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Full Length Research Paper

Effects of hydraulic retention time and media of constructed wetland for treatment of domestic wastewater

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Abbreviations: BOD₅, Biochemical Oxygen demand; COD, chemical oxygen demand; HRT, hydraulic retention time; NH₄⁺, ammonium; NO₂⁻, nitrite; NO₃⁻, nitrate nitrogen; SRT, solids retention time; SS, suspended solids; TKN, total kjeldahl nitrogen; TP, total phosphate; and UFCW, up-flow constructed wetland.

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Abstract

A greenhouse experiment was conducted to investigate the effect of varying soil-to-sand ratios of constructed wetland on wastewater treating efficiency. Wetland beds were prepared with locally available plants, specifically cattail (*Typha* sp.). Treatment efficiency was evaluated for parameters such as BOD₅, COD, SS, TKN and TP. The results indicated that the nutrient reduction corresponds to a longer retention time in wetland beds. Under the longest hydraulic retention time (HRT) of 3 days, the system with media containing a soil-to-sand ratio of 75:25 illustrated the highest removal efficiencies of BOD₅, COD, SS, TKN and TP by 92±5, 91±%, 76±9, 90±3 and 95±3%, respectively. The infiltration rate was also decreased after operation, particularly in the treatment with lower sand content. However, the highest growth rate of cattail was found under the shortest HRT (0.75 day) condition.

Key words: Hydraulic retention time (HRT), Media, *Typha* sp., constructed wetland.

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