RINGKASAN

Jenis tanah Inceptisol termasuk jenis tanah marjinal atau rendah unsur hara. Pertanian yang diterapkan merupakan pertanian intensif yang banyak menggunakan input dari luar yang tinggi, dan mengakibatkan pencemaran lingkungan. Pencemaran logam berat Pb pada tanah apabila tidak dikendalikan akan semakin meningkat sehingga menimbulkan dampak yang berbahaya terhadap lingkungan dan organisme hidup. Tujuan penelitian ini adalah untuk: 1. Mengetahui pengaruh pupuk N-ZEO-SR PLUS terhadap sifat kimia tanah Inceptisol meliputi pH H_2O, pH KCl, Daya Hantar Listrik, N-total, N-tersedia, Kapasitas Tukar Kation dengan tercemar logam berat timbal (Pb) pada tanaman kedelai *(Glycine max L.);* 2. Mengetahui pengaruh pupuk N-ZEO-SR PLUS terhadap bobot biji kedelai kering panen.

Penelitian dilaksanakan pada bulan November 2023 hingga April 2024, di *screenhouse* Fakultas Pertanian, dan Laboratorium Ilmu Tanah, Fakultas Pertanian, Universitas Jenderal Soedirman, Purwokerto. Rancangan percobaan yang digunakan yaitu menggunakan Rancangan Acak Kelompok (RAK) dengan 2 faktor. Faktor pertama yaitu dosis pupuk N-ZEO-SR PLUS dan faktor kedua yaitu konsentrasi logam berat timbal (Pb). Variabel pengukuran meliputi pH (KCl), pH (H_2O), Daya Hantar Listrik, N-total, N tersedia, Kapasitas Tukar Kation, dan Bobot Panen Kering Kedelai. Analisis menggunakan Analysis of Variance (Anova) dengan taraf 5 % dan uji lanjut DMRT (*Duncan Multiple Range Test*) dengan taraf 5%.

Hasil penelitan menunjukan bahwa pemberian pupuk N-ZEO-SR PLUS tidak berpengaruh terhadap sifat kimia tanah Inceptisol meliputi pH H2O, pH KCl, Daya Hantar Listrik, N-total, N-tersedia dan Kapasitas Tukar Kation. Pemberian konsentrasi timbal (Pb) berpengaruh terhadap Daya Hantar Listrik dengan nilai tertinggi 0,292 dS/m dan N-total dengan nilai tertinggi 0,395%. Pemberian pupuk N-ZEO-SR PLUS meningkatkan bobot kering panen biji kedelai (*Glycine Max* L.) dengan hasil terbaik 28,38% pada dosis 150 kg/ha. Terdapat interaksi kedua perlakuan pupuk N-ZEO-SR PLUS dan konsentrasi timbal (Pb) terhadap pH KCl.

SUMMARY

The Inceptisol soil type is classified as marginal soil or low in nutrients. The agriculture practiced is intensive farming, which relies heavily on external high-inputs and leads to environmental pollution. Heavy metal Pb contamination in soil, if not controlled, will continue to increase, resulting in dangerous impacts on the environment and living organisms. The objectives of this research are to: 1. Determine the effect of N-ZEO-SR PLUS fertilizer on the chemical properties of Inceptisol soil, including pH H_2O, pH KCl, Electrical Conductivity, Total Nitrogen, Available Nitrogen, and Cation Exchange Capacity with lead (Pb) contamination in soybean (Glycine max L.) plants; 2. Determine the effect of N-ZEO-SR PLUS fertilizer on the dry seed weight of harvested soybeans.

The research was conducted from November 2023 to April 2024, in the screenhouse of the Faculty of Agriculture and Soil Science Laboratory, Faculty of Agriculture, Jenderal Soedirman University, Purwokerto. The experimental design used was a Randomized Block Design (RBD) with 2 factors. The first factor was the N-ZEO-SR PLUS fertilizer dosage, and the second factor was the concentration of the heavy metal lead (Pb). Measurement variables included pH (KCl), pH (H_2O), Electrical Conductivity, Total Nitrogen, Available Nitrogen, Cation Exchange Capacity, and Dry Soybean Harvest Weight. The analysis used was Analysis of Variance (ANOVA) at a 5% significance level, followed by the DMRT (Duncan's Multiple Range Test) at a 5% level.

The research results indicate that the application of N-ZEO-SR PLUS fertilizer does not affect the chemical properties of Inceptisol soil, including pH H_2O, pH KCl, Electrical Conductivity, total nitrogen (N-total), available nitrogen (N-tersedia), and Cation Exchange Capacity. The application of lead (Pb) concentration affects Electrical Conductivity, with the highest value being 0.292 dS/m, and Total N, with the highest value being 0.395%. The application of N-ZEO-SR PLUS fertilizer increases the dry weight of harvested soybean seeds (Glycine max L.) with the best result being 28.38% at a dose of 150 kg/ha. There is an interaction between the treatments of N-ZEO-SR PLUS fertilizer and lead (Pb) concentration on pH KCl.