Investigating the Effectiveness of the Eradication of Microcystis aeruginosa Using Sonication and Magnetic Filtration

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Harmful algae blooms (HABs) containing cyanobacteria significantly lower oxygen levels in natural bodies of water, killing organisms in marine or freshwaters. They also produce microcystins, potentially causing fatal illnesses. This issue is present globally. Nitrogen and Phosphorus loading of aquatic ecosystems is the leading cause of HABs. The best way to control cyanobacteria is to remove it completely. This was attempted with fungal degradation, magnetic filtration, coagulation, sonication, and numerous other ways. The most successful, while possessing flaws, were sonication with ~60% reduction and magnetic filtration with ~60-95% reduction. Sonication's flaws included: not reaching every cell, cell regrowth, and it requires algae containing gas vacuoles. Magnetic filtration's flaw is requiring a low pH level. It is proposed that applying both methods of sonication at ultrasonic levels and magnetism filtration simultaneously would have a greater effect on the overall cell count of the Microcystis aeruginosa than sonication or magnetic filtration on its own and even more so than no eradication methods at all, since the flaws overlap. Three different methods were applied: sonication, magnetic filtration, and both methods combined. Initial counts were compared to the number of cells after treatment, regrowth count was calculated every two days for twenty days, and an average of three trials was taken. When both methods were applied there was a high initial reduction percentage. Additionally, the regrowth rate was non-existent. The statistics tests showed a high level of confidence in the data. The results support that this could be an efficient, effective, and long-lasting method.

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