CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
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Project Number
J2213

Project Title
Marinas: Toxic or Safe?

Abstract

Objectives/Goals
This, wonderful project may help recent environmental concerns associated with copper based boat hull paints. This years project continues our science experiment from 2015. Our results from 2015 showed cayenne pepper when added to environmentally safe hull paint was more effective than adding nothing and adding vanilla extract or lemon extract. Since cayenne pepper was our spicy substance in 2015, this year we have chosen even spicier powdered peppers. Copper based boat hull paint contains biocides and heavy metal which can harm sea creatures and even humans. There are other kinds of boat hull paints that are environmentally safe and not as toxic to the marine life. However, these environmentally safe boat hull paints are not considered as effective as the copper based boat hull paint. Therefore, to try and improve the effectiveness of the environmentally safe hull paint we added cayenne pepper, habanero pepper, ghost pepper, and Carolina Reaper (all powders). We thought that the Carolina Reaper pepper would have the least amount of marine growth because on the Scoville Heat Unit scale it registers 2,200,000 SHU while cayenne pepper registers 50,000 SHU.

Methods/Materials
When first setting up the project we cut marine grade plywood into six 8 in by 11 in boards. We then added the spicy powders to the environmentally safe hull paint. Next we painted each of the boards, one with copper based paint, one with environmentally safe paint, one with cayenne pepper, one with habanero pepper, one with ghost pepper, and one with Carolina Reaper. Every week for the past 8 weeks (January 8 through March 7), week we counted marine life observed on each of the painted boards and using our grid calculated the percentage of algae growth covering each board.

Results
We put our painted boards in the water on January 8th, and of course, at that time there was no growth. Between weeks 1 and 6, no growth was observed on our boards. Our latest check on March 7th (week 9), still no algae growth or other life on Board A. While we observed algae coverage of 52% on Board B, 48% on Board C, 38% on Board D, 43% on Board E, and 59% on Board F. Therefore, currently the habanero powder added to the environmentally safe paint is doing the best.

Conclusions/Discussion
At this time in our experiment we have found habanero pepper to be most effective of the added substances but still not as effective as the copper based boat hull paint.

Summary Statement
Copper based boat hull paints are effective but toxic to the environment, our experiment adds spicey substances to environmentally safe paint to make it more effective.

Help Received
Phil Pritting, donated environmentally safe paint, which is highly appreciated.