Pricey to Priceless Gel Electrophoresis

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Pricey to Priceless Gel Electrophoresis's purpose was to design a more cheap and effective way for forensic analysists to measure the accuracy of evidence in DNA testing of criminals, along with now allowing high school students the ability to obtain hands on experience that is generally reserved for college laboratory courses— potentially raising the education levels of students. This experiment was chosen because of my interest in why and how gel electrophoresis is used, leading to my design of an inexpensive, portable version that forensic scientists and students could use safely around the world. So could a homemade model of gel electrophoresis work efficiently enough to be used in laboratories today? Once constructing the chamber, I began synthesis of the needed materials for experimentation such as the buffer solution and agarose gel in order to run the samples. The process is then typically followed by hooking up electrodes, a power supply, and watching the DNA molecules migrate through the gel. Migration needs to occur in a manner that allows for the separation of different sized pieces of DNA—the larger pieces appear at the top of the chamber and the smaller pieces appear at the bottom of the chamber. A scientist then compares the pattern of the crime scene DNA to the pattern of the suspects' DNA and looks to see if there is a match. Three different forms of DNA were used in the testing of this experiment. Macromolecules in food coloring dye first ran through the machine, resulting in visible separation of the dyes into different colors. Then DNA extracted from fruit and humans migrated through the machine, resulting into the separation of various bands of DNA fragments, proving that the gel electrophoresis machine gives accurate results.

Awards Won: