



APPLICATION OF SHALLOW POND SYSTEM USING WATER HYACINTH FOR DOMESTIC WASTEWATER TREATMENT IN THE PRESENCE OF HIGH TOTAL DISSOLVED SOLIDS (TDS) AND HEAVY METAL SALTS

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Abstract

The use of aquatic macrophytes for the domestic wastewater treatment is increasing in various parts of the world. The aim of this study is to examine the potential of shallow pond system using water hyacinth (*Echhornia crassipes*) along with the microorganisms present in the bio-film attached to the roots and water column for treatment of domestic wastewater in the presence of high total dissolved solids (TDS) and heavy metal salts. The shallow pond system is different from conventional water hyacinth system and it has high oxygen rich zone to provide the superior growth of aerobic microorganism. The studies indicate that, water hyacinth can tolerate TDS up to 2000 mg/L in the shallow pond system. The heavy metal removal is a function of phytoaccumulation or phytoextraction, which can lead to morphological deformity if heavy metals exceed the saturation limit of 268 & 2152 mg/kg Cd, 381 & 3372 mg/kg Cu, 229 & 1850 mg/kg Ni, 462 & 2764 mg/kg Zn, in shoots and roots respectively. The reduction in TDS is marginal (19%) at the highest tolerable limit whereas the heavy metal reduction is 66%, 68%, 64%, 70% for Cd, Cu, Ni and Zn respectively at the outlet of the treatment system. The sewage treatment performance of the shallow pond water hyacinth system for all other parameters is estimated as 81% Chemical oxygen demand (COD), 91% Biochemical oxygen demand (BOD₅), 16% Total dissolved solids (TDS), 70% Total suspended solids (TSS), 4% Chlorides, 74% Ammonia nitrogen (NH₃-N), 41% Phosphate (PO₄-P), 96% Most probable number (MPN) and 98% Total viable count (TVC) reduction.

Key words: domestic wastewater, heavy metal salts, high total dissolved solids, shallow pond system, water hyacinth

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