

Effectiveness of phytoremediation in waste-water treatment: a case of Karoi water supply station, Zimbabwe

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Abstract

Urbanization is elevating water pollution issues in urban surface water sources which makes it a need to develop and adopt cheap nature based pollution control and management strategies. The research assessed the effectiveness of *Salvinia molesta*, Duckweed and *Azolla filiculoides* plant species in waste water phytoremediation at Karoi Water Supply Station in Zimbabwe. An experimental research design was adopted in this study. Laboratory tests were conducted to interpret and analyse changes in water parameters over a 15-day experimental period. Results indicated that Duckweed absorbed nitrates at a faster rate (64%) compared to *A. filiculoids* (57%) and *S. molesta* (63%) plant species. *Azolla filiculoids* absorbed nitrates at a rate significantly slower than both Duckweed and *S. molesta* as signified by 7% and 6% difference respectively. In terms of phosphates absorption, *A. filiculoids* indicated to be the fastest absorber with an absorption rate of 62% followed by *S. molesta* (52%) and Duckweed (45%). The different margins in rates of these plant species in absorption of phosphates was larger than that experienced in nitrates absorption as highlighted by 10% difference between *Azolla* and *Salvinia* and 12% between *A. filiculoids* and Duckweed. Duckweed was the fastest absorber of nitrates but the slowest absorber of phosphates whereas *A. filiculoids* was the fastest absorber of phosphates but the slowest absorber of nitrates. It was also confirmed that *S. molesta* requires a longer period of time to reduce water alkalinity compared to *A. filiculoides* and Duckweed. Over a 15-day time period *S. molesta* and Duckweed reduced the pH from 10.93 to 8 and 10.93 to 8.8 respectively whilst *A. filiculoids* reduced it from 10.93 to 8.9, an indication of more effectiveness of Duckweed and *S. molesta* in reducing alkalinity over a 15-day time period.