

Investigating the Phytoremediation of Phosphate Using *Cyperus Alternifolius*

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Abstract:

Sustainable nutrient recovery is a global priority as excess of phosphates in wastewater is still a major contributor towards the environmental degradation. Phytoremediation is an eco-friendly solution, however, for smallscale experiments it may be difficult to monitor nutrient uptake, thus interfering with the experiment and producing an excess of chemical waste. The aim of this study is to assess the performance of continuous removal of phosphate from the pond water by *Cyperus alternifolius* (Umbrella Papyrus) and to present a very practical analytical method that requires minimum volume of water. Hydroponic plant conditions were treated daily with 5 ppm phosphate in this study. The 24-hour assimilation cycles were monitored but not using the entire experimental water, and this was innovatively reduced to a 10 mL spectrophotometric micro-assay. The important results show that *Cyperus alternifolius* has a very high efficiency in the short term (24 hours) for the removal of phosphate. In addition, the newly adopted 10 mL testing method produced very accurate concentration data with a tremendous reduction in reagent use and keeping samples intact. The importance of this research is that it demonstrates a strong biological method of continuous-flow wastewater filtration while offering the scientific community an innovative, realistic, resource-saving laboratory tool for monitoring low volume aquatic systems.

Keywords:

Sustainability, sustainable wastewater treatment, phytoremediation, environmental protection.