

ABSTRACT

Ameviana Fitri Noveira. 24020123420016. The Effect of Plant Density of Akar Wangi (*Chrysopogon Zizanioides* (L.) Roberty) Combined with Compost in the Remediation of Zinc (Zn) Metal Contaminated Soil from the Jatibarang Landfill. Under the guidance of Endah Dwi Hastuti and Yulita Nurchayati.

Leachate-contaminated soil at the Jatibarang Landfill is known to contain heavy metal zinc (Zn) exceeding the threshold, requiring an effective and environmentally friendly remediation method. Phytoremediation using vetiver plants (*Chrysopogon zizanioides*) combined with compost is an alternative because the deep root system is able to absorb metals, while the compost improves the physical, chemical, and biological properties of the soil. This study aims to analyze the effect of vetiver plant density and compost application on reducing soil Zn levels and plant growth in leachate-contaminated soil. The research used a 2×2 factorial Completely Randomized Design (CRD) with plant density factors [D1 (1 individual) and D2 (3 individuals)] and compost [K0 (without compost) and K1 (20% compost (w/w))]. Each treatment was replicated six times for growth parameters and three times for Zn content analysis. The parameters observed included soil Zn levels, Zn reduction efficiency, root and shoot bioconcentration factor (BCF), translocation factor (TF), and plant growth parameters. Data were analyzed using ANOVA at a significance level of 5%. The results showed that the combination of vetiver and compost was able to reduce soil Zn levels from 174.41 mg/kg to 49.33–52.17 mg/kg with a reduction efficiency of 70.09–71.72%. High plant density has the potential to reduce Zn levels with a root BCF of 1.38 and increase plant growth. Compost application also has the potential to reduce Zn levels with a root BCF of 1.26, a shoot BCF of 1.05, and a TF of 0.98, and increase root and shoot growth although it had no effect on plant height, root length, and chlorophyll content. There was no significant interaction between plant density and compost on Zn reduction or plant growth. In general, high plant density and compost application are each effective in supporting Zn phytoremediation in leachate-contaminated soil.

Keywords: zinc, phytoremediation, vetiver, compost, plant density.