

## RINGKASAN

Pupuk NZEO-SRPlus adalah pupuk N-Zeolit lepas lambat yang dibuat melalui impregnasi dan adsorpsi pupuk urea ke dalam pori-pori berukuran nano zeolit dan permukaan yang bermuatan negatif dalam bentuk butiran dengan mineral jenis lempung montmorillonite sebagai bahan perekat dan diperkaya dengan Si dan *coating nano* zeolit serta bahan humat untuk meningkatkan efisiensi dan efektivitas pemupukan. Tujuan dari penelitian ini adalah untuk mengetahui (i) pengaruh dosis pupuk NZEO-SRPlus terhadap sifat kimia tanah (pH H<sub>2</sub>O, DHL, KTK, Si-tersedia, N-tersedia, P-tersedia, K-tersedia), (ii) pengaruh waktu pemberian pupuk NZEO-SRPlus terhadap sifat kimia tanah (pH H<sub>2</sub>O, DHL, KTK, Si-tersedia, N-tersedia, P-tersedia, K-tersedia), serapan Si, dan hasil tanaman jagung (*Zea mays* L.), dan (iii) kombinasi terbaik antara dosis dan waktu pemberian pupuk NZEO-SRPlus terhadap beberapa sifat kimia tanah, serapan Si, dan hasil tanaman jagung.

Penelitian dilakukan di laboratorium Ilmu tanah dan lahan *Experimental Farm* Fakultas Pertanian, Universitas Jenderal Soedirman. Penelitian menggunakan Rancangan Acak Kelompok Lengkap (RAKL) dengan dua faktor dan 3 ulangan. Faktor pertama dosis (D) terdiri dari 5 taraf (D0= 0 kg N/ha, D1= setara 50 kg N/ha, D2= 100 kg N/ha, D3= 150 kg N/ha, D4= 200 kg N/ha). Faktor kedua waktu pemberian (W) yang terdiri dua taraf (W1= pemberian pupuk awal Tanam (5 hst) 100% dan W2= pemberian pupuk awal tanam (5 hst) 50% + umur 30 hst 50%). Variabel yang diamati diantaranya: pH H<sub>2</sub>O, DHL, KTK, Si-tersedia, N-tersedia, P-tersedia, K-tersedia, Si serapan tanaman, bobot tongkol berkelobot, dan bobot biji pipilan.

Hasil penelitian menunjukkan bahwa dosis Pupuk NZEO-SRPlus mampu menurunkan pH H<sub>2</sub>O, meningkatkan DHL, Si-tersedia, N-tersedia, Si serapan tanaman, bobot tongkol berkelobot, dan bobot biji pipilan. Waktu pemberian W2 meningkatkan hasil tanaman jagung lebih tinggi pada variabel bobot tongkol berkelobot dan bobot biji pipilan yaitu menjadi 7,1 ton/ha dan 2,06 ton/ha. Tidak terjadi interaksi antara perlakuan Dosis dan Waktu pemberian pupuk NZEO-SRplus. Kombinasi terbaik adalah pemberian perlakuan dosis pupuk NZEO-SRPlus 1000 kg/ha (D4) dan waktu pemberian 50% di awal tanam + 50% pada 30 hst (W2).

## SUMMARY

*NZEO-SRPlus fertilizer is a slow-release N-Zeolite fertilizer made through impregnation and adsorption of urea fertilizer into nano-sized pores of zeolite and negatively charged surface in the form of granules with montmorillonite clay minerals as adhesives and enriched with Si and nano zeolite coatings, as well as humic materials to increase the efficiency and effectiveness of fertilization. The purpose of this study was to determine (i) the effect of NZEO-SRPlus fertilizer dosage on soil chemical properties (pH H<sub>2</sub>O, EC, CEC, available Si, available N, available P, available K), (ii) the effect of time of application of NZEO-SRPlus fertilizer on soil chemical properties (pH H<sub>2</sub>O, EC, CEC, available Si, available N, available P, available K), Si uptake, and maize yield (*Zea mays* L.), and (iii) the best combination between dose and time of application of NZEO-SRPlus fertilizer on several soil chemical properties, Si uptake, and maize yield.*

*The research was conducted at the Experimental Farm and Soil Science Laboratory, Faculty of Agriculture, Jenderal Sudirman University. The study used a randomized complete block design (RCBD) with two factors and 3 replications. The first factor was dose (D) consisted of 5 levels (D<sub>0</sub>= 0 kg N/ha, D<sub>1</sub>= equivalent to 50 kg N/ha, D<sub>2</sub>= 100 kg N/ha, D<sub>3</sub>= 150 kg N/ha, D<sub>4</sub>= 200 kg N/ha Ha). The second factor was the time of application (W) which consisted of two levels (W<sub>1</sub> = application of early fertilizer for planting (5 days after planting) 100% and W<sub>2</sub> = fertilizer application for early planting (5 days after planting) 50% + age 30 days after planting 50%). The variables observed were: pH H<sub>2</sub>O, EC, CEC, available Si, available N, available P, available K, Si plant uptake, the weight of cobs, and weight of shelled seeds.*

*The results showed that the dose of NZEO-SRPlus fertilizer was able to reduce pH H<sub>2</sub>O, increase EC, available Si, available N, plant uptake Si, the weight of cobs, and the weight of shelled seeds. The time of giving W<sub>2</sub> increased maize yields higher on the weight of cob and shelled seed weight to 7.1 tons/ha and 2.06 tons/ha, respectively. There was no interaction between NZEO-SRPlus fertilizer dose and time of application. The best combination is the application of NZEO-SRPlus fertilizer dose of 1000 kg/ha (D<sub>4</sub>) and the time of application of 50% at the beginning of planting + 50% at 30 DAP (W<sub>2</sub>).*