

RINGKASAN

Penggunaan pupuk urea yang semakin masif oleh petani sebagai faktor utama produksi tanaman kale yang optimal, menyebabkan banyak masalah baru. Mulai dari meningkatnya biaya produksi yang dipicu mahalnya urea, hingga degradasi lahan akibat penumpukan zat kimiawinya. Degradasi lahan memicu petani untuk semakin menambah input urea agar kebutuhan hara bagi kale dapat terpenuhi yang akhirnya justru menurunkan efisiensi penggunaannya. Perlu dicarikan solusi yang berbasis organik untuk mengatasi masalah efisiensi urea dan degradasi lahan, salah satunya dengan penggunaan limbah tahu sebagai POC. Penelitian ini bertujuan untuk 1) mengetahui dosis pupuk urea yang efisien untuk pertumbuhan tanaman kale, 2) mengetahui konsentrasi POC limbah tahu yang terbaik untuk pertumbuhan tanaman kale, 3) mengetahui kombinasi pemupukan urea dan POC limbah tahu yang terbaik untuk pertumbuhan tanaman kale, dan 4) mengetahui pengaruh pemupukan urea dan POC limbah tahu terhadap persentase efisiensi serapan N tanaman kale.

Penelitian ini dilaksanakan di Desa Karangkemiri, Kecamatan Karanglewas, Kabupaten Banyumas dengan ketinggian 110 m dpl, serta di Laboratorium Agronomi dan Hortikultura Fakultas Pertanian, Universitas Jenderal Soedirman dari bulan Agustus sampai Oktober 2019. Penelitian menggunakan Rancangan Acak Kelompok Lengkap (RAKL) yang terdiri dari 2 faktor, yaitu 4 taraf dosis pupuk urea berupa U0 (0 g/tanaman), U1 (0,20 g/tanaman), U2 (0,41 g/tanaman), dan U3 (0,82 g/tanaman) serta 4 taraf konsentrasi POC limbah tahu berupa T0 (0 ml/l air), T1 (50 ml/l air), T2 (100 ml/l air), dan T3 (150 ml/l air), sehingga diperoleh 16 kombinasi perlakuan. Penelitian diulang 3 kali dengan tiap unit terdiri dari 3 tanaman, sehingga keseluruhan terdapat 144 tanaman. Variabel yang diamati dan diukur meliputi tinggi tanaman, jumlah daun, luas daun, bobot tajuk segar, bobot tajuk kering, panjang akar, bobot akar segar, bobot akar kering, serapan nitrogen, kadar klorofil daun, dan pH tanah. Data hasil penelitian dianalisis ragam pada taraf kesalahan 5% dan jika terdapat perbedaan yang signifikan, maka dilakukan uji lanjut dengan *Duncan's Multiple Range Test* (DMRT) pada taraf kesalahan 5%.

Hasil penelitian menunjukkan bahwa pemupukan urea dosis 0,41 g/tanaman atau 50% dosis rekomendasi berpengaruh terhadap tinggi dan bobot tajuk segar tanaman kale, sedangkan dosis 0,82 g/tanaman berpengaruh terhadap luas daunnya. Pemupukan POC limbah tahu konsentrasi 150 ml/l air berpengaruh terhadap tinggi tanaman kale, sedangkan konsentrasi 0 ml/l air berpengaruh terhadap bobot akar keringnya. Pemupukan POC limbah tahu konsentrasi 150 ml/l air tidak mampu memberikan efisiensi pemupukan urea sebesar 50% dari dosis rekomendasi, tapi konsentrasi 50 ml/l air yang mampu memberikannya dan berpengaruh terbaik hanya terhadap luas daun tanaman kale. Pemupukan urea dan POC limbah tahu tidak mampu meningkatkan persentase efisiensi serapan N tanaman kale secara optimal.

SUMMARY

The increasingly massive use of urea fertilizer by farmers as a major factor in the optimum production of kale plants, has caused many problems. Starting with the rising costs of production that triggered by urea to land degradation from the chemical accumulation. Land degradation triggers farmers to increasingly add urea input to hara's need for kale can be fulfilled, which eventually reduces its use efficiency. It needs to be found with organic-based solutions to deal with urea efficiency problems and land degradation, one with the use of tofu waste as liquid organic fertilizer (LOF). This research aims to 1) determine the most efficient dose of urea fertilizer for kale's plant growth, 2) determine the best concentration of LOF of tofu waste for kale's plant growth, 3) determine the best combination of urea fertilizer and LOF of tofu waste for kale's plant growth, and 4) determine the effect of fertilization of urea and LOF of tofu waste to kale's nitrogen absorption efficiency percentage.

This research was conducted in the Karangkemiri village, Karanglewas district, Banyumas regency at high altitudes 110 m above the sea level, and also in the Laboratory of Agronomy and Horticulture, Faculty of Agriculture, General Soedirman University from August to October 2019. The research used Randomized Completely Block Design which consisted of 2 factors. The first factor was 4 doses of urea fertilizer as follows U0 (0 g/plant), U1 (0,20 g/plant), U2 (0,41 g/plant), and U3 (0,82 g/plant) and also 4 concentration levels of LOF of tofu waste as follows T0 (0 ml/l water), T1 (50 ml/l water), T2 (100 ml/l water), dan T3 (150 ml/l water), so obtained 16 combinations of treatments. The research was repeated 3 times with each research unit consisting of 3 plants, so that overall 144 plants were obtained. Variables observed and measured include plant height, leaf number, leaf width, fresh shoot weight, dry shoot weight, root length, fresh root weight, dry root weight, nitrogen absorption, leaf chlorophyll levels, and hydrogen ion concentration of the land. Research data were analyzed using analysis of variance with an error rate of 5% and if it had a significant effect, so further testing was done with Duncan's Multiple Range Test (DMRT) with an error rate of 5%.

The results showed that the fertilization of urea dose 0,41 g/plant or 50% of recommendation dose has affected the kale's height and shoot fresh weight, while urea dose 0,82 g/plant has affected the kale's leaf width. The fertilization of concentration LOF of tofu waste 150 ml/l water has affected the kale's height and the concentration of 0 ml/l water has affected the kale's dry root weight. The fertilization of concentration LOF of tofu waste 150 ml/l water could not provide the efficiency of 50% of urea's fertilization recommendation dose. However concentration of LOF of tofu waste 50 ml/l water was able to provide it and showed the best treatment for leaf width. The fertilization of urea and LOF of tofu waste were unable to increase optimal levels of kale nitrogen absorption efficiency percentage.