

Co-treatment of landfill leachate and municipal wastewater using the ZELIAC/zeolite constructed wetland system

ABSTRACT

Constructed wetland (CW) is a low-cost alternative technology to treat wastewater. This study was conducted to co-treat landfill leachate and municipal wastewater by using a CW system. *Typha domingensis* was transplanted to CW, which contains two substrate layers of adsorbents, namely, ZELIAC and zeolite. Response surface methodology and central composite design have been utilized to analyze experimental data. Contact time (h) and leachate-to-wastewater mixing ratio (%; v/v) were considered as independent variables. Colour, COD, ammonia, nickel, and cadmium contents were used as dependent variables. At optimum contact time (50.2 h) and leachate-to-wastewater mixing ratio (20.0%), removal efficiencies of colour, COD, ammonia, nickel, and cadmium contents were 90.3%, 86.7%, 99.2%, 86.0%, and 87.1%, respectively. The accumulation of Ni and Cd in the roots and shoots of *T. domingensis* was also monitored. Translocation factor (TF) was >1 in several runs; thus, *Typha* is classified as a hyper-accumulator plant.

Keyword: Co-treatment; Landfill leachate; RSM; Wetland; ZELIAC; Zeolite