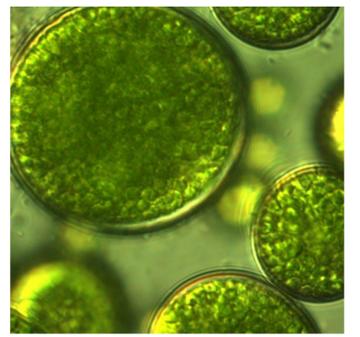


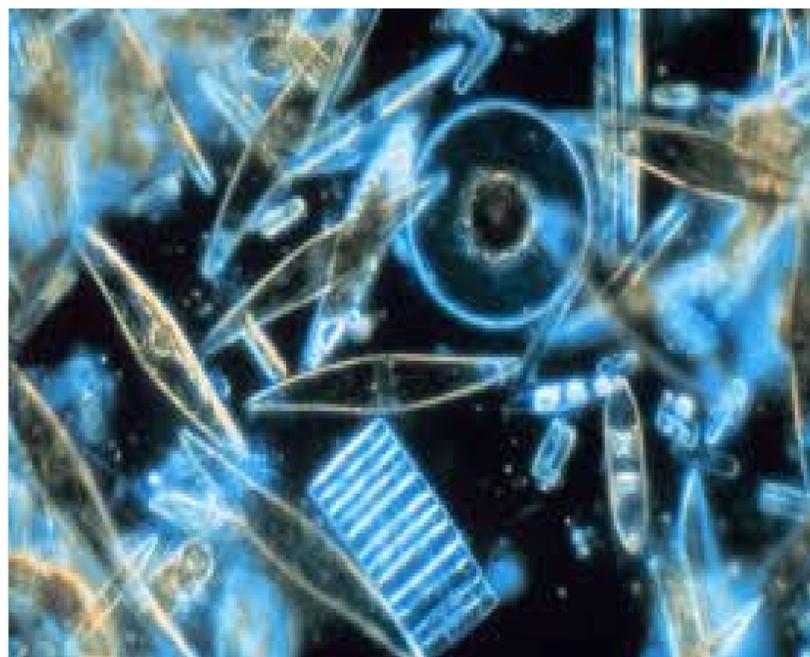
Possible Solution to Harmful Algal Blooms: Silica-Solubilizing Bacteria And Verification of Properties



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I. Introduction

Diatoms are beneficial algae that can outcompete the toxic algae, but only if they have sufficient bio-available silicon. Silicon is highly abundant on earth but is in a form that is unavailable to diatoms. We found that there are bacteria that can convert silicon into a form that diatoms can use. These silicon solubilizing bacteria are commonly found in soil bacteria which have been primarily studied for their beneficial effects on rice and sugarcane production. Our first goal in our project is to isolate the silicon-solubilizing bacteria from local soils and perform various tests to screen the characteristics of the bacteria.



Diatoms found in aqueous solution- Outcompetes Algae when enough silica is present for consumption

II. Methods

- Research current scientific literature to determine accurate way to verify silica solubilizing properties
- Create silicate solubilizing isolation agar using modified Burn and Rovira medium
- Commercial silica-solubilizing bacteria (*Bacillus mycoides*) was obtained and put into a solution containing beef broth, distilled water, and diatomaceous earth as a proof of concept.
- Inoculate 10 plates using *Bacillus mycoides* and 10 plates using soil from underneath a horsetail plant to test for silica solubilizing properties
- Incubate 28- 30 C temperatures for up to 7 weeks

*Media preparation was done according to specifications in ⁴, but some modifications were made according to cost and availability of ingredients. *

III. Results

Most of the work that has been performed was directed at fulfilling adequate preparation for future experiments. Experts in the field have been able to offer insights into correct handling and identification of algae and diatoms as well as their quantities. Prior issues of obtaining silica-solubilizing bacteria were remedied with obtaining a commercial source. However, our SSB testing results were inconclusive. Either the testing procedures did not detect SSB or our bacteria did not show proper silica solubilization.

IV. Conclusions and Future Work

Proof of concept was the goal of current work with the hurdle of obtaining silica-solubilizing bacteria one of the major goals. We then needed to verify solubilization via the chosen bacteria. Plates were made. After 3,5, and 6 days, growth was apparent, but we did not see any silica solubilizing clearing. Either we do not have an SSB or our plates are unable to detect SSB activity, we have an SSB and our plates were good, or our silica sources were not acceptable for the SSB. Moving forward, finding a reliable method to test the SSB properties, obtaining a new SSB, or a new silica source will be necessary to determine the potential for our larger hypothesis to be tested. Theoretically, once the issues of proper SSB determination can be solved, this may be a viable solution to the algal blooms



1: Single inoculated using diatomaceous earth as silica source



2: All plates inoculated show growth but no clearing of silica

V. SOURCES

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