An Engineered System for Filtering Pb2+ Using Chlorophyta, Phase Two

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The importance of clean water is crucial to communities all over the world. Continuing from last year, the research focus for this phase was to design and build a working filter mechanism and to better understand the biological/chemical process that takes place when the chlorophyta comes in contact with the ionic lead in the water. The improvements added to the wet algae mechanical filter (WAMF) design included solving the problems of possible lead in the filter paper, overcoming the vacuum effect that separates the algae, the pressure created, and other limitations. The WAMF was built with input and output valves, a threaded plunger, a removable section for algae, and the ability to process about 250 ml of water. Two WAMF designs were built and tested. The second WAMF was designed using trial results from the first device. The WAMF was used to test lead removal from a 100 ml sample with 20 ppm Pb2+. The strain of algae used this year was not as effective as the original strain from 2014. This is likely due to lower levels of sulfur in the algae. With increased lead volume and reduced algae effectiveness, the lead removal was not definitive using the indicator solution. UV/VIS Spectrophotometry analysis of the process solution collected after each pass through the WAMF showed a decrease in the concentration of lead. Once the algae chemistry and algae volume to lead contamination ratio is solved, the WAMF could save lives by preventing lead poisoning from contaminated drinking water.

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