CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

33353

Project Title

The Antioxidant Effects of Beta Carotene and Vitamin C on Agrobacterium tumefaciens Tumors as seen on Mammoth Sunflowers

Preliminary

Abstract

Objectives/Goals

The purpose of the experiment is to determine whether the antioxidants Beta Carotene and Vitamin C are effective in preventing tumor (gall) formation in Mammoth Sunflowers. The effect of the antioxidants on plant height is also examined. I expect the antioxidants to have a positive effect on gall prevention and plant height.

Methods/Materials

Six groups of sunflowers (A,B,C D E & F) with five plants in each group were planted using the same type of soil and same size pot. The plants were rotated regularly to ensure equal exposure to sunlight. They were given equal amounts of watering solution every second day. Groups A & D were given water supplemented with Beta Carotene, Groups B & E were given water supplemented with Vitamin C and Groups C & F were given water without antioxidants. On day 21 Groups A, B, & C (one group from each watering category) were inoculated with A. tumefaciens. Plant growth and gall formation were measured every second day over a period of 54 days.

Results

The plants inoculated and given Beta Carotene formed 9 galls, the plants inoculated and given Vitamin C formed 3 galls and the plants inoculated and given water formed 2 galls. The antioxidant solutions were not preventive in gall formation. There was no significant difference between the height of the Beta Carotene plants, the Vitamin C plants or the water plants. All p values were > 0.05 There was no significant difference between the height of the inoculated and non-inoculated plants with a p value = 0.1267

Conclusions/Discussion

Although the data was inconclusive and did not support the hypothesis this may have been due to the small sample size. I believe that further research in this area is important as it could lead to important finding concerning the use of antioxidants in tumor or cancer biology.

Summary Statement

This experiment examined whether the antioxidants Beta Carotene and Vitamin C have an effect on plant gall formation.

Help Received

My family helped me in designing my project, measuring the plants and analyzing the data.