CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
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Project Number
J1926

Project Title
Aquaponics vs. Hydroponics: Replacing Commercial Fertilizers with Fish Waste

Abstract

Objectives/Goals
Last year I tested various methods of hydroponics, but this year I was curious about learning more about aquaponics, I wanted to investigate whether a natural fertilizer, such as fish waste, could be as effective as a commercial one.

Methods/Materials
The key materials used in my project were goldfish, a 10-gallon fish tank, Earth Juice plant food, lettuce seeds, and hydroponic coco coir. One set of plants was watered systemically with the fish waste, while the other set of plants was watered with the commercial fertilizer. I measured and documented plant growth on a regular basis, including the number of leaves and germinated plants.

Results
While documenting my plants, I found that the aquaponics portion of my testing had a higher germination rate. About 88% of the aquaponic plants germinated and 50% of the hydroponic plants germinated. However, the range of the number of leaves on the individual hydroponic plants ranged from 5 to 8 while on the aquaponic plants the number of leaves on the individual plants ranged only from 2 to 5. Also, the leaves growing on the hydroponic plants were larger and more robust.

Conclusions/Discussion
I learned that growing plants through aquaponics is a more sustainable process than ordinary hydroponics. However, hydroponics using commercial fertilizer is more effective in producing robust plants because they were fertilized with the right ratio of nutrients a plant needs to flourish. I also learned that nitrates are a crucial factor in growing healthy plants whether they are incorporated through fish waste or a commercial fertilizer. Overall the hydroponic method was far more successful than the aquaponic method. However, I also know that on a large scale, both Hydroponics and Aquaponics are extremely effective from my observations at Solution Farms. With time and practice, I believe that hydroponics and aquaponics will be the future for farming plants.

Summary Statement
The purpose of my project was to investigate whether a natural fertilizer, such as fish waste, could enrich plants as effectively as a commercial one.

Help Received
I designed and carried out this project on my own. I consulted with Solution Farms in Vista, California to learn more about aquaponics.