



CALIFORNIA STATE SCIENCE FAIR 2008 PROJECT SUMMARY

Name(s) Adella A. Fejeran	Project Number S1408
Project Title Antioxidant Protection of Escherichia coli against UV Radiation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Antioxidants are said to prevent the damage of cells caused by ultraviolet radiation. To observe the effect of antioxidants on the survival rate of nonpathogenic MM28 and QC781 strains of Escherichia coli (Yale University), concentrations in correlation with the recommended daily allowances/recommended doses for supplementation of vitamin C, vitamin E, and the combination of vitamins C & E were made.</p> <p>Methods/Materials The solutions were incorporated into nutrient broth media containing E. coli that grew for 24 hours, were serially diluted, plated, and exposed to ultraviolet light for 0, 5, and 10 minutes. After exposure, the plates were placed in an incubator at 37° C and allowed to grow for 48 hours at which time the colonies present on the plates were counted and recorded.</p> <p>Results From the results, the presence of vitamins had an adverse effect to the E. coli. Plates that did not contain vitamins and were not exposed to UV light exhibited a significantly greater average amount of colonies than plates that contained vitamins and were not exposed to UV light. Vitamin C (37.5mg/500mL and 45mg/500mL) vitamin E, and the combination of vitamins C & E (37.5 & 100mg/500mL at 10 minutes, 45 & 100mg/500mL, 75 & 200mg/500mL, and 90 & 200mg/500mL) did not significantly increase the amount of colonies on plates that were exposed to UV light.</p> <p>Conclusions/Discussion The research hypothesis that higher concentrations of antioxidants will result in the survival of more E. coli colonies was not supported for vitamin C (37.5mg/500mL and 45mg/500mL), vitamin E, and the combination vitamins C & E (37.5 & 100mg/500mL at 10 minutes, 45 & 100mg/500mL, 75 & 200mg/500mL, and 90 & 200mg/500mL). However, the research hypothesis was supported for vitamin C concentrations 75mg/500mL and 90mg/500mL (strain MM28) and for the combination of vitamins C & E concentration 37.5 & 100mg/500mL at 5 minutes (strain MM28). The research hypothesis that longer exposure time of UV irradiation will cause fewer colonies of E. coli to survive was supported. Conversely, the research hypothesis that the combination of vitamins C & E will increase UV resistance in E. coli was not supported.</p>	
Summary Statement The effect of vitamins C, E, and the combination of C and E on the protection of E. coli against UV radiation, was tested by comparing the number of colonies on plates that contained vitamins and were exposed to UV light with the control.	
Help Received Teacher Todd Linke helped guide my completion of this project; the Mount Miguel Science Department provided that lab equipment and work space; Dr. Wertz of Yale University provided the E. coli and helpful advice.	