RINGKASAN

Cabai rawit merupakan komoditas hortikultura dengan nilai jual tinggi dan permintaan cenderung meningkat, namun terkadang hasil tanaman mengalami penurunan akibat teknik budidaya yang kurang tepat dan cekaman abiotik. Cekaman abiotik yaitu kondisi lingkungan yang tidak menguntungkan bagi tanaman seperti suhu ekstrem, intensitas cahaya tinggi, dan kekurangan nutrisi yang dapat mengganggu pertumbuhan dan hasil tanaman. Selain itu, penggunaan pupuk sintetis secara terus-menerus dapat menimbulkan kerugian karena mencemari lingkungan dan menciptakan residu pada tanah. Permasalahan ini dapat diatasi dengan pemberian pupuk organik dan pupuk N,P,K dosis rendah untuk mengurangi kerusakan tanah akibat pupuk sintesis. Penelitian ini bertujuan untuk (1) mengetahui konsentrasi terbaik aplikasi pupuk organik cair terhadap pertumbuhan dan hasil tanaman cabai, (2) mengetahui pengaruh dosis pupuk N,P,K rendah terhadap pertumbuhan dan hasil tanaman cabai, (3) mengetahui pengaruh interaksi pupuk organik cair dan pupuk N,P,K terhadap pertumbuhan dan hasil tanaman cabai, dan (4) mengetahui perubahan kandungan unsur hara tanah antara kondisi awal dan akhir setelah aplikasi pupuk organik cair (POC) dan pupuk N,P,K.

Penelitian dilaksanakan di *Screenhouse* Lahan Eksperimental Farm Fakultas Pertanian, Universitas Jenderal Soedirman, Laboratorium Ilmu Tanah dan Sumberdaya Lahan, dan Laboratorium Agronomi dan Hortikultura. Penelitian ini dilaksanakan pada Juli 2024 hingga Maret 2025. Penelitian dilakukan dengan menggunakan metode Rancangan Acak Kelompok Lengkap (RAKL). Kombinasi perlakuan pada penelitian ini yaitu dosis pupuk N,P,K dengan dosis 0 g/*polybag*, 50% rekomendasi pupuk N,P,K (0,675 g/*polybag* Urea, 0,675 g/*polybag* SP-36, 0,5625 g/*polybag* KCI), dan 100% rekomendasi pupuk N,P,K (1,35 g/*polybag* Urea, 1,35 g/*polybag* SP-36, 1,125 g/*polybag* KCI), dan konsentrasi POC dengan konsentrasi 0 ml POC/l air, 10 ml POC/l air, dan 20 ml POC/l air. Variabel yang diamati yaitu tinggi tanaman, jumlah cabang tanaman, jumlah daun, luas daun, kehijauan daun, diameter batang, waktu muncul bunga, jumlah buah per-tanaman, berat buah per-buah, dan berat buah per-tanaman.

Hasil penelitian menunjukkan bahwa konsentrasi pupuk organik cair mampu meningkatkan rerata tinggi tanaman, Jumlah cabang tanaman, kehijauan daun, jumlah buah per-tanaman, berat buah per-buah, dan berat buah per-tanaman. Konsentrasi pupuk organik cair terbaik ditunjukkan pada perlakuan P1 (10 ml POC/l air) dengan variabel jumlah daun, diameter batang, jumlah buah per-tanaman, berat buah per-buah, dan berat buah-pertanaman. Pemberian pupuk N,P,K dosis rendah mampu meningkatkan Jumlah daun dan diameter batang. Dosis pupuk N,P,K 50% rekomendasi pupuk N,P,K memberikan hasil terbaik pada variabel jumlah cabang tanaman, Jumlah daun, kehijauan daun, diameter batang 1,28 cm, jumlah buah per-tanaman, dan berat buah per-tanaman. Kombinasi pupuk organik cair dengan pupuk N,P,K tidak terjadi interaksi dalam meningkatkan pertumbuhan dan hasil tanaman cabai rawit. Hasil uji laboratorium tanah awal dan akhir menunjukkan kenaikan pada parameter tanah pH dan N-total. Penurunan uji tanah awal dan akhir pada parameter tanah c-organik, K-total, dan P-total.

SUMMARY

Cayenne pepper is a horticultural commodity with high selling value and increasing demand, but sometimes crop yields decline due to improper cultivation techniques and abiotic stress. Abiotic stress refers to unfavorable environmental conditions for plants, such as extreme temperatures, high light intensity, and nutrient deficiencies, which can disrupt plant growth and yield. Additionally, the continuous use of synthetic fertilizers can cause harm by polluting the environment and leaving residues in the soil. These issues can be addressed by applying organic fertilizers and low-dose N,P,K fertilizers to reduce soil damage caused by synthetic fertilizers. This study aims to (1) determine the optimal concentration of liquid organic fertilizer application on the growth and yield of chili plants, (2) determine the effect of low doses of N,P,K fertilizer on the growth and yield of chili plants, (3) to determine the effect of the interaction between liquid organic fertilizer and N,P,K fertilizer on the growth and yield of chili plants, and (4) to determine changes in soil nutrient content between initial and final conditions after the application of liquid organic fertilizer (POC) and N,P,K fertilizer.

The study was conducted at the Screenhouse Experimental Farm of the Faculty of Agriculture, Jenderal Soedirman University, the Soil Science and Land Resources Laboratory, and the Agronomy and Horticulture Laboratory. The study was carried out from July 2024 to March 2025. The study was conducted using the Complete Randomized Block Design (CRBD) method. The treatment combinations in this study were fertilizer doses of N, P, and K at 0 g/polybag, 50% of the recommended fertilizer doses of N, P, and K (0.675 g/polybag Urea, 0.675 g/polybag SP-36, 0.5625 g/polybag KCI), and 100% recommended fertilizer N,P,K *(1.35 g/polybag Urea, 1.35 g/polybag SP-36, 1.125 g/polybag KCI), and POC concentration at 0 ml POC/l water, 10 ml POC/l water, and 20 ml POC/l water. The observed variables were plant height, number of branches, number of leaves, leaf area, leaf greenness, stem diameter, flowering time, number of fruits per plant, fruit weight per fruit, and fruit weight per plant.*

The results of the study indicate that the concentration of liquid organic fertilizer can increase the average plant height, number of plant branches, leaf greenness, number of fruits per plant, fruit weight per fruit, and fruit weight per plant. The optimal concentration of liquid organic fertilizer was observed in treatment P1 (10 ml POC/l water) for the variables number of leaves, stem diameter, number of fruits per plant, fruit weight per fruit, and fruit weight per plant. The application of low-dose N,P,K *fertilizer was able to increase the number of leaves and stem diameter. A fertilizer dose of 50% of the recommended* N,P,K *fertilizer provided the best results for the variables of number of plant branches, number of leaves, leaf greenness, stem diameter of 1.28 cm, number of fruits per plant, and fruit weight per plant. The combination of liquid organic fertilizer with* N,P,K *fertilizer did not interact in enhancing the growth and yield of chili plants. Initial and final soil laboratory test results showed increases in soil pH and total N parameters. Initial and final soil tests showed decreases in soil organic C, total K, and total P parameters.*