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, NH$_4$-N and NO$_3$-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 NH$_4$-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 NH$_4$-N.