CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

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Project Number
J2318

Project Title
The Effects of Aluminum on Vanessa cardui

Abstract

Objectives/Goals
The objective of our project was to see if aluminum had a biological affect on the life cycle and reproduction of Vanessa cardui, also known as the Painted Lady Butterfly. This is important because aluminum and its compounds are used in many products that people use and consume everyday, including food, antiperspirants, vaccines, make-up, soda cans, antacids and cooking pans. The FDA has stated that the issue of aluminum toxicity is not resolved and needs further research.

Methods/Materials
We mixed four different concentrations of aluminum chloride hexahydrate, 0.04%, 0.2%, 0.4% and 4%, into the food of 250 larvae and observed the effects over 79 days. We recorded the effects of the aluminum on the transformation of the larvae into chrysalides, the emergence into butterflies, and the production of eggs.

Results
Our experiment showed a significant affect on the health of the larvae and butterflies. The larvae that were fed the higher concentrations of aluminum had a lower rate of transformation into chrysalides, more mutations and more deaths. Similarly, the butterflies from these larvae had a lower rate of emergence, more mutations, and produced fewer eggs. These effects were greater as the concentrations of aluminum increased.

Conclusions/Discussion
Our results showed that aluminum had a negative biological effect on the Vanessa cardui. Some of our research supported this conclusion and found a link between aluminum and Alzheimer's, and possibly breast cancer. Other studies disagreed. Our experiment suggests that aluminum may have even more widespread effects on an organism. Until further studies are completed, we should be more cautious of the amounts of aluminum we use and consume.

Summary Statement
Our project tested the toxicity of aluminum on Vanessa cardui.

Help Received
Our math teacher, Mr. McAusland, checked our calculations for accuracy. A high school chemistry teacher, Mark Regan, answered our questions about aluminum. Our moms helped us take pictures, cut papers for our board and proofread our report.