

The phytoremediation potential of water hyacinth

Master of Science in Engineering

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ABSTRACT

Water hyacinth was brought to South Africa many decades ago as an ornamental flower. After it entered the water system, water hyacinth became an invasive weed resulting from its rapid growth rate and lack of natural enemies. This rapid growth stems from a high nutrient uptake rate which can be employed to remediate eutrophic water. This study consisted of two parts and investigated the potential for water hyacinth to be used as a tool for the phytoremediation of eutrophic dam water in summer and winter. In summer, individual hyacinth plants were grown in either Hoagland's solution or water from Hartbeespoort Dam, with another set of vessels containing Hartbeespoort Dam water without plants. In winter, only water from Hartbeespoort Dam was used with vessels either containing 10, 4 or no plants. The results show that in summer water hyacinth can remove phosphate and nitrates at a rate of 0.378mg/L and 0.365mg/L per day respectively, while in winter those rates drop to 0.056mg/L and 0.070mg/L per day respectively. It has also been demonstrated that an algae bloom can be expected if the water hyacinth is removed from or allowed to die in eutrophic water where algae spores are present. This study suggests that water hyacinth can be employed in an in-situ steady state system to remediate eutrophic water bodies and reduce the occurrence of algae blooms.