A Sustainable Cyanobacteria Mitigation Method for Freshwater Ecosystems in the Rocky Mountain Region

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The purpose of this project was to engineer a cyanobacteria mitigation device and test how deployed, regulated concentrations of hydrogen peroxide could kill cyanobacteria and how Great Mullein biochar held in the device could collect the cyanobacteria detritus. I hypothesized 2.5mL/500mL of 3% hydrogen peroxide in distilled water would be the most effective at killing Dolichospermum, and Great Mullein biochar would be effective at reducing the amount of detritus in the water. The experiment involved two parts. The first part was to test how deployed concentrations of hydrogen peroxide [0mL (control), 0.5mL, 1.5mL, and 2.5mL] affect Dolichospermum death rates. The second part was to test how effectively detritus (constituted by dying and dead cells) was collected by Great Mullein biochar. The data collected did support the original hypothesis. The findings lead to the conclusion that 2.5mL/500mL of hydrogen peroxide was most effective at killing the Dolichospermum and the Great Mullein biochar was effective at cleaning up the detritus. Statistical analysis suggested that 2.5mL/500mL of hydrogen peroxide after 48 hours was statistically significant compared to the control decreasing the Dolichospermum by 99%. Additionally, statistical analysis also suggested that when biochar was added to the water, the amount of detritus was decreased compared to water without biochar by 96%. The combination of hydrogen peroxide and Great Mullein biochar created a successful method to mitigate harmful algal blooms.

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