RINGKASAN

Tanaman padi (*Oryza sativa* L.) merupakan sumber karbohidrat utama setelah jagung dan gandum. Produksi padi tahun 2023 sebesar 53,63 juta ton mengalami penurunan 2,05% dibanding tahun 2022. Untuk memenuhi kebutuhan pangan, peningkatan produktivitas padi menjadi prioritas, salah satunya melalui pemanfaatan lahan marginal seperti tanah Entisol yang memiliki kesuburan rendah. Perbaikan sifat fisik dan biologi tanah diperlukan agar penyerapan hara optimal. Salah satu solusi adalah penggunaan pupuk NSZeo-SR yang mengandung Nitrogen, Sulfur, dan Zeolit. Penelitian ini bertujuan mengetahui pengaruh dosis pupuk NSZeo-SR terhadap sifat kimia tanah Entisol dan fisiologi tanaman padi.

Penelitian dilakukan di Desa Glempangpasir, Cilacap, dari September 2024 hingga Februari 2025, dengan menggunakan Rancangan Acak Kelompok (RAK) 11 perlakuan, masing-masing 3 ulangan, total 36 unit percobaan. Bahan yang digunakan pada penelitian ini meliputi tanah Entisol, air bebas ion (*aquades*), H_2SO_4 pekat, NaOH 40%, NaOH 0,05N, H_2SO_4 0,05N, *metil red*, larutan *fenolftalein*, benih padi varietas Inpari 32, pupuk NSZeo-SR yang terdiri atas zeolite alam, sulfur, pupuk KCL, pupuk SP-36 dan upuk urea. Sedangkan alat yang digunakan dalam penelitian ini meliputi timbangan digital, serta peralatan untuk analisis sampel laboratorium seperti botol kocok, labu ukur 1 L, labu ukut 100 ml (Herma), corong (Pyrex), labu didih, labu elenmeyer, labu kjeldahl, gelar ukur, kuvet, pipet, oven, destilasi, pH meter, lumpang dan alu, gelas ukur, dan alumunium foil. Variabel yang diamati meliputi Eh, serapan N, N-total, C-organik, rasio C/N, jumlah dan kehijauan daun, serta jumlah stomata.

Hasil penelitian menunjukkan bahwa pemberian pupuk NSZeo-SR mampu meningkatkan variabel jumlah daun, jumlah daun, dan jumlah stomata pada tanaman padi. Dosis terbaik diperoleh pada 1.600 g/ha. Pemberian pupuk NSZeo-SR tidak memberikan pengaruh secara nyata terhadap variabel Potensial redoks, N Total, Serapan N, C-organik dan C/N rasio. Namun, pada pemberian dosis pupuk NSZeo-SR 960 g/ha menunjukan nilai yang lebih baik dibandingkan dengan pupuk urea pada semua variabel sifat kimia.

SUMMARY

Rice plants (Oryza sativa L.) are the main source of carbohydrates after corn and wheat. Rice production in 2023 of 53.63 million tons decreased by 2.05% compared to 2022. To meet food needs, increasing rice productivity is a priority, one of which is through the utilization of marginal land such as Entisol soil which has low fertility. Improvement of physical and biological properties of the soil is needed for optimal nutrient absorption. One solution is the use of NSZeo-SR fertilizer containing Nitrogen, Sulfur, and Zeolite. This study aims to determine the effect of NSZeo-SR fertilizer doses on the chemical properties of Entisol soil and the physiology of rice plants.

The study was conducted in Glempangpasir Village, Cilacap, from September 2024 to February 2025, using a Randomized Block Design (RBD) of 11 treatments, each with 3 replications, a total of 36 experimental units. The materials used in this study include Entisol soil, deionized water (aquades), concentrated H2SO4, 40% NaOH, 0.05N NaOH, 0.05N H2SO4, methyl red, phenolphthalein solution, Inpari 32 variety rice seeds, NSZEO-SR fertilizer consisting of natural zeolite, sulfur, KCL fertilizer, SP-36 fertilizer and urea fertilizer. While the tools used in this study include digital scales, and equipment for laboratory sample analysis such as shake bottles, 1 L measuring flasks, 100 ml measuring flasks (Herma), funnels (Pyrex), boiling flasks, Elenmeyer flasks, Kjeldahl flasks, measuring cylinders, cuvettes, pipettes, ovens, distillation, pH meters, mortars and pestles, measuring cups, and aluminum foil. Observed variables include Eh, N uptake, N-total, C-organic, C/N ratio, number and greenness of leaves, and number of stomata.

The results showed that the application of NSZeo-SR fertilizer was able to increase the number of leaves, the number of leaves, and the number of stomata in rice plants. The best dose was obtained at 1,600 g/ha. The application of NSZeo-SR fertilizer did not have a significant effect on the variables of Redox Potential, Total N, N Uptake, C-organic and C/N ratio. However, the application of NSZeo-SR fertilizer dose of 960 g/ha showed better values compared to urea fertilizer in all chemical property variables.