CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

Priyansh Gupta

Project Number

S0512

Project Title

Investigating the Role of Antioxidants in the Prevention of Skin Cancer Using Saccharomyces cerevisiae

Abstract

Objectives/Goals

The objective of this research project was to find out how effective antioxidant protection is against skin cancer and to also find out the antioxidant that best helps prevent the harsh UV damage experienced from the sun.

Methods/Materials

To complete this research project, Saccharomyces Cerevisiae cells were incubated in rich YPD media for a four hour period and were then subject to various tests using a cellometer and a spectrophotometer. Dose response and time response experiments were completed to determine the amount of antioxidants (Ascorbic Acid, Vitamin E, and Zinc Oxide) that should be added to the Saccharomyces Cerevisiae cells' growth culture, and to find out exposure time under UV light. Antioxidants and various combinations of the antioxidants were then dissolved into the yeast culture, and were then exposed to the UV light. Cellometer slides were prepared, and using the cellometer and Trypan Blue (0.4% concentration), cell number was counted (dead and alive). Viability rates were then calculated.

Results

All the antioxidants and combinations produced significantly higher viability rates than the control group (45.53% average viability rate). Ascorbic Acid and Zinc Oxide (75.27% average viability rate) together showed the largest viability rates of all of the antioxidants, whereas Vitamin E (49.37% average viability rate) provided the least protection from the UV rays.

Conclusions/Discussion

The experiment performed proved my hypothesis right and wrong. I had correctly hypothesized that all antioxidants would help reduce UV damage, but had incorrectly hypothesized that Zinc Oxide by itself would produce the highest viability rates. Vitamin E had many adverse effects in UV protection, as it produced the lowest viability rates, while Zinc Oxide greatly helped prevent UV damage.

Summary Statement

I investigated how effective various antioxidants are in the prevention of skin cancer.

Help Received

The research was done in a school laboratory under the supervision of Dr. Malhotra; parents helped buy various supplies and drive to necessary locations.