



Elimination of phosphorous from phosphorus-rich farmyard wastewater using reeds bed system containing steel furnace slag

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Received 17 March 2013; Accepted 10 June 2013

ABSTRACT

It has been demonstrated that blast furnace slag (BFS) has high P adsorption capacity. Steel furnace slag (SFS) has similar physical and chemical properties to BFS, but whether the former has similar P adsorption characteristics to the latter is unclear. In order to assess its reuse potential as main filter media in treating phosphorus-rich farmyard wastewater, the phosphorus adsorption isotherm of SFS in high-P solution was derived and the adsorption process was examined as a function of pH; then, SFS was used as a main substrate in a tidal flow reed bed system and its treatment performance was evaluated to determine the removal efficiency of COD, BOD₅, SS, TN and PO₄-P during farm wastewater treatment process. Compared with Freundlich and Tempkin isotherm, Langmuir model yielded the best fit for the SFS. The maximum adsorption capacity reached 27.8 mg P/g at an optimum pH of 4.0. Our results show that SFS reed bed may be a novel effective system to wipe off phosphorus from wastewater, and then it may also provide an approach for the reuse of SFS.

Keywords: Phosphorous adsorption; Steel furnace slag (SFS); Reed bed; Tidal flow

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