



Seasonal treatment efficiency of surface flow constructed wetland receiving high nitrogen content wastewater

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ABSTRACT

This research investigated the performance of a constructed wetland (CW) that functions as a post-treatment unit for the secondary effluent of a piggery wastewater treatment facility. The pollutant mass removal efficiency was evaluated from 37 sampling events on non-rainy days during 2008–2010. Based on the findings, the pollutant concentrations decreased somewhat along the cells from the influent to the effluent while DO and pH increased along the cells and appeared to peak at the deep marsh region during the spring season. The overall cumulative treatment efficiencies for the entire monitoring period were 53% for total suspended solids; 35–37% for biological oxygen demand and chemical oxygen demand; 33% for total phosphorous; and 17–21% for total nitrogen and other nitrogen forms. The main reason for the low treatment performance was attributed to the low carbon to nutrient ratio (i.e., the COD/BOD:TN:TP ratio) in the CW influent. Moreover, algal bloom was frequently observed in the deep marsh region primarily due to the relatively long retention time at the open water zones in the CW. To further improve the treatment performance of the CW treating secondary piggery wastewater, it is necessary to ensure that the influent characteristics meet the desirable organics and nutrient requirements to maximize the biological functions of the wetland.

Keywords: Free water surface flow; Constructed wetland; Secondary effluent; Livestock wastewater; High nutrient content; Nonpoint source pollution

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