CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

Barron Regan

Project Number

J0521

Project Title

The Effects of Antioxidants on Agrobacterium tumefaciens Induced Plant Tumors

Abstract

Objectives/Goals

Agrobacterium tumefaciens is a bacteria that injects its own DNA into plant cells causing cancerous tumors to grow. The objective of my experiment was to see if antioxidants could minimize or prevent the growth of these tumors in sunflower plants.

Methods/Materials

I grew 25 sunflower plants from seeds and divided them into five groups. I watered one control group with plain water and four groups with antioxidants including: acai berry, blueberry, grape seed and green tea. On week two, I inoculated all of the plants with Agrobacterium tumefaciens, also known as Crown Gall disease. By week four, many tumors began to appear. I counted and measured the tumors for four weeks.

Results

My results showed that antioxidants are effective in reducing Agrobacterium tumefaciens-induced plant tumors. The Control group grew the most tumors and they had the largest average volume. The green tea, on the other hand, completely prevented the growth of any tumors. The acai berry, blueberry and grape seed were effective in slowing the growth and size of tumors, but a number of tumors still appeared.

Conclusions/Discussion

My experiment showed that certain antioxidants can minimize or prevent cancerous tumors in plants. Although many studies have shown that antioxidants protect cells from the damage caused by free radicals, the National Cancer Institute has stated that more research is necessary to prove their effectiveness in fighting cancer, especially in humans. My project shows that more research is worthwhile.

Summary Statement

My project tested the ability of antioxidants to minimize or prevent the growth of tumors in sunflower plants.

Help Received

Mr. McAusland, my math teacher, helped decide proper calculations for measuring tumors; Mr. Binkley, at Carolina Biological Supply, answered questions about bacteria; mom helped take pictures, proof read report and cut papers for board.