

RINGKASAN

Jagung manis (*Zea mays* Saccharata Sturt) membutuhkan nitrogen dalam jumlah yang cukup tinggi dalam pertumbuhannya, tetapi nitrogen yang mampu diserap tanaman hanya sedikit karena sifatnya yang mudah hilang. Pemberian pupuk nitrogen harus disesuaikan dengan kebutuhan unsur hara jagung, sehingga nitrogen dapat menjadi lebih efisien. Pemberian bahan organik perlu dilakukan untuk menekan kehilangan nitrogen di dalam tanah. Kasgot merupakan bahan organik berasal dari sisa dekomposer larva maggot berupa sisa sampah organik. Kandungan nitrogen pada kasgot yang rendah dan bersifat mudah menguap membuat penggunaan kasgot dibutuhkan dalam jumlah yang banyak. Pengkayaan kasgot dengan zeolit perlu dilakukan untuk mengikat dan meningkatkan unsur nitrogen kasgot. Penelitian ini bertujuan untuk (1) mengetahui pengaruh aplikasi pupuk nitrogen dan kasgot yang diperkaya zeolit terhadap efisiensi serapan nitrogen pada tanaman jagung manis, (2) mengetahui pengaruh aplikasi pupuk nitrogen dan kasgot yang diperkaya zeolit terhadap fisiologis tanaman jagung manis, (3) mengetahui dosis pupuk nitrogen dan kasgot diperkaya zeolit yang efektif terhadap efisiensi serapan nitrogen dan fisiologis tanaman jagung manis.

Penelitian ini dilaksanakan di Laboratorium Kebun Percobaan dan Laboratorium Agronomi dan Hortikultura Fakultas Pertanian, Universitas Jenderal Soedirman untuk fermentasi kasgot dan pengamatan tanaman jagung manis. Analisis serapan N, kasgot, dan tanah dilaksanakan di Balai Penerapan Standar Instrumen Pertanian Jawa Tengah. Penelitian ini dilaksanakan pada bulan Desember 2023 hingga April 2024. Penelitian ini menggunakan Rancangan Acak Kelompok Lengkap (RAKL) yang terdiri dari 2 faktor dengan 3 kali ulangan. Faktor pertama dosis pupuk nitrogen N0: Kontrol; N1: 150 kg/ha; N2: 300 kg/ha. Faktor kedua dosis kasgot K0: Kontrol; K1: Kasgot 100%; K2: Kasgot 95% + Zeolit 5%; K3: Kasgot 90% + Zeolit 10%. Data hasil penelitian dianalisis menggunakan *Analysis of Variance* (ANOVA) pada taraf 5%. Apabila Uji F berpengaruh nyata, maka uji dilanjutkan menggunakan *Duncan Multiple Range Test* (DMRT). Variabel yang diamati, yaitu kandungan klorofil (mg/g), lebar bukaan stomata (μm), kerapatan stomata (buah/ mm^2), indeks luas daun, laju asimilasi bersih ($\text{g}/\text{dm}^2/\text{minggu}$), laju pertumbuhan tanaman ($\text{g}/\text{m}^2/\text{minggu}$), aktivitas nitrat reduktase ($\mu\text{mol}\times 10^3/\text{mg}/\text{jam}$), serapan N tanaman (g/tanaman), efisiensi serapan N (%), efisiensi fisiologis (g BK/g hara diserap), dan kadar kemanisan ($^{\circ}\text{Brix}$).

Hasil penelitian menunjukkan bahwa dosis pupuk nitrogen berpengaruh terhadap indeks luas daun, laju asimilasi bersih, laju pertumbuhan tanaman, aktivitas nitrat reduktase, serapan N tanaman, efisiensi serapan N, dan kadar kemanisan. Dosis kasgot menunjukkan adanya perbedaan serapan N tanaman, efisiensi serapan N, dan efisiensi fisiologis. Interaksi antara dosis pupuk nitrogen dan kasgot berpengaruh pada efisiensi fisiologis. Dosis pupuk nitrogen 150 kg/ha memberikan efisiensi serapan nitrogen terbaik pada tanaman jagung manis.

SUMMARY

Sweet corn (Zea mays Saccharata Sturt) requires a fairly high amount of nitrogen in its growth, but only a small amount of nitrogen can be absorbed by the plant because it is easily lost. The application of nitrogen fertilizer must be adjusted to the nutrient needs of corn, so that nitrogen can be more efficient. The provision of organic materials needs to be done to reduce nitrogen loss in the soil. Kasgot is an organic material derived from the remaining maggot larvae decomposers in the form of organic waste. The low nitrogen content in kasgot and its volatile nature make the use of kasgot needed in large quantities. Enrichment of kasgot with zeolite needs to be done to bind and increase the nitrogen element of kasgot. This study aims to (1) determine the effect of nitrogen fertilizer application and zeolite-enriched kasgot on nitrogen uptake efficiency in sweet corn plants, (2) determine the effect of nitrogen fertilizer application and zeolite-enriched kasgot on the physiology of sweet corn plants, (3) To determine the doses of nitrogen fertilizer and zeolite-enriched kasgot that are effective on nitrogen uptake efficiency and physiology of sweet corn plants.

This research was conducted at the Experimental Farm and Agronomy and Horticulture Laboratory, Faculty of Agriculture, Universitas Jenderal Soedirman for kasgot fermentation and observation of sweet corn plants. N uptake, kasgot, and soil analysis were conducted at the Central Java Agricultural Instrument Standards Implementation Center. This research was conducted from December 2023 to April 2024. This study used a Complete Randomized Group Design (RCBD) consisting of 2 factors with 3 replications. The first factor is the dose of nitrogen fertilizer: N0: Control; N1: 150 kg/ha; N2: 300 kg/ha. The second factor is the dose of kasgot: K0: Control; K1: 100% Kasgot; K2: 95% Kasgot + 5% Zeolite; K3: 90% Kasgot + 10% Zeolite. The research data were analysed using Analysis of Variance (ANOVA) at the 5% level. If the F test had a significant effect, the test was continued using the Duncan Multiple Range Test (DMRT). The variables observed were chlorophyll content (mg/g), stomatal aperture width (μm), stomatal density (pieces/ mm^2), leaf area index, net assimilation rate ($\text{g}/\text{dm}^2/\text{week}$), plant growth rate ($\text{g}/\text{m}^2/\text{week}$), nitrate reductase activity ($\mu\text{mol}\times 10^3/\text{mg}/\text{h}$), plant N uptake (g/plant), N uptake efficiency (%), physiological efficiency (g dry weight/g nutrients absorbed), and sweetness content ($^{\circ}\text{Brix}$).

The results showed that the dose of nitrogen fertilizer affected the leaf area index, net assimilation rate, plant growth rate, nitrate reductase activity, plant N uptake, N uptake efficiency, and sweetness content. Doses of kasgot showed differences in plant N uptake, N uptake efficiency, and physiological efficiency. The interaction between doses of nitrogen fertilizer and kasgot affects physiological efficiency. Nitrogen fertilizer dose of 150 kg/ha gives the best nitrogen uptake efficiency in sweet corn plants.