2021KipferIsaac-abstract

Abstract

Increasing water temperatures due to climate warming is increasing the frequency and severity of toxic cyanobacteria blooms. Warming promotes toxic cyanobacteria growth over non-toxic strains and increases the rate of cyanotoxin release. The release of cyanotoxins, such as microcystin produced by *Planktothrix agardhii*, into the water column threatens ecosystem and human health. While conventional water treatment cannot remove microcystin, biodegradation by heterotrophic bacteria can remove these toxins effectively. We predicted that higher temperatures in the range of 5 to 20°C would increase bacterial cell density, and in turn, the rate of bacterial degradation of microcystin. These indicators were measured at 0, 6, 12, 24, 48, 96, and 192 hours of incubation at their respective temperatures. We found that microcystin concentration decreased over time for all temperature treatments and the degradation rate increased at higher temperatures. Additionally, an increase in bacterial abundance was observed, which was also enhanced by increasing temperature. These results suggest that the rate of cyanotoxin degradation by heterotrophic bacteria can be enhanced by increasing water temperature. These findings may have applications in water treatment with potential biodegradation steps to remove cyanotoxins.

Honors College
Ball State University
Muncie, IN 47306