Eco-Engineered Floating Wetlands: A Promising Technique to Improve Water Quality

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The production of nitrogen fertilizers has made it possible to grow enough crops to keep up with the growing population. This excessive input of nitrogen fertilizers on crops is causing leaching and surface runoff that is detrimental to biological environments. The purpose of the experiment was to use engineered floating wetlands to study nitrogen phytoremediation by four species of hydroponic plants. The plants that were compared included Spinacia oleracea (spinach), Brassica oleracea (dwarf Siberian kale), Lactuca sativa (Cimmaron romaine lettuce), and Lactuca capitata (Buttercrunch lettuce). Both nitrates and nitrites in the water were measured, over time, in the aquatic systems. Nitrogen levels were measured with test strips and the Griess colorimetric method. In order to determine if the plants effectively removed nitrogen, statistical analysis of the data was conducted using an analysis of variance (ANOVA). If there were significant differences between the treatment groups, then a Tukey HSD test was run on the data to determine where the differences occurred. It was predicted that all four species compared would decrease the amount of nitrogen runoff in the water. It was hypothesized that both the nitrate and nitrite levels would decrease over time. The hypothesis was supported. The nitrate and nitrite levels decreased in all tubs that had floating wetlands containing leafy greens. Of the species compared, it was predicted the spinach would be the most efficient phytoremediator of nitrogen. This portion of the hypothesis was rejected. Of the treatment groups, romaine was the most effective at removing nitrogen from the water. Based on this study, the concept of using floating wetlands to remove excess nitrogen from aquatic environments is very promising.