CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

Rohan Bhushan; Christopher How

Project Number

34059

Project Title

Nitrosomonas europaea: Accelerating Bioremediation of Ammonia Using Magnesium Sulfate

Abstract

Objectives/Goals

The purpose of this project is to investigate the effect of magnesium sulfate on the growth of Nitrosomonas europaea, for the purpose of bioremediation. Our hypothesis for this project is that the magnesium sulfate will accelerate the growth of Nitrosomonas europaea, thus enabling more ammonia to be oxidized.

Methods/Materials

The constants in this experiment are 0.2 micron filtered water, water amount, containment dimensions, ammonia amounts, location, temperature, and time. The variable in the experiment is the amount and addition of MgSO4. This project's research methodology consists of three phases. The first phase includes gathering materials needed. The second phase includes the preparation of samples and incubation. The third phase includes testing content of ammonia against different amounts of MgSO4. Five samples were created, each with three trials for more accurate results. The dependent variable was calculated by measuring the amount of ammonia in each containment unit.

Results

The results show that the MgSO4 significantly helped to increase growth of Nitrosomonas europaea, resulting in the reduction of ammonia. The results show that our hypothesis is correct.

Conclusions/Discussion

Based on our results, as a proposed solution, we designed a microbial filter model which has the potential to be used in the bioremedial treatments. If we were going to expand this experiment we would prolong the incubation phase and observe the changes in growth of Nitrosomonas europaea during the experimentation. Also, we would use our filter designs to construct a device which could be implemented in the Salinas River or other ammonia polluted sources.

Summary Statement

This project is about the effects of Magnesium Sulfate on Nitrosomonas Europaea and we recorded this effect by using the bioremediation of Ammonia.

Help Received

Dr. Jim Barry from MBARI gave us detailed information on Nitrosomonas europaea; Mr. Peter Hofsteen gave us thorough information on ammonia and its relation to the agricultural industry; MBARI allowed us to use their sieve to filter the Carmel River water.