CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

Bryce M. Wong

Project Number

38548

Project Title

Used Coffea Arabica Grinds as Soil Substitute to Mitigate Waste and Environmental Pollution

Abstract

Objectives/Goals

Used coffee grinds (UCG) are increasingly becoming a huge waste problem. To mitigate this problem my experiment is about reusing UCG as soil to grow plants. Research shows UCG is beneficial in composting. However, I wanted to take this further by growing plants in UCG with some organic substances. Using UCG will reduce trash in the landfills.

Methods/Materials

To test my hypothesis, I planted fava beans, radish and lettuce seeds in used arabica coffee grinds (UCG) with different additives. I made three experimental groups: One group of plants is UCG with crushed eggshells and home prepared Lactic Acid Bacteria (LAB). Another group is UCG with alfalfa sprouts and the third group is UCG with fertilizer. I also planted same type of seeds in 100 percent potting soil as my control group. For 36 days, I watered, measured the height of the plants, recorded, and took photos every other day.

Results

Among my experimental groups, the fava bean grew the tallest in UCG with eggshells and Lactic Acid Bacteria. Its height was 32 centimeters. Radish and lettuce grew also in this group however, radish and lettuce grew the tallest in UCG with alfalfa sprout. Radish was 6.5 cm tall and lettuce was 3.0 cm tall. Radish and lettuce grew poorly in UCG with fertilizer. The fertilizer might have altered the PH causing the growth to be hindered.

Conclusions/Discussion

My hypothesis was supported by the results that UCG with eggshells and Lactic Acid Bacteria (LAB) could be used as soil. The combination of these two additives addresses the concerns of stunted growth of the plants and the lack of micronutrients of used coffee grinds. Eggshells add calcium that helps in the creation of plants' cell walls and provides aeration. The bacteria in the LAB solution break down minerals in the soil making nutrients available to the plants and also, prevents fungi growth. Planting in UCG can be very beneficial to our environment. It will help reduce cost of waste disposal and in the future, may become a viable substitute for soil when agricultural land becomes scarce.

Summary Statement

Due to increasing coffee consumption, UCG as soil subsitute in planting could pave the way to improve our state's environmental health and lessen cost of waste disposal.

Help Received

Ms. Mergeson is my mentor, Coffee Bean store in Torrance provided free UCG, and Janeline Wong for scientific discussion.

Preliminary