CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
J0420

Project Title
Determining Different Sizes of Molecules in Plant Derived Dyes Using Gel Electrophoresis

Abstract

Objectives/Goals
My objective was to compare the difference in sizes of color molecules in two different brands of food coloring dye. My goal is to show which color molecules are the smallest and largest. I will prove that the two brands don't use the same mixture of color molecules to produce their dye.

Methods/Materials
To make the electrophoresis chamber,I used a plastic box, steel wire, wire cutters, and wooden sticks to make the comb. To make the agarose gel,I used measuring spoons, measuring cup, bowl, baking soda, bottled water, agar powder, a microwave, and a butter knife. The materials that I needed are nine volt batteries, alligator clip leads, food coloring dye of two different brands, a plastic syringe, and a ruler.
I made an agarose gel and placed it in the chamber with my comb where it hardened leaving holes for the dye. First, I needed to connect five nine volt batteries with steel wires at the top and bottom of the box using alligator clip leads. This provided the electrical current needed for the migration and separation of the dye. To work, the positive electrode was opposite of the dye wells. Then I put the same three colors from two different brands of dye in the wells. I monitored the process every 10-15 min. At the end of the experiment, I compared the distances that each color molecule traveled from two different brands.

Results
I identified and compared the distances traveled by the color molecules. The dye that showed excellent separation and migration was the green dye. To make green you need to combine blue with yellow. After observing the greens, I noticed that one brand had more blue rather than yellow in it (Albertson's). However, the Betty Crocker brand used more yellow and just slightly used blue. Using the process of electrophoresis helped to identify what color molecules each brand used to make their dye. I also determined that the smallest color molecule was yellow because it traveled the furthest. The largest color molecule was blue because it traveled the shortest distance.

Conclusions/Discussion
I determined from this experiment that not all dyes are made from the same color molecules. I also discovered that the yellow color molecule is likely the smallest and the blue color molecule is likely the largest.

Summary Statement
I attempted to determine the difference in sizes of color molecules between two different brands of dye using gel electrophoresis.

Help Received