

# **Performance evaluation of laboratory scale up-flow constructed wetlands with different designs and emergent plants**

## **Abstract**

The objective of present study was to assess the simultaneous removal of organic pollutants and nutrients by five laboratory scale up-flow constructed wetlands (UFCWs). Aerobic and anaerobic regions were well developed at the upper and lower beds, respectively, in the UFCW reactors with supplementary aeration. The emergent plants employed were *Phragmites australis* and Manchurian wild rice. The COD, T-N, T-P,  $\text{NH}_4\text{-N}$  and  $\text{NO}_3\text{-N}$  removal efficiencies for the UFCW reactors were in the range of 90-94%, 69-92%, 29-52%, 59-98% and 45-100%, respectively. The organic matter and  $\text{NH}_4\text{-N}$  removal efficiencies in the aerated wetland reactors were better than the non-aerated wetland reactors. The supplementary aeration has enhanced the aerobic biodegradation of organic matter and nitrification. The Manchurian wild rice outperformed *P. australis* in the removals of T-P, T-N and  $\text{NH}_4\text{-N}$ .