CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J0229

Project Title
Converting Waste into Fuel?

Abstract

Objectives/Goals
My objectives were to see if cellulase can break down seaweed and find the optimum conditions for the cellulase to work efficiently. The ultimate goal is to convert the seaweed into ethanol as an alternative fuel source.

Methods/Materials
For each test, I degraded seaweed using cellulase, with a mixture of seaweed, water, and enzyme for two hours. Then I would calculate the weight decrease and make a percentage. I also tested other areas such as temperature, time, concentration of enzyme, and type of enzyme.

Results
I found that cellulase could degrade seaweed, where the percentage of the weight decrease was 11%. Cellulase from Aspergillus sp. was found to be the best enzyme, where it led to a weight decrease of 14%. 40 C is the optimum temperature because the weight decrease percentage was 19%. I found that when the concentration of enzyme was increased, the weight of the seaweed dropped. Finally, 2 hours is the optimum time for the enzyme to work, for the percentage of the weight decrease was 39%.

Conclusions/Discussion
My conclusions are that cellulase can degrade seaweed, 40 C is the optimum temperature, and cellulase from Aspergillus sp. is the best enzyme. Also, as the concentration increases, the weight of the seaweed drops, and 2 hours is the optimum working time.

Summary Statement
My project is to find the optimum conditions where seaweed can be broken down by cellulase to increase the amount of ethanol produced.

Help Received
Mother for helping me gather materials; Father for continuous support.