



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Jamie A. Dyvig	Project Number J1708
Project Title Effects of Electromagnetic Radiation on Plant Growth	
Abstract Objectives/Goals Electromagnetic radiation is used constantly in our daily lives; does it affect living organisms? The purpose of this project was to discover if electromagnetic radiation affects plant growth. Based on my research, my hypothesis was that exposure to low levels of electromagnetic radiation would have minimal impact on the growth rate of wheatgrass and radish sprouts. Methods/Materials I constructed two aluminum foil Faraday cages to isolate the electromagnetic fields. Next, I set up the electromagnetic radiation by having a wireless video camera and wireless access point emit microwave radiation at 2.4 GHz. Six trials were performed with a total of 880 seeds (560 radish sprout seeds and 320 wheatgrass seeds). I recorded the air temperature, relative humidity, soil temperature, and electromagnetic wave exposure levels daily. Results The first trial was a control, conducted to ensure that the environments in the boxes were the same. The wireless devices were not turned on, and no significant differences in the resulting plant growth were found in the two Faraday cages. Radish sprouts had a mean height difference of 2%, and the wheatgrass had a mean height difference of less than 1%. The second experiment had continuous radiation at 2.4 GHz. The mean height of the radish plants exposed to the electromagnetic radiation was 16.5% lower than the control plants. The wheatgrass mean was 5.1% lower. In the third experiment, the difference was 8.2%. The fourth experiment showed a difference of 15%. The fifth trial mean result was 9% different, and the sixth trial mean difference was 11%. Conclusions/Discussion In the control trial, no significant differences were observed between the plant growths in each box. In the next five trials when electromagnetic radiation at 2.4 GHz was introduced to one box, the plants exposed to electromagnetic radiation consistently had significantly lower mean plant heights. Not only were plant heights significantly lower, but differences were also evident in the greener color and more robust appearance of the control plants. In the sixth experiment when a water deprivation stress test was introduced, the plants exposed to electromagnetic radiation recovered more slowly.	
Summary Statement My project explores the effects of 2.4 GHz electromagnetic radiation on the growth of plants.	
Help Received Father helped construct Faraday boxes and wireless interface; science teacher for guidance; Dr. Kaslow for information on EMF meter.	