RINGKASAN

Tanaman Kedelai, Permasalahan, dan Solusi Kedelai (*Glycine max* L.) adalah komoditas pangan penting ketiga di Indonesia sebagai sumber protein nabati. Produksi nasional masih jauh dari kebutuhan sehingga impor diperlukan dengan harga fluktuatif. Salah satu masalah utama adalah luasnya lahan kering masam (Ultisol) dengan kesuburan rendah (pH rendah, Al toksik, defisiensi hara). Solusi yang ditawarkan adalah perbaikan kesuburan tanah melalui aplikasi asam humat dan Plant Growth Promoting Rhizobacteria (PGPR). Asam humat memperbaiki sifat fisik, kimia, dan biologi tanah, sementara PGPR menambat nitrogen, melarutkan fosfat, memproduksi fitohormon, dan menghambat patogen.

Tujuan untuk enganalisis pengaruh aplikasi asam humat dan PGPR, baik tunggal maupun kombinasi, terhadap pertumbuhan dan hasil tanaman kedelai di lahan Ultisol, serta menentukan dosis optimum untuk mengurangi ketergantungan pada pupuk kimia. Penelitian ini dilaksanakan di Lahan Percobaan Fakultas Pertanian, Kecamatan Jambi Luar Kota, Kabupaten Muaro Jambi (±35 m dpl, tanah Ultisol), pada Juni–November 2024. Adapun Metode Penelitian Menggunakan Rancangan Acak Kelompok Faktorial (3 taraf PGPR × 5 taraf Asam Humat = 15 kombinasi perlakuan, 3 ulangan). Parameter: luas daun, bobot kering tajuk dan akar, bobot kering tanaman, jumlah polong, bobot biji, bobot 100 biji, laju asimilasi bersih, laju tumbuh tanaman, serapan hara. Penelitian ini menghasilkan kombinasi PGPR 10 mL L^{-1} dan Asam Humat 0,5–1 mL L^{-1} memberikan hasil terbaik pada hampir semua parameter. Aplikasi keduanya meningkatkan serapan hara, laju asimilasi bersih, dan laju tumbuh tanaman secara signifikan di tanah masam. Disarankan untuk menggunakan kombinasi PGPR 10 mL L^{-1} dan Asam Humat 0,5–1 mL L^{-1} untuk meningkatkan pertumbuhan dan hasil tanaman kedelai di lahan ultisol.

Kata kunci : Kedelai, PGPR, Asam Humat

ABSTRACT

Soybean (*Glycine max* L.) is the third most important food commodity in Indonesia as a source of plant-based protein. National production still falls short of demand, necessitating imports with fluctuating prices. One of the main challenges is the vast area of acidic dry land (Ultisol) with low fertility (low pH, toxic aluminum, and nutrient deficiencies). The proposed solution is soil fertility improvement through the application of humic acid and Plant Growth Promoting Rhizobacteria (PGPR). Humic acid enhances the physical, chemical, and biological properties of the soil, while PGPR fixes nitrogen, solubilizes phosphate, produces phytohormones, and inhibits pathogens.

The study aims to analyze the effect of humic acid and PGPR applications, both individually and in combination, on the growth and yield of soybean plants in Ultisol soil, as well as to determine the optimum dosage to reduce dependency on chemical fertilizers. The research was conducted at the Experimental Field of the Faculty of Agriculture, Jambi Luar Kota District, Muaro Jambi Regency (±35 m above sea level, Ultisol soil), from June to November 2024. A factorial randomized block design was used (3 PGPR levels × 5 humic acid levels = 15 treatment combinations, 3 replications). Parameters observed included leaf area, shoot and root dry weight, total plant dry weight, number of pods, seed weight, weight of 100 seeds, net assimilation rate, plant growth rate, and nutrient uptake.

The study found that the combination of PGPR at 10 mL L^{-1} and humic acid at 0.5–1 mL L^{-1} gave the best results across nearly all parameters. The combined application significantly increased nutrient uptake, net assimilation rate, and plant growth rate in acidic soils. It is recommended to use a combination of PGPR at 10 mL L^{-1} and humic acid at 0.5–1 mL L^{-1} to improve the growth and yield of soybean plants on Ultisol soils.

Keywords: Soybean, PGPR, Humic Acid.