

RINGKASAN

Nitrogen (N) merupakan unsur hara esensial bagi tanaman, namun memiliki karakteristik mudah hilang melalui pencucian, denitrifikasi, dan volatilisasi, sehingga dapat menyebabkan rendahnya efisiensi penggunaan nitrogen oleh tanaman. Efisiensi yang rendah ini berdampak pada pemborosan input pupuk dan menurunkan produktivitas tanaman. Oleh karena itu, strategi untuk meningkatkan efisiensi serapan nitrogen perlu dikembangkan. Penggunaan bahan organik seperti Kasgot terformulasi berpotensi meningkatkan efisiensi pemanfaatan nitrogen serta memperbaiki sifat fisik dan kimia tanah. Penelitian ini bertujuan untuk mengetahui pengaruh kasgot terformulasi dan dosis nitrogen terhadap respon agronomi tanaman jagung manis, mengetahui pengaruh kasgot terformulasi dan dosis nitrogen terhadap efisiensi penggunaan nitrogen, dan mengetahui interaksi antara kasgot dan nitrogen terhadap efisiensi nitrogen serta respon agronomis tanaman jagung manis.

Penelitian dilaksanakan di *screenhouse Experimental Farm* Fakultas Pertanian Universitas Jenderal Soedirman pada bulan November 2024 sampai Januari 2025. Menggunakan Rancangan Acak Kelompok Lengkap (RAKL) dengan 2 faktor dan 3 ulangan. Faktor pertama adalah dosis kasgot: K0 = 0 ton ha⁻¹, K1 = 10 ton ha⁻¹, K2 = 20 ton ha⁻¹, dan K3 = 30 ton ha⁻¹. Faktor kedua adalah dosis pupuk nitrogen: D0 = 0 kg ha⁻¹, D1 = 100 kg ha⁻¹, D2 = 200 kg ha⁻¹, dan D3 = 300 kg ha⁻¹. Variabel yang diamati meliputi: tinggi tanaman, jumlah daun, luas daun, panjang akar, berat kering tanaman, kandungan klorofil, ANR, laju fotosintesis, efisiensi nitrogen, efisiensi agronomi, dan hasil tanaman. Data dianalisis menggunakan ANOVA dan apabila berbeda nyata diuji lanjut dengan uji DMRT taraf 5%.

Hasil penelitian menunjukkan bahwa pemberian kasgot dan nitrogen berpengaruh nyata terhadap parameter agronomis dan fisiologis tanaman jagung manis. Dosis kasgot 20 ton ha⁻¹ serta nitrogen 300 kg ha⁻¹ meningkatkan tinggi tanaman, diameter batang, luas daun, panjang akar, efisiensi nitrogen dan agronomi tertinggi dicapai pada kombinasi kasgot terformulasi 10 ton ha⁻¹ dan nitrogen 100 kg ha⁻¹. pada parameter laju fotosintesis dengan kombinasi terbaik diperoleh pada kasgot terformulasi 30 ton ha⁻¹ dan nitrogen 100 kg ha⁻¹, interaksi juga diperoleh pada variabel biomassa dan pertumbuhan dengan kombinasi perlakuan terbaik diperoleh pada kasgot terformulasi 30 ton ha⁻¹ dan nitrogen 300 kg ha⁻¹, pada variabel hasil interaksi ditemukan pada panjang tongkol berkelobot dengan kombinasi terbaik diperoleh pada kasgot terformulasi 30 ton ha⁻¹ dan nitrogen 100 kg ha⁻¹, sedangkan pada variabel bobot tongkol, panjang tongkol tanpa kelobot, dan diameter tongkol tidak ditemukan interaksi namun diketahui hasil terbaik pada aplikasi dosis nitrogen 30 ton ha⁻¹.

SUMMARY

Nitrogen (N) is an essential nutrient for plants but is prone to losses through leaching, denitrification, and volatilization, which can lead to low nitrogen use efficiency (NUE) in plants. This low efficiency results in fertilizer wastage and reduced crop productivity. Therefore, strategies to improve nitrogen uptake efficiency need to be developed. The use of organic materials such as formulated maggot waste (maggot frass) has the potential to enhance the efficiency of inorganic nitrogen utilization as well as improve the physical and chemical properties of the soil. This study aimed to (1) determine the effect of formulated maggot frass and nitrogen doses on the agronomic response of sweet corn, (2) determine the effect of formulated maggot frass and nitrogen doses on nitrogen use efficiency, and (3) determine the interaction between maggot frass and nitrogen on nitrogen efficiency and the agronomic response of sweet corn.

The experiment was conducted in a screenhouse at the Experimental Farm of the Faculty of Agriculture, Jenderal Soedirman University, from November 2024 to January 2025, using a randomized complete block design (RCBD) with two factors and three replications. The first factor was maggot frass dose (0, 10, 20, and 30 tons ha^{-1}), and the second was nitrogen dose (0, 100, 200, and 300 kg ha^{-1}). The observed variables included plant height, number of leaves, leaf area, root length, plant dry weight, chlorophyll content, nitrate reductase activity, photosynthesis rate, nitrogen use efficiency, agronomic efficiency, and crop yield. Data were analyzed using ANOVA followed by DMRT at a 5% significance level.

The results showed that the application of maggot frass and nitrogen had a significant effect on the agronomic and physiological parameters of sweet corn. The dose of 20 tons ha^{-1} of maggot frass combined with 300 kg ha^{-1} of nitrogen increased plant height, stem diameter, leaf area, and root length. The highest nitrogen use efficiency and agronomic efficiency were achieved with the combination of 10 tons ha^{-1} of maggot frass and 100 kg ha^{-1} of nitrogen. Interaction effects were observed in the photosynthesis rate, with the best combination found at 30 tons ha^{-1} of maggot frass and 100 kg ha^{-1} of nitrogen. Interactions were also found in biomass and growth variables, with the best combination achieved at 30 tons ha^{-1} of maggot frass and 300 kg ha^{-1} of nitrogen. For yield variables, an interaction was found in the length of husked cobs, with the best combination at 30 tons ha^{-1} of maggot frass and 100 kg ha^{-1} of nitrogen. Meanwhile, no interaction was observed for ear weight, husk-free ear length, and ear diameter, although the best results for these variables were obtained with the application of 300 kg ha^{-1} of nitrogen.