UJI TOKSISITAS LOGAM SENG DALAM TANAH SEKITAR BEKAS TEMPAT PEMBUANGAN AKHIR (TPA) KADISOKA TERHADAP PERTUMBUHAN KACANG HIJAU *(Vigna radiata* L.*)* DAN BUNGA MATAHARI (*Helianthus anuus* L.*)*

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INTISARI

Uji toksisitas logam seng dalam tanah bekas tempat pembuangan akhir (TPA) Kadisoka terhadap pertumbuhan kacang hijau *(Vigna radiata* L.*)* dan bunga matahari (*Helianthus anuus* L.*)* telah dilakukan. Penelitian ini bertujuan untuk menganalisis sifat fisikokimia dan kandungan logam Zn, menentukan kapasitas adsorpsi maksimum, mempelajari desorpsi logam Zn dalam tanah bekas TPA Kadisoka dan mempelajari pengaruh toksisitas logam berat Zn dalam tanah bekas TPA Kadisoka terhadap pertumbuhan kacang hijau *(Vigna radiata* L.*)* dan bunga matahari (*Helianthus annus* L.*)*. Sampel tanah diambil 4 titik di sekitar TPA Kadisoka yaitu tanah titik I, II, III, dan IV. Sifat fisikokimia sampel tanah yang dianalisis meliputi penentuan kadar air, konduktivitas listrik, pH, karbon organik total, kadar abu, kapasitas tukar kation dan kadar logam Zn dalam tanah. Kapasitas adsorpsi dilakukan dengan menginteraksikan sampel tanah dan variasi larutan standar Zn. Kajian desorpsi Zn dilakukan dengan penambahan asam oksalat dalam berbagai konsentrasi. Konsentrasi Zn dalam larutan setelah interaksi diukur dengan instrumen Spektrofotometer Serapan Atom (SSA). Eluat hasil desorpsi digunakan untuk menguji toksisitas logam Zn terhadap pertumbuhan benih kacang hijau dan bunga matahari.

Hasil dari penelitian memperlihatkan bahwa sampel tanah titik II mengandung kadar logam Zn paling tinggi sebesar 544,58 mg kg^{-1}. Isoterm adsorpsi keempat titik tanah mengikuti model isoterm Langmuir dengan adsorpsi maksimum pada konsentrasi larutan Zn 100 mg kg^{-1}. Desorpsi logam Zn paling optimum pada konsentrasi asam oksalat 0,7 mol L^{-1}. Pengujian toksisitas logam Zn menunjukkan bahwa, pada konsentrasi tinggi logam Zn menimbulkan efek racun, sehingga menghambat pertumbuhan akar serta hipokotil kacang hijau *(Vigna radiata* L.*)* dan bunga matahari (*Helianthus annus* L.*)*.

Kata kunci: desorpsi, kacang hijau, logam Zn, tanah, toksisitas.

TOXICITY TEST OF ZINC METAL IN SOIL AROUND THE LANDFILL OF KADISOKA ON THE GROWTH OF MUNG BEAN *(Vigna radiata* L.*)* AND SUNFLOWER (*Helianthus anuus* L.*)*

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ABSTRACT

An experiment entitled "Toxicity Test of Zinc Metal in Soil Around The Landfill of Kadisoka on the Growth of Mung Bean *(Vigna radiata* L.*)* and Sunflower (*Helianthus anuus* L.*)*" has been carried out. The aim of the experiment are to analyze the physicochemical properties and total zinc metal content of soil around the landfill of Kadisoka Sleman Yogyakarta, to study adsorption and desorption of soil against zinc metal, and to study ecotoxicity test of zinc metal in soil around the landfill of Kadisoka against mung bean *(Vigna radiata* L.*)* and sunflower (*Helianthus anuus* L.*)*. Soil sample were divided into four sample point, there were sample point I, II, III, and IV based on places where they were taken. Physicochemical properties determined in this study included water content, pH, conductivity, total organic carbon, cation exchange capacity, ash content, total zinc metal content in soil, and characterization of soil samples by Fourier Transform Infrared Spectroscopy. Study of zinc metal adsorption in samples was done by adding zinc solution and the effect of concentration were investigated. Study of zinc metal desorption in sample was done by adding oxalic acid and the effect of concentration were investigated. Zinc metal concentration after interactions was measured by atomic adsorption spectrophotometer instrument (AAS). Ecotoxicity test with the soil eluates from the desorption experiments was performed with mung bean *(Vigna radiata* L.*)* and sunflower (*Helianthus anuus* L.*)*.

Result of this experiment showed that the highest zinc metal content was owned by sample point II in amount of 544.58 mg kg^{-1}. Adsorption isotherms of zinc metal in the soil followed the Langmuir isotherm model and the maximum adsorption occurred at 100 mg kg^{-1}. Optimum desorption occurred at the concentration of oxalic acid 0.7 mol L^{-1}. An ecotoxicity test showed that zinc metal at high concentration was found to be toxic for the growth of root and hypocotyl of mung bean *(Vigna radiata* L.*)* and sunflower (*Helianthus anuus* L.*)*.

Keywords: adsorption, ecotoxicity, mung bean, soil, zinc metal.