

The Effects of *Serratia marcescens* Algicidal Production of Prodigiosin on the Growth of *Microcystis aeruginosa*: An Environmentally-Preventative Approach

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The 2019 *Microcystis aeruginosa* bloom instilled economic and environmental disaster along the Mississippi and Louisiana Gulf Coasts due to the creation of eutrophic freshwater zones in natural saltwater environments. A public health and wellness concern, cyanobacterial production of neurotoxins and hepatotoxins alongside the cultivation of *Vibrio vulnificus* lead to the closure of beaches and a complete loss of maritime industry for six months. This experiment approaches a solution to *M. aeruginosa*'s invasive growth: the algicidal biomolecule, prodigiosin, developed by microbial fermentation using *Serratia marcescens* as a model organism due to accessibility. In a BSL-1 lab, ten plates of *M. aeruginosa* were tested, and *S. marcescens* was added to five; the plates were incubated for a period of 96 hours at 47 degrees celsius. On the plates containing *S. marcescens*, the alkaloid red bio-dye characteristic of prodigiosin came into view after 24 hours of incubation. Complete inhibition of *M. aeruginosa* growth was observed on the five plates with *S. marcescens*, proving the inhibitive qualities of prodigiosin. Using prodigiosin and its results within this experimentation, an algicidal treatment of the biomolecule can be administered to regulated industrial dumping to prevent a large-scale *Microcystis aeruginosa* bloom. Alongside the use of an algicide, further disaster mitigation policy by the federal government, regulations on industrial pollutants, wire filtration, and *Crassostrea virginica* beds are viable measures to prevent this large-scale of a disaster from occurring again.

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