CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1713

Project Title
How Does Acceleration Affect the Direction of Plant Root Growth?

Abstract

Objectives/Goals
The purpose of this experiment is to determine how acceleration affects the direction of root growth. My independent variable is the direction of the force applied to the plant seed which is directly related to the radius of rotation (cm). My dependant variable is the direction of plant root growth (degrees of angle). I hypothesized that the root will grow toward the direction of the force applied to the seed.

Methods/Materials
Approximately ten lentil seeds in each of six CD boxes, filled halfway with cotton (as growth medium), were placed on a turntable and allowed to turn for two weeks at 78 rpm. Two trials were performed. Watering was performed twice daily. The angle of root growth was measured, plotted against the radius (distance from center of turntable to seed), and compared to the calculated angle (based on the vector sum of gravity and acceleration due to rotation).

Results
It was found that as the radius increased, the angle of the direction of root growth also increased, supporting my hypothesis. Despite the scatter, the graph trendline supported my statement. The measured and calculated angles showed differences. However, when plotted together against the radius the trendline of both were similar.

Conclusions/Discussion
I conclude that the direction of root growth depends on the acceleration applied to it. Some reasons of errors include uneven cotton thickness, difficulty in distinguishing the main root from its branches, and unequally distributed water.

Summary Statement
Using lentil seeds, different accelerations were applied by using a turntable and its effect on direction of root growth was measured.

Help Received
My parents and Dr. Injeyan helped me obtain material and setup for my experiment.