



CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

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| Name(s) Kirandeep Gill; Kamalpreet Tut | Project Number 22210 |
| Project Title The Effect of Glucose on Expression of the Amylase Gene in Bacteria | |
| Abstract Objectives/Goals In this context of study, the experiment to be performed is: what effect does maltose have on gene expression of amylase in bacteria? The hypothesis is that glucose will "turn off" the regulator gene for producing amylase because the presence of glucose is a stimulator to turn the gene "off"; therefore, if glucose is already present in the gene, the operon will be turned "off". Methods/Materials A 2% starch agar was prepared in the lab. Then, soil samples were obtained and placed on the agar plate with a sterile loop. This agar plate was then placed in the incubator at 37°C. After a span of 48 hours, the agar plates were examined for bacteria colonies. The following samples were prepared in the lab: 2% starch, 1% glucose with 2% starch, 2% glucose with 2% starch, and 3% glucose with 3% starch. The plates containing glucose represented the experimental group of bacteria. Once these samples were made, they were set in the autoclave at 121°C and poured onto agar plates. Using a patching technique, the bacteria colony that was amylase producing, was introduced to all of the agar plates. Then, all of the plates were incubated at 37°C for a span of 48 hours. They were removed from the incubator and examined for typical 'halos' that might have appeared. A picture of the samples was taken from a digital camera and using a mapping computer program, the halos were measured. A t-test was then applied to the data. Results The results showed that the greater concentration of the glucose present in the agar, the less the halo measured to be. Conclusions/Discussion This project is designed to observe what effect glucose has on the expression of the amylase gene. The amylase enzyme is responsible for breaking up starch, and in humans it can be found in the saliva. The enzymes are highly specific, each easily catalyzes only one type of chemical reaction. In order to carry out this experiment an amylase producing bacterium was isolated. This bacterium was patched on to agars that contained starch and different gradients of glucose. Once, they were incubated the haloes that the bacteria colonies gave off were measured. | |
| Summary Statement Our project is about the effect of glucose on expression of the amylase gene in bacteria. | |
| Help Received Mr. Okuda provided us with the lab equipment and facility to carry out our experiment, Mr. Johnson provided us with statistical analysis information and how to apply it, our parents supported us. | |