

## ABSTRACT

**Muhammad Luthfi Fachrezi. 24020123420009. Effects of Biochar and Plant Density on Zinc Uptake and Growth of Vetiver Grass (*Chrysopogon zizanioides* (L.) Roberty) in Jatibarang Landfill Soil. Under the guidance of Endah Dwi Hastuti and Yulita Nurchayati.**

Leachate contamination resulting from solid waste disposal increases soil Zn concentrations beyond permissible limits. One potential mitigation strategy is phytoremediation using vetiver grass (*Chrysopogon zizanioides*) combined with biochar application. This study aimed to evaluate the effects of biochar and planting density of vetiver grass on soil Zn reduction, Zn uptake capacity, and plant growth. The experiment was arranged in a completely randomized design with a  $2 \times 2$  factorial pattern and three replications. The first factor was biochar application, consisting of no biochar (B0) and biochar addition (B1), while the second factor was planting density, namely low density (one plant per planting bag, D1) and high density (three plants per planting bag, D2). Data were analyzed using two-way analysis of variance (ANOVA), followed by Duncan's Multiple Range Test (DMRT) at a 95% confidence level. Biochar application showed potential to reduce soil Zn concentration and enhance Zn uptake, with a root bioconcentration factor (BCF root) of 1.21, shoot bioconcentration factor (BCF shoot) of 0.78, and a translocation factor (TF) of 0.70, while plant growth per planting bag was not significantly affected, except for root length. High planting density also showed potential to reduce soil Zn concentration and increase Zn uptake, with a BCF root of 1.33, BCF shoot of 0.85, and TF of 0.85, and significantly improved shoot and root growth per planting bag, except for root length. No significant interaction between biochar application and planting density was observed for soil Zn concentration, Zn uptake, or plant growth parameters, except for plant height. Overall, both biochar application and high planting density independently contributed to reducing soil Zn concentration, enhancing Zn uptake and vetiver grass growth per planting bag.

*Keywords: leachate, zinc, phytoremediation, vetiver grass, biochar, plant density*