Possibilities for reduction of selected pollutants in urban area rainfall wastewater with the use of ditches

Anna Rabajczyk*, Kamila Orlińska, Katarzyna Żak

Chair of Environmental Protection and Modelling, The Jan Kochanowski University in Kielce, ul. Świętokrzyska 15, 25-406 Kielce, Poland, email: chromium@ujk.edu.pl (A. Rabajczyk)

Received 19 September 2014; Accepted 3 February 2015

ABSTRACT

Wastewater composition depends on a variety of factors, including the type of catchment and the method of catchment development, methods of black ice control, parameters of atmospheric precipitation and the season. The major pollutants of rainfall wastewater are heavy metals, animal waste, mineral hydrocarbons, salts, de-icers, leaves and other plant parts, but the volume of pollution may vary even within one catchment. From the viewpoint of rainfall wastewater pretreatment, in urban areas, ditches are significant facilities since they are inhabited by a variety of flora species, mainly ruderal and reed bed vegetation, which have a capacity for accumulating heavy metals such as chromium, copper, nickel, lead, cadmium and zinc. The focus of the present study is a ditch located in the western part of the city of Kielce, which collects rainfall wastewater from closed stormwater drainage of Skrajna, Malików and Kolejarzy Streets, then removes it to the pretreatment facility and finally—to the Sufraganiec river. The material for analysis was collected between November 2012 and April 2013, following atmospheric precipitation of varying intensity, as well as after snowmelt. In the collected material, the pH, electrolytic conductivity, suspension, bicarbonates, as well as concentrations of selected heavy metals (Pb, Cd, Zn, Cu, Ni, Cr) were determined.

Keywords: Rainfall wastewater; Ditch; Urban area; pH; Heavy metals

*Corresponding author.

Presented at the 12th Scientific Conference on Microcontaminants in Human Environment 25–27 September 2014, Czestochowa, Poland

1944-3994/1944-3986 © 2015 Balaban Desalination Publications. All rights reserved.