CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J0410

Project Title
DNA Testing: Commercial Kits vs. Household Methods

Abstract

Objectives/Goals
Is there a difference between the quality and quantity of DNA extracted from kiwi, wheat germ, and white onion using a commercial kit vs. household methods? Based on my research, I believed the DNA extracted would vary in amount and appearance. The kit results might provide purer, larger quantity DNA extracts. The commercial kit would also offer simpler procedures. The household methods would require many more ingredients and steps, and would extract less DNA. The household methods would also provide less pure DNA due to cell debris and proteins present, especially in the wheat germ extract samples.

Methods/Materials
I began following directions on the DNA kit. I cut up the biological material, mixed it with the lysis reagent, and poured a bit of this mixture into a test tube containing the precipitation reagent. All the household methods followed the same basic procedure: the mashing and heating breaking down the cell walls, then adding detergent to break open the cell membranes. Sieving the paste removed most of the unwanted material, including cell debris and proteins. Finally the alcohol was carefully layered on top. These procedures were repeated in the numerous repetitions of trials I performed.

Results
The kit results varied greatly. The kiwi DNA usually appeared a day later; the wheat germ immediately formed large amounts of white, frizzy DNA with many strings intertwined, and the onion produced very small strands of DNA. The household methods all produced a substantial amount of DNA. The onion, once stirred, quickly showed many DNA strands. The wheat germ formed medium sized clumps. The stirred kiwi extract formed quite a few strings of intertwined DNA each time.

Conclusions/Discussion
If you're looking for pure results and an easy, relatively quick way to extract DNA, the kit may be the way to go, although it did not guarantee a good amount of DNA produced each time. The household methods require more steps and time, but produced substantial amounts of DNA in each trial. So why spend all of that money, when you have ingredients handily stashed away in your kitchen that can produce results equal to a scientific kit? For teachers who could not afford to purchase expensive DNA extraction kits, this might be especially important, since they could still perform successful DNA extraction experiments using the household methods.

Summary Statement
The goal of this project was to discover if there was a difference between the quality and quantity of DNA extracted from kiwi, wheat germ, and white onion using a commercial kit vs. household methods.

Help Received
Thanks to my parents for purchasing the "DNA: I CAN DO THAT!" kits and other ingredients. Thanks to my science teacher for her advice and for providing test tubes, stirrers, and other supplies.