



“Gheorghe Asachi” Technical University of Iasi, Romania



RESEARCH ON WASTEWATER PHYTOREMEDIATION USING AQUATIC SPECIES FOR HEAVY METALS PHYTOEXTRACTION AND BIOACCUMULATION

Dana Malschi^{1*}, Ioan C. Oprea¹, Lucrina Ștefănescu¹, Gabriela E. Popița¹,
Dorian Ioan Brăhăița¹, Elena Rînba², Rozalia Kadar³

¹Babeș-Bolyai University, Faculty of Environmental Sciences and Engineering, 30 Fântânele Str., 400294 Cluj-Napoca, Romania

²Babeș-Bolyai University, Botanical Garden, 42 Republicii Str., Cluj-Napoca, Romania

³Agricultural Research and Development Station Turda, 27 Agriculturii Str., Cluj County, România

Abstract

Phytoremediation tests on heavy metals bioaccumulation were performed during 2012-2014 with aquatic species *Lemna minor*, *Pistia stratiotes*, *Eichhornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata*, *Cladophora glomerata* on samples of contaminated waters collected from the toxic pond of waste landfill Șomârd-Mediaș, Sibiu County. With the purpose to check the species capacity for heavy metal removal and bioaccumulation, comparative analysis of water samples was performed. Three types of experimental waters for each species have been used: drinking plain water as blank; water collected from the toxic pond of Șomârd waste landfills; water with 1/2 dilution from the toxic pond of Șomârd waste landfills. The study was conducted in micro containers with contaminated water using constructed wetlands. The bioaccumulation of heavy metals (Cd, Cu, Ni, Zn, Pb, Fe, Cr) in the green tissue samples (mg/kg dry matter) have been measured after the phytoremediation process. The statistical analysis was performed, based on the determination of microelements with flame atomic absorption spectrometry (ZEEnit 700 Analytik Jena) method. The results have shown that: *L. minor* plants *P. stratiotes* and *E. crassipes* plants were able to extract and to accumulate Cu, Pb, Ni, Fe, Zn, Cr, Cd in their tissues. *V. spiralis* and *H. verticillata* plants were able to extract Cr, Cd. The green algae *C. glomerata* was able to extract Pb, Zn, Cr, Cd. This study has shown that the presence of aquatic species in the toxic pond water have important effects on wastewater phytoremediation in period of two weeks. In order to implement this biotechnology, the tests results have shown a great positive influence of the phytoremediation of contaminated waters using aquatic species in constructed wetlands.

Key words: heavy metals removal and bioaccumulation, *Lemna minor*, *Pistia stratiotes*, *Eichhornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata*, *Cladophora glomerata*

Received: January, 2015; Revised final: October, 2015; Accepted: November, 2015

* Author to whom all correspondence should be addressed: e-mail: danamalschi@yahoo.com; Phone: +40745 367373; Fax: +40264-30 70 30