CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
J2113

Project Title
Microwave Oven: A Cooking Companion or a Dangerous Device?

Abstract

Objectives/Goals
The objective is to determine the effects of microwave radiation on the seed germination and growth of a bean plant.

Methods/Materials
Forty-two bean seeds were placed into 7 groups with 6 seeds (or trials) per group. Group 0 was the control group--no exposure to microwave radiation. Groups 1 through 6 were the experimental groups--exposure to microwave radiation for 10, 20, 30, 40, 50, and 60 seconds, respectively. Seeds were grown in cotton balls and germination was assessed. Those that germinated were transplanted into coffee cups filled with soil. Plant growth was assessed by measuring the hypocotyl, epicotyl, and primary, secondary, tertiary, quaternary, and quinary stems. Plant characteristics were observed and the number of bean seeds produced was recorded.

Results
All six seeds (or trials) in Group 0 and Group 1 germinated. The radicle growth rate of Group 0 was the fastest. All the seeds from Group 4, 5, and 6 did not germinate except for 1 seed in Group 5. The plant growth of Group 0 surpassed those bean seeds exposed to microwave radiation except for the hypocotyl growth. Several physical abnormalities occurred in those seeds exposed to microwave radiation, i.e. shorter height, thinner stems, and leaf and stem abnormalities. On Day 40, Group 1 produced the most bean seeds (40) and Group 0 produced 34. Seeds exposed to microwave radiation for greater than 20 seconds produced at most 21 beans.

Conclusions/Discussion
Microwave exposure significantly affected the normal process of seed germination and overall growth of the bean plant. However, it is still unclear whether the microwave radiation itself, the heat from the microwave, or both affected the growth of the bean seeds. This project has definitely made me more aware of using the microwave. I hope this will encourage more research in understanding the possible health risks of microwave radiation.

Summary Statement
My project investigated the effects of microwave radiation on the seed germination and growth of a bean plant.

Help Received
Mother helped type the report. Neighbor helped water the plants.