

RINGKASAN

Kedelai merupakan tanaman jenis kacang-kacangan, sebagai sumber protein nabati penting di Indonesia dan banyak diminati masyarakat. Upaya memperluas lahan budidaya kedelai untuk meningkatkan produksi dapat dilakukan pemanfaatan lahan Inceptisol. Namun, budidaya pada tanah Inceptisol memiliki kendala yaitu memiliki sifat tanah yang kurang subur, diantaranya adalah pH tanah agak masam, KTK sangat rendah, kadar C-organik rendah, dan kandungan unsur hara N, P, K rendah. Salah satu upaya untuk meningkatkan kesuburan tanah Inceptisol dengan memperbaiki karakteristik kimia tanah melalui pemupukan. Penggunaan pupuk anorganik dengan taraf yang berbeda sesuai perlakuan pada kajian ini ditujukan sebagai sumber utama unsur hara di dalam tanah, karena kandungan hara dalam Inceptisol tergolong rendah. Peran pupuk hayati sebagai fasilitator dalam penyediaan hara agar dapat diserap tanaman. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian kombinasi pupuk hayati dan pupuk anorganik N, P, K terhadap pertumbuhan tanaman kedelai dan sifat kimia tanah Inceptisol.

Penelitian ini dilaksanakan di lahan percobaan Desa Kebanggan, Kecamatan Sumbang, Kabupaten Banyumas dan analisis tanah dilaksanakan di Laboratorium Ilmu Tanah Fakultas Pertanian Universitas Jenderal Soedirman. Penelitian dilaksanakan pada bulan Juli 2024 sampai Desember 2024. Rancangan percobaan yang digunakan dalam penelitian ini adalah Rancangan Acak Kelompok (RAK) non faktorial yang terdiri dari 10 perlakuan dan 3 ulangan. Perlakuan yang dicoba terdiri P0 (Kontrol), P1 (NPK Standar), P2 (150% NPK + 100% Pupuk Hayati), P3 (150% NPK + 200% Pupuk Hayati), P4 (100% NPK + 100% Pupuk Hayati), P5 (100% NPK + 200% Pupuk Hayati), P6 (75% NPK + 100% Pupuk Hayati), P7 (75% NPK + 200% Pupuk Hayati), P8 (50% NPK + 100% Pupuk Hayati), P9 (50% NPK + 200% Pupuk Hayati), dimana pupuk N, P, K 100% adalah 50 kg/ha urea, 50 kg/ha TSP, dan 100 kg/ha KCl adalah dan pupuk hayati 100% 3,12 ml/2 liter. Variabel yang diamati yaitu pH H₂O, pH KCl, C Organik, KTK, N total, P tersedia, dan K tersedia, serta tinggi tanaman, jumlah daun, diameter batang, jumlah polong, jumlah biji, berat polong, bobot segar brangkas, dan bobot kering brangkas kedelai. Data hasil pengamatan dianalisis dengan analisis sidik ragam (ANOVA) pada taraf 5%. Apabila signifikan, dilakukan uji lanjutan DMRT pada taraf 5%.

Hasil penelitian menunjukkan bahwa perlakuan pemberian kombinasi pupuk hayati dan pupuk anorganik N, P, K berpengaruh nyata terhadap komponen sifat kimia tanah yaitu mampu meningkatkan kandungan C Organik 39,38% dan N total 69,23%. Selain itu, berpengaruh nyata terhadap pertumbuhan dan produksi tanaman kedelai yaitu dapat meningkatkan tinggi tanaman 4 MST 16,74%, tinggi tanaman saat panen 3,69%, jumlah daun 8 MST 2,32%, jumlah daun saat panen 13,77%, jumlah polong 43,15%, jumlah biji 44,40%, berat polong 67,14%, dan bobot segar brangkas 31,59%. Kombinasi perlakuan P4 (100% NPK + 100% Pupuk Hayati) memberikan hasil terbaik dalam meningkatkan sifat kimia tanah, pertumbuhan dan produksi hasil tanaman kedelai.

SUMMARY

Soybeans is a type of legume, an important source of vegetable protein in Indonesia and highly sought after by the public. Efforts to expand soybean cultivation areas to increase production can be achieved by utilizing Inceptisol soils. However, soybean cultivation on Inceptisol soils faces challenges due to their poor soil properties, including slightly acidic soil pH, very low cation exchange capacity (CEC), low organic carbon content, and low nutrient content of nitrogen (N), phosphorus (P), and potassium (K). One approach to improving Inceptisol soil fertility is by enhancing soil chemical characteristics through fertilization. The use of inorganic fertilizers at different rates, as applied in this study, is intended as the primary source of nutrients in the soil, as nutrient content in Inceptisol is relatively low. Biofertilizers play a role as facilitators in nutrient availability for plant uptake. This study aims to determine the effect of applying a combination of organic fertilizer and inorganic N, P, K fertilizer on soybean plant growth and the chemical properties of Inceptisol soil.

This study was conducted on experimental land in Kebanggan Village, Sumbang District, Banyumas Regency, and soil analysis was carried out at the Soil Science Laboratory, Faculty of Agriculture, Jenderal Soedirman University. The study was conducted from July 2024 to December 2024. The experimental design used in this study was a non-factorial Randomized Block Design (RBD) consisting of 10 treatments and 3 replications. The treatments tested included P0 (Control), P1 (Standard NPK), P2 (150% NPK + 100% Organic Fertilizer), P3 (150% NPK + 200% Organic Fertilizer), P4 (100% NPK + 100% Organic Fertilizer), P5 (100% NPK + 200% Organic Fertilizer), P6 (75% NPK + 100% Organic Fertilizer), P7 (75% NPK + 200% Organic Fertilizer), P8 (50% NPK + 100% Organic Fertilizer), P9 (50% NPK + 200% Organic Fertilizer), where 100% N, P, K fertilizer is 50 kg/ha urea, 50 kg/ha TSP, and 100 kg/ha KCl, and 100% organic fertilizer is 3.12 ml/2 liters. The variables observed were pH H₂O, pH KCl, organic carbon, KTK, total N, available P, and available K, as well as plant height, number of leaves, stem diameter, number of pods, number of seeds, pod weight, fresh weight of pods, and dry weight of pods. The observation data were analyzed using analysis of variance (ANOVA) at the 5% level. If significant, a post-hoc DMRT test was conducted at the 5% level..

The results of the study indicate that the application of a combination of organic fertilizer and inorganic N, P, K fertilizer has a significant effect on soil chemical properties, specifically increasing organic carbon content by 39.38% and total nitrogen by 69.23%. Additionally, it has a significant effect on soybean plant growth and yield, increasing plant height by 16.74% at 4 MST, plant height at harvest by 3.69%, number of leaves at 8 MST by 2.32%, number of leaves at harvest by 13.77%, number of pods by 43.15%, number of seeds by 44.40%, pod weight by 67.14%, and fresh weight of pods by 31.59%. The P4 treatment combination (100% NPK + 100% organic fertilizer) yielded the best results in improving soil chemical properties, plant growth, and soybean yield.