

RINGKASAN

Penelitian ini bertujuan untuk menghasilkan kompos EGp sebagai produk agroteknologi alternative. Mengetahui pengaruh pemberian kompos EGp yang di per kaya unsur Cu, Zn, dan B pada tanaman kedelai ditanah kritis. Mengetahui pengaruh pemberian pupuk NPK pada tanaman kedelai ditanah kritis. Mengetahui pengaruh interaksi pemberian kompos EGp unsur Cu, Zn dan B dengan Pupuk NPK pada pertumbuhan kedelai. Mengetahui efisiensi penggunaan pupuk kompos EGp terhadap NPK.

Penelitian ini telah dilaksanakan di Rumah Kaca Fakultas Pertanian Universitas Islam Sumatra Utara, Jln. Karya Wisata, Gedung Johor, Kecamatan Medan Johor, Kota Medan, ketinggian tempat ± 45 mdpl. Penelitian ini dimulai bulan Desember 2024 sampai selesai. Metode penelitian menggunakan Rancangan Acak Kelompok (RAK) factorial yang terdiri dari dua faktor. Faktor yang pertama yaitu pupuk kompos EGp dengan Unsur Hara Cu, Zn, dan B yang terdiri dari 4 taraf yaitu E_0 = tanpa perlakuan; E_1 = 7,5 ton/ha (225 g/polybag); E_2 = 15 Ton/ha (450 g/polybag); E_3 = 22,5 ton/ha (675 g/polybag). Faktor yang kedua adalah pupuk NPK Mutiara yang terdiri dari 4 taraf yaitu N_0 = tanpa perlakuan; N_1 = 100 Kg/ha (0,45 g/polybag); N_2 = 105 Kg/ha (0,9 g/polybag); N_3 = 110 Kg/ha (1,35 g/polybag). Variabel pengamatan yaitu terdiri dari tinggi tanaman, diameter batang, jumlah polong, bobot polong, jumlah biji, bobot biji, jumlah bintil akar.

Berdasarkan hasil penelitian menunjukkan bahwa hasil analisis kandungan POC eceng gondok sebagai sumber pupuk organik cair mengandung unsur C-organik (26,58%) dan N-total (2,69%) yang tergolong tinggi, P_2O_5 (0,85%) dan kadar air (33,60%) pada kategori sedang, serta K_2O (2,75%) tergolong tinggi. Kondisi ini menunjukkan bahwa bahan tersebut berpotensi baik sebagai sumber pupuk organik. POC eceng gondok (EGp) berpengaruh nyata dalam meningkatkan tinggi tanaman, diameter batang, jumlah polong, bobot polong, jumlah biji, bobot biji, dan jumlah bintil akar. Perlakuan terbaik diperoleh pada pemberian POC eceng gondok E_3 (675 g/polybag). Pupuk NPK Mutiara berpengaruh nyata terhadap pertumbuhan tinggi tanaman, diameter batang, jumlah polong, bobot polong, dan bobot biji, tetapi tidak berpengaruh terhadap jumlah biji dan jumlah bintil akar. Perlakuan terbaik terdapat pada dosis pupuk NPK Mutiara 1,35 g/polybag. Interaksi antara kompos eceng gondok plus Cu, Zn, B, dan pupuk NPK Mutiara tidak berpengaruh nyata dalam meningkatkan pertumbuhan dan produksi tanaman kedelai. Namun kombinasi perlakuan terbaik terdapat pada kompos eceng gondok 675 g/polybag dengan pupuk NPK Mutiara 1,35 g/polybag.

Kata Kunci : Kompos eceng gondok, pupuk NPK, tanah Ultisol, pertumbuhan tanaman, hasil kedelai, efisiensi pemupukan, pupuk organik.

SUMMARY

*This study aims to produce EGp compost as an alternative agrotechnology product; to determine the effect of applying EGp compost enriched with Cu, Zn, and B elements on soybean (*Glycine max L.*) grown in degraded soil; to examine the effect of NPK fertilizer application on soybean plants in degraded soil; to evaluate the interaction effect between EGp compost enriched with Cu, Zn, and B and NPK fertilizer on soybean growth; and to assess the efficiency of EGp compost use in relation to NPK fertilizer.*

This research was conducted in the Greenhouse of the Faculty of Agriculture, Islamic University of North Sumatra, located on Jln. Karya Wisata, Gedung Johor, Medan Johor District, Medan City, at an altitude of approximately 45 meters above sea level. The study began in December 2024 and continued until completion. The research employed a factorial Randomized Block Design (RBD) consisting of two factors. The first factor was EGp compost enriched with micronutrients Cu, Zn, and B, consisting of four levels: E_0 = without treatment; E_1 = 7.5 tons/ha (225 g/polybag); E_2 = 15 tons/ha (450 g/polybag); and E_3 = 22.5 tons/ha (675 g/polybag). The second factor was NPK Mutiara fertilizer, also consisting of four levels: N_0 = without treatment; N_1 = 100 kg/ha (0.45 g/polybag); N_2 = 105 kg/ha (0.9 g/polybag); and N_3 = 110 kg/ha (1.35 g/polybag). The observed variables included plant height, stem diameter, number of pods, pod weight, number of seeds, seed weight, and number of root nodules.

Based on the research results, the analysis of water hyacinth liquid organic fertilizer (POC) as a source of organic fertilizer showed that it contained high levels of C-organic (26.58%) and total N (2.69%), moderate levels of P_2O_5 (0.85%) and moisture content (33.60%), as well as a high level of K_2O (2.75%). These conditions indicate that the material has good potential as a source of organic fertilizer. Water hyacinth POC (EGp) had a significant effect on increasing plant height, stem diameter, number of pods, pod weight, number of seeds, seed weight, and number of root nodules. The best results were obtained from the application of 675 g/polybag (E_3) of water hyacinth POC. NPK Mutiara fertilizer had a significant effect on plant height, stem diameter, number of pods, pod weight, and seed weight, but showed no significant effect on the number of seeds and root nodules. The best treatment was obtained at a dosage of 1.35 g/polybag of NPK Mutiara fertilizer. The interaction between water hyacinth compost enriched with Cu, Zn, and B and NPK Mutiara fertilizer did not show a significant effect on the growth and yield of soybean plants. However, the best combination treatment was obtained with 675 g/polybag of water hyacinth compost and 1.35 g/polybag of NPK Mutiara fertilizer.

Keywords : *Water hyacinth compost, NPK fertilizer, Ultisol soil, plant growth, soybean yield, fertilization efficiency, organic fertilizer.*