Lead Remediation: Applications of Algae in Fresh Water

Rossi, Wyeth

Lead has been beneficial and problematic dating back to its discovery nearly 7,000 years ago. Lead contamination of drinking water is most commonly due to outdated water piping, and mining and manufacturing waste leaching into streams and reservoirs. Lead exposure from contaminated water causes significant health issues for humans, animals and plants. This project presents a safe, effective and affordable method for removing lead from water through bioremediation utilizing algae. Thermophilic blue green algae, collected from a mining region, and spirogyra lab cultivated algae were tested as bioremediants. Five 30 gram samples of each strain of algae were placed in specially designed containers and allowed to float atop a 350 milliliter solution of distilled water contaminated to 100ppm of lead, in a laboratory setting. Controls were 100ppm lead solution, containers, light, temperature, and time. Algae type was the variable. Samples were tested at one, four and eight day points using a Microwave Plasma Atomic Emission Spectrometer (MP-AES). In the first round of testing, the spirogyra algae produced no discernable results. The lead solution exposed to thermophilic blue green algae experienced a decrease in lead levels ranging from 54% to 99.27%. A second round of testing is being conducted utilizing thermophilic blue green algae, light, time, temperature and containers as controls, and solution type as the variable. Distilled water contaminated to 100ppm of lead, and water collected from a stream contaminated with mining waste are both being tested. Results from the second round of testing will be completed prior to May 1st, 2016. In conclusion, thermophilic blue green algae is an excellent bioremediation agent for removing lead from freshwater in a controlled setting.

Awards Won: