CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)

Brianna L. Lawrence

Project Number

S1611

Project Title

Growing Plants in a Hydroponics System vs. a Traditional Soil Based System: A Comparison of Cost, Growth, & Maintenance

Abstract

Objectives/Goals

In a climate like the Desert, non-native plants to the area are hard to grow outside without constant watch. Gardeners in such a climate could grow these non-native plants inside. Usually, indoor plants are grown in soil. However, growing plants using hydroponics is another method. This experiment compares growing plants in a hydroponics system vs. growing plants in a traditional soil system. The growth, maintenance, and cost were factors that determined the better process.

Methods/Materials

Lettuce, basil, and spinach were selected because of their rapid growth rate. Seeds from each plant type were placed between wet paper towels in bags to germinate. These bags were placed in a bathroom with the heat lamp on. They germinated until the seeds had root lengths of 3 inches. Then, the seedlings were placed in their growing systems. Only 1 spinach seed germinated, so spinach was removed from the experiment. In the soil system, 5 lettuce and 3 basil seedlings were planted in a large pot filled with a soil that contained fertilizer. These plants were then measured, watered, and set in a window sill. The hydroponics system was set-up from a kit called the Waterfarm. This kit was assembled and purified water with the recommended nutrient solution was added to it. The pH of the nutrient solution was tested and adjusted. 5 lettuce seedling and 3 basil seedlings were planted in the Waterfarm. The Waterfarm was placed in the window sill next to the soil system. After 6 weeks of growing, all the data from the plants was collected and used to form a conclusion.

Results

The soil system cost $18. The hydroponics system cost $67.50. The soil system obviously cost less. The hydroponics system required a lot of maintenance. The pH of the nutrient solution had to be checked every 3 days and changed every 9-14 days. The nutrient solution level also had to be checked and adjusted. The air pump and drip ring had to be checked for proper functioning daily. The soil system simply needed to be watered as needed. In growth, the soil lettuce grew 8 1/2 inches and the soil basil grew 5 inches. However, the hydroponics lettuce only grew 5 inches and the basil only grew 2 1/2 inches. The soil plant growth doubled the hydroponic plant growth.

Conclusions/Discussion

The soil system is a better choice when gardening inside. The system showed better results in cost, maintenance, and growth compared to the hydroponics system.

Summary Statement

This project compares two different growing systems (traditional soil and hydroponics) with factors such as cost, maintenance, and growth.

Help Received

Mother helped put board together