconds, I strained the cell material, and added 2 tablespoons of detergent. After 15 minutes, I added in a small amount of an enzyme, and 1 tablespoon alcohol. The controlled variables were salt, DNA source, water and alcohol. The manipulated variables were the detergents and enzymes used to purify DNA.

Results
Out of all the eight detergents used, Ultra Joy with surfactants Sodium Laureth Sulfate and Cocamide Mea, acting with an enzyme Polyaminopropyl Biguanide, brought out the most DNA.

Conclusions/Discussion
In order to speedily identify genetically modified organisms, there has to be a procedure which will extract DNA with accessible household materials, preserving the purity at the same time. In my experiment with household chemicals I used eight different detergents, which were all picked for their different chemicals components (see report for analysis). I investigated which detergent brought out the largest quantity of DNA, and the purest yield of DNA.

The best results came out to be with Ultra Joy dish detergent, because of the amount of surfactants present. Thus, my hypothesis was not proven. As I continue working with spectrometer, additional information on DNA purity will become available.

Summary Statement
Using widely available chemicals, it is possible to obtain the quantity of DNA needed for the amplification procedures, of the purity that allows further analysis for the GMO presence.

Help Received
I thank Dr. Prince for allowing me to use his laboratory, especially the spectrometer needed for measurements of DNA matter. I thank my parents for their help on reading my work and helping me edit it. And finally, I thank my coach for all of her support and guidance.

Preliminary