

THE PHYTOREMEDIATION APPLICATION IN AGRICULTURAL POLLUTION REDUCTION

Linda Grinberga¹
Inga Grinfelde²

¹⁾ Researcher, Latvia University of Life Sciences and Technologies, Latvia
²⁾ Assist. Professor, Latvia University of Life Sciences and Technologies, Latvia

Abstract

The phytoremediation is effective solution for agricultural non-point source pollution reduction. One of phytoremediation technology is to build constructed wetlands. Meteorological and hydrological factors and their effects on nutrient retention in surface flow constructed wetland treating agricultural non-point source pollution were analysed in this study. The main objectives were to determine the factors that contribute to nutrient removal and provide maintenance recommendations that could optimize performance of constructed wetlands. In order to estimate removal efficiency of nitrogen and phosphorus compounds water samples were collected from the surface flow constructed wetland located in Zalenieki County, Latvia, twice per month since June, 2014. Water quality parameters such as total suspended solids, nitrate nitrogen, ammonium nitrogen, total nitrogen, orthophosphate phosphorus, and total phosphorus were monitored. The V-notch weir and water level loggers were installed at the inlet and outlet of the wetland to measure water flow. Daily precipitation and air temperature was obtained from the nearest meteorological station to determine the impacts of meteorological conditions on nutrient retention.

The seasonal impact of meteorological conditions on nitrogen transformations in surface flow constructed wetland was demonstrated by increase of ammonium-nitrogen concentrations and decrease of nitrate-nitrogen concentrations during the vegetation period. In the study period the retention efficiency of surface flow constructed wetland for total phosphorous was higher during the vegetation period by 53%. The concentrations of suspended solids were higher after the wetland during March, April and May, which is related to occurrence of high flow conditions in the spring period.

Keywords: constructed wetland, non-point source pollution, total nitrogen reduction.