CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35825

Project Title

The Effect of Folic Acid Uptake on the Fertility and Behavior of Zebrafish

Abstract

Objectives/Goals

This experiment was designed to test if taking the folic acid pills is the initial factor of their faster development and hyperactivity.

Methods/Materials

MATERIALS

10 female zebrafish and 12 males (bought from Petco), 15 gallon fish tank/aquarium for control, 7 four-gallon tanks (Petco), NaOH (1 liter), 50-50 meth water (1 liter), Nature Made Folic Acid 400 mcg (bought), pure folic acid (donated by Michael Quinlan from CLU), 10 mL Pipettes (from classroom), microscope (in class), small heater (from home), pestle and mortar, microcentrifuge tubes (class), centrifuge, air pump (bought from Petco), 8 bubbling stones and tubes (bought from Petco), High Performance Liquid Chromatography machine, LC 18 Column.

Methods:

Ten females and twelve males were randomly allocated to 15-gallon tank to be maintained at 25℃. The diets were prepared for the experiment to be fed to the zebrafish. The males were kept in the separate tank while the females were placed into different treatments at different concentrations of each pill (100 ppm, 5 ppm, 20 ppm, 10 ppm and 0 ppm). They were to be kept in separate tanks for about 2 weeks and then be set in at a higher temperature environment and water of about 78 degrees Fahrenheit.

For the HPLC analysis, the first trial was run with a LC-18 column with a 10 minute retention time and a 4 minute post-time at 27 degrees celsius. The UV wavelength was 282 and the pressure was 400 bars.

Results

The higher concentration of folic acid allowed for more eggs to be produced and their behavior was also impacted. They were more alert than the fish in the lower concentrations. We know that the reason for their altered behavior and reproduction was due to the folic acid because the HPLC confirmed that the folic acid was being up-taken.

Conclusions/Discussion

The zebrafish experienced a change in behavior and fertility during and after the treatment. The fish in the higher concentration of 100 ppm were more alert as compared to the ones in the control group as well as in the tanks that were given lower concentrations. Since we computed a p-value of 0.000247, the small value indicates that we can reject our null hypothesis and we can safely assume that the alternative hypothesis can be held as true. The folic acid improved the alert behavior of the fish and also allowed for

Summary Statement

We studied the effects that folic acid would have on the reproduction ofzebrafish and how it would potentially affect the behavior of their offspring.

Help Received

Dr. Nikki Malhotra as a guide and lab provider

Preliminary