CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
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Project Number
J1905

Project Title
Creating Food Options for People Allergic to Heavy Metals

Abstract

Objectives/Goals
About 3-5% of the world's population, including my dad, have an allergy to Chromium and Nickel. Since many foods contain Chromium and Nickel, people with metal allergies have to go on restricted diets and use medications to prevent reactions. I want to prove that it is sensible to grow potatoes without the presence of Chromium and Nickel to offer people with allergies more food options. My hypothesis was that if potatoes are grown in a hydroponic system without the presence of heavy metal allergens such as Chromium and Nickel, they will produce as good a yield as when grown in the presence of metals.

Methods/Materials
In my experiment I grew three types of potatoes, Red Thumb, All Blue, and Kennebec, in an ebb and flow hydroponic system in a green house environment. I grew potatoes because they absorb high quantities of metals and people allergic to metals are unable to eat potatoes. Each type was grown hydroponically with concentrations of chromium and nickel that replicate allergen free soil, typical soil, and polluted soils. There were four trials for each varietal, in each concentration of the metals, for a total of 36 trials. There were an additional four potatoes of each varietal grown in potting mix, for a total of 12 control potatoes, which where exposed to the natural environment. I then compared the yield and growth of the potatoes grown in the absence of metals to those grown with metals.

Results
My experiment collected data on potato growth rates, yield mass and yield volume for three potato varietals when grown hydroponically in three metal concentrations. The differences in mass and volume were visually observable, and all of the varietals of potatoes grown without chromium and nickel were larger in mass and volume.

Conclusions/Discussion
Overall, my experiment confirmed my hypothesis as all three potato varietals grown without the chromium and nickel produced a larger yield and grew larger than the control sets. Growing allergen free foods, without chromium and nickel, could improve the quality of life for people with metal allergies.

Summary Statement
My research and experiment were centered around successfully growing potatoes without the presence of chromium and nickel for my dad who has an allergy to these metals, and for others who suffer from similar allergies.

Help Received
My science teacher and parents guided me throughout the process of developing the idea of the experiment. I conducted the experiment myself under supervision. Elka Worner and Joseph McCorkle reviewed my board.