CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

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Project Number

J1826

Project Title

Invisible Forces: Magnetic Effects on Plant Germination and Growth

Abstract

Objectives

The objective of this study is to identify if exposing plants to strong magnetic fields affect plant germination and or growth.

Methods

Tests were performed using 24 bean plant seedlings in total, twelve within Ziploc baggies, twelve within test-tube environments. Within each group, subsets of three were then subjected to varying degrees of magnetic force, observing and measuring findings daily. Differing strengths of neodymium magnets were used to produce strong magnetic fields, employing the influence over the fourteen day test period.

Results

Ziploc Test Environment - Ziploc test environments containing applied magnetic fields showed magnetic influence concerning germination, having sprouted two days earlier than control specimens without. Subset Beta experienced a catastrophic neodymium magnet failure after six days, resulting in an unexpected finding, having all plants within that given subset grow at a rate of double as compared to all others.
Test-Tube Environment - Cumulative results viewed through the average mean in test-tube environments showed fewer positive signs for magnetic field effects in relation to plant germination and growth. Overall, the control group outperformed all other subsets, yet nothing discerning from the performance of others.

Conclusions

In conclusion, magnetic fields do appear to have the potential to alter plant germination and growth. Expedited germination was noted as compared to the control subset viewed in the Ziploc baggy environment, sprouting a full two days early. In optimum test-tube soil environments, effects were less notable when comparing mean averages obtained from sample sets. However, the most notable effect observed occurred through pure chance and test failure. Sample set Ziploc Beta experienced a catastrophic magnetic field failure, resulting in only a 6-day magnetic field exposure. The results obtained from this entire subset outperformed all other subsets by nearly double, showing a potential breakthrough for magnetics in plant biology, not just for expedited germination, but for enhanced growth as well. The initial hypothesis was not supported by data obtained.
Upon further testing, if magnetic field exposure truly does expedite germination and growth with relative frequency, crops may potentially be harvested earlier, planted in shorter season cycles, require less water consumption, and may yield more value in crop production.

Summary Statement

Tested the effects of strong magnetics fields on plant germination and growth, measuring any and all influences observed.

Help Received

Aided by Derrick McCain (Step Dad) in project setup, material handling, and customized magnet/ test-tube holder apparatus build-out.