CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35560

Project Title
Can Plants Use Glucose to Replace Photosynthesis?

Abstract

Objectives/Goals
The objective of the project was to find out if a plant needs to photosynthesize if they are given the materials produced in photosynthesis, or if they have the capability to respire only. Do the plants need a certain amount of time in the light, or none at all? Does the concentration of glucose affect their ability to grow, with or without light?

Methods/Materials
-Grow Lights
-Wheatgrass Seeds
-Glucose
-Boxes (to keep out light)
-Water
First, I planted the seeds in three light conditions, with three different watering conditions. The light conditions were no light, 3 hours of light (half light), and 6 hours of light (full light), and the watering conditions were plain water, 1% glucose water, and 5% glucose water. There were nine different conditions in total. I watered daily and measured height daily.

Results
The results demonstrated that the 5% glucose watered plants grew only slightly better than the no light, plain water plants, which grew the worst. The plain water, half light plants grew around the middle of the height range. The plants with 1% glucose watering grew the next best, regardless of their lighting conditions. The plants that grew the very best were the plain water, full sun plants.

Conclusions/Discussion
Further investigation of scientific papers indicated that 5% glucose watered plants might have grown so poorly because the glucose lowered the osmotic potential of the soil. When plants take in nutrients from the soil, the osmotic potential of the plant must be lower than the osmotic potential of the soil for the transfer to happen. The concentration of glucose was so high that the glucose began to interfere with the plant's ability to take in sufficient nutrients to help them grow. However, plants watered with 1% glucose did manage to grow taller than their 0% glucose counterparts, with both deprived of light, which shows that they grew solely off of respiration, using the glucose that was provided.

Summary Statement
To find out if plants need to make their own glucose, through photosynthesis, to grow, or if they can live and grow without photosynthesizing.

Help Received
My dad helped me make the boxes, and my mom helped me plant some seeds into the containers.