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Indigo dyeing wastewater treatment by eco-friendly constructed wetlands using different bedding media

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ABSTRACT

Most natural and synthetic textile dyes, especially vat dyes, are resistant to degradation and decolorization by conventional treatment methods. In this study, the purification of synthetic textile wastewater containing commercial indigo dye by a green technological treatment system was investigated. A vertical-flow constructed wetland model comprising three different bedding materials, sand, gravel, and zeolite, was used to treat synthetic indigo dyeing wastewater. Treatment efficiency was evaluated by measuring color and pollution parameters such as chemical oxygen demand (COD), pH, oxidation–reduction potential, and electrical conductivity. According to the results, the constructed wetland system reduced color by up to 97% and lowered the COD by up to 62%. This study demonstrated that the constructed wetland system is a promising technique for purification of indigo dyeing textile effluents of COD and color as compared to conventional methods.

Keywords: Vertical-flow constructed wetlands; Vat dye; Indigo dyeing wastewater; Decolorization; COD removal; Zeolite

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