



Application of using surface constructed wetland for removal of chemical oxygen demand and ammonium in polluted river water

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ABSTRACT

River water was mostly polluted in northern China in the past decades and the major contaminants were organic matter and ammonia. In this study the performance of the pilot-scale and full-scale surface constructed wetlands for removing COD (chemical oxygen demand) and ammonium from polluted river water was evaluated. Results showed that the effluent COD and $\text{NH}_4^+\text{-N}$ concentrations in the pilot scale wetland systems were 10.72–19.34 mg l^{-1} and 0.18–0.90 mg l^{-1} , respectively, which met Grade-III (COD 20 mg l^{-1} , $\text{NH}_4^+\text{-N}$ 1 mg l^{-1}) of national surface water standards in China. The maximal COD and $\text{NH}_4^+\text{-N}$ removal efficiency was 96.18% and 99.78%. COD and $\text{NH}_4^+\text{-N}$ removal in spring and summer were better than that in fall and winter based on the $k\text{-C}^*$ model. Combined with research results of the two-year full-scale study, it indicated that the surface wetland system was a promising technology for treating polluted river water to meet the requirement of Grade-III water quality in northern China.

Keywords: Constructed wetland; Polluted river treatment; COD; Ammonium; First-order removal; Vegetation

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