CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

Leigh F. Polson

Project Number

36872

Project Title

The Effects of Antioxidants on Daphnia magna under Oxidative Stress Conditions

Abstract

Objectives/Goals

The objective of this test is to measure the efficacy of antioxidants to reduce oxidative stress induced on D. magna.

Methods/Materials

2000 Daphnia and aquarium, microscope and slides, Liquid Vitamin C, Liquid Vitamin E, Stopwatch

Set up aquarium with Daphnia, food supply, filtration, and proper pH level water. Record Daphnia heartbeats under microscope for each of six solutions of Hydrogen Peroxide and various concentrations of Vitamins A and C antioxidants.

Results

Measuring the Daphnia heartbeats under the influence of a mock oxidative stressor, Hydrogen Peroxide (H2O2), combined with the six vitamin solutions of differing ratios of Vitamins A & C, it was proven that the solution that most effectively reduced the oxidative stress was the 1:1 ratio of the vitamins.

Conclusions/Discussion

Repeated trials under the influence of the six H2O2/antioxidants solutions concluded that the most effective was the solution with a 1:1 ratio of antioxidants. Vitamins A and C worked best in this combination due to one being hydrophobic (Vitamin E) and hydrophilic (Vitamin C). At this ratio, the antioxidants work together by breaking into the outer and inner layers of the free radicals and supplying the needed electrons to reduce oxidative stress. My goal is to continue this research to further understand the impact of these vitamins on athletes, to improve performance and overall health.

Summary Statement

My project uses hydrogen peroxide to mock oxidative stress on D. magna, which is combated by added antioxidants to measure how a body can recover from a rigorous workout.

Help Received

Ms. Jennifer Polson, Dr. Cheuvront (Villa Park HS), Mr. Paul Hunt (VPHS), Ms. Corbett (VPHS)