Exploring the Effect of Herbicides on Acquatic Ecosystems: The Denitrification Efficacy of Lemna minor under Varying Atrazine Concentrations

Johnson, Abigail

Aquatic plants that uptake nitrogen are an integral part of most aquatic ecosystems, serving to help prevent eutrophication and hypoxic conditions. Additionally, such plants are sometimes used in the wastewater treatment process. Certain herbicides, such as atrazine, may influence the phytoremediation abilities of these plants. The purpose of this experiment was to determine the percent denitrification efficacy of Lemna minor under varying atrazine concentrations. Tested concentrations, which were chosen with regards to current research and regulations on atrazine within aquatic ecosystems, were 0, 0.4, 4, 40, and 4000 µg/L. There were four replications across each concentration group, and each sample contained forty Lemna minor fronds suspended in a modified Steinberg's solution. Initial nitrate levels were measured, and after ten days, final levels were measured for each sample. After the collection of nitrate level data, analysis included a test to determine the correlation between atrazine concentration and percent nitrate removal. Assuming a logarithmic trend, this yielded an R-value of -0.82. Via post hoc analysis, a statistically significant difference in percent denitrification efficacy was found to exist between all except two concentration pairings. Further research is needed in order to affirm these results and to determine specifically why these results were obtained.

Awards Won: