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Possible Application of *Bacopa monnieri* to Treat Wastewater with Textile Dye at Moderately High Salinity Conditions

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Abstract

In general, textile dying process release a large amount of waste water with high pH and salinity as during the process considerably high amount of salt is added. Moreover, salt is further added to wastewater along with coagulating agents to increase the precipitation of dye-stuff during the chemical treatment process. Bitter salt (Magnisum sulphate), a by-product of salt inductry is known to increase precipitation in textile dye effluents. As *Bacopa monnieri* (Lunuwila) can grow at considerably high salinity levels, this research checked the possibility of using *B. monnieri* as a phytoremediation agent for the treatment of wastewater from textile industry. Two laboratory level treatment setups were prepared using $FeSO_4$(Ferous alum) and $MgSO_4$ (bitter salt) for comparing the treatment efficiencies of *B. monnieri*. The preliminarily treated dye effluent was used in the experimental treatment setups. Batch system experiments were conducted by using hydroponic system in black coloured trays (size 35 cm*128 cm) and messed trays (size 18 cm*25 cm) with *B. monnieri* under ambient condition for a period of five weeks. In order to determine the optimum amount of coagulating agent a simple jar test was done. Three replicates each for ferrous alum treatment and bitter salt treatmentswere prepared. Heavy metal (Cu^{2+} and Pb^{2+}) concentrations, and chemical oxygen demand (COD) of effluent before and after phytoredediation were determined. Maximum salinity level that the plant could grow was 6.97 g/L. Maximum heavy metal removal efficiency for Pb^{2+} was 18 % and 11.5% in Ferrous Sulphate and bitter salt treated systems, respectively. Maximum Cu^{2+}removal efficiency was 65% and 85%, respectively. Further, the maximum COD removal efficiency was 70.18% and 69.7%, respectively. These findings suggested that the use of B. monnieri in high salinity hydroponic systems is effective for reducing heavy metal (Cu, Pb) and COD levels in effluents from textile dying process.

Key words: *Bacopa monnieri, hydroponic system, salinity, textile dye*

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