

## RINGKASAN

Edamame (*Glycine max* L. Merrill) merupakan kedelai yang berasal dari Jepang dan memiliki potensi untuk dikembangkan di Indonesia, namun produksinya terhambat oleh terbatasnya lahan produktif. Upaya yang dapat dilakukan yaitu memanfaatkan Ultisol yang sebarannya terluas hingga 45.794.000 ha. Ultisol memiliki sifat kimia yang sangat rendah, sehingga perlu pemberian bahan organik untuk menyediakan unsur hara, salah satunya yaitu kasgot. Kasgot merupakan sisa hasil biokonversi sampah organik seperti sisa sayur, buah, dan limbah organik lainnya oleh larva *Black Soldier Fly* (BSF). Namun, kandungan unsur hara kasgot belum memenuhi standar mutu pupuk Kepmentan No. 261/KPTS/SR.310/M/4/2019, sehingga perlu diperkaya dengan bahan amelioran seperti biochar, legum, dan zeolit untuk meningkatkan mutu pupuk. Penelitian ini bertujuan untuk mengetahui pengaruh aplikasi formula kasgot diperkaya dengan bahan amelioran terhadap perubahan sifat kimia Ultisol dan mengetahui pengaruh aplikasi formula kasgot diperkaya dengan bahan amelioran terhadap serapan P tanaman edamame (*Glycine max* L. Merrill).

Penelitian ini dilaksanakan di Laboratorium Kebun Percobaan, Laboratorium Agronomi dan Hortikultura, Laboratorium Tanah dan Sumberdaya Lahan, dan Laboratorium Perlindungan Tanaman yang terletak di Fakultas Pertanian, Universitas Jenderal Soedirman, serta Laboratorium Balai Penerapan Standar Instrumen Pertanian (BSIP) Jawa Tengah. Kegiatan penelitian dilaksanakan mulai dari bulan September 2023 sampai Juni 2024. Penelitian ini menggunakan Rancangan Acak Kelompok (RAK) non faktorial dengan perlakuan formula kasgot dan 4 ulangan, meliputi K0: Kontrol negatif; K1: Kontrol positif; K2: Kasgot 100%; K3: Kasgot 88% + biochar 5% + legum 2% + zeolit 5%; K4: Kasgot 76% + biochar 10% + legum 4% + zeolit 10%; K5 = Kasgot 64% + biochar 15% + legum 6% + zeolit 15%; K6 = Kasgot 52% + biochar 20% + legum 8% + zeolit 20%. Dosis formula kasgot yang digunakan yaitu 5 ton ha<sup>-1</sup>. Variabel yang diamati yaitu sifat kimia tanah meliputi pH H<sub>2</sub>O, pH KCl, C-organik (%), P-tersedia (ppm), P-total (mg 100g<sup>-1</sup>), KTK (cmol(+) kg<sup>-1</sup>), dan K-dd (cmol(+) kg<sup>-1</sup>) serta serapan P tanaman edamame. Data hasil penelitian dianalisis menggunakan uji ANOVA pada taraf kesalahan 5%. Apabila hasil analisis menunjukkan adanya pengaruh nyata, maka dilanjutkan dengan uji *Duncan's Multiple Range Test* (s) pada taraf kesalahan 5%.

Hasil penelitian menunjukkan bahwa formula kasgot diperkaya dengan bahan amelioran mampu meningkatkan serapan P tanaman edamame dengan nilai tertinggi pada formula kasgot 88% + biochar 5% + legum 2% + zeolit 5% sebesar 1,81%. Namun formula kasgot diperkaya dengan bahan amelioran belum dapat meningkatkan sifat kimia Ultisol seperti pH H<sub>2</sub>O, pH KCl, C-organik, P-tersedia, P-total, KTK, dan K-dd.

## SUMMARY

*Edamame (Glycine max L. Merrill) is a soybean originating from Japan and has the potential to be developed in Indonesia, but its production is hampered by limited productive land. Efforts can be made to utilize Ultisol, which has the widest distribution of up to 45,794,000 ha<sup>-1</sup>. Ultisol has very low chemical properties, so it is necessary to provide organic materials to provide nutrients, one of which is maggot frass. Maggot frass is the residue of the bioconversion of organic waste such as vegetable, fruit, and other organic waste by Black Soldier Fly (BSF) larvae. However, the nutrient content of kasgot has not met the fertilizer quality standards of Kepmentan No. 261/KPTS/SR.310/M/4/2019, so it needs to be enriched with ameliorants such as biochar, legumes, and zeolites to improve fertilizer quality. This study aims to determine the effect of the application of maggot frass formulation enriched with ameliorants on changes in the chemical properties of Ultisol and to determine the effect of the application of maggot frass formulation enriched with ameliorants on P uptake of edamame plants (Glycine max L. Merrill).*

*This research was conducted at the Experimental Farm Laboratory, Agronomy and Horticulture Laboratory, Soil and Land Resources Laboratory, and Plant Protection Laboratory located at the Faculty of Agriculture, Jenderal Soedirman University, and laboratory of the Central Java Agricultural Instrument Standards Implementation Center (AISIC). Research activities were carried out from September 2023 to June 2024. This study used a non-factorial Randomized Group Design (RAK) with kasgot formula treatment and 4 replications, including K0: Negative control; K1: Positive control; K2: 100% maggot frass; K3: 88% maggot frass + 5% biochar + 2% legume + 5% zeolite; K4: 76% maggot frass + 10% biochar + 4% legume + 10% zeolite; K5 = 64% maggot frass + 15% biochar + 6% legume + 15% zeolite; K6 = 52% maggot frass + 20% biochar + 8% legume + 20% zeolite. The dose of maggot frass formulation used is 5 tons ha<sup>-1</sup>. The observed variables were soil chemical properties including pH H<sub>2</sub>O, pH KCl, C-organic (%), P-available (ppm), P-total (mg 100g<sup>-1</sup>), CEC (cmol(+) kg<sup>-1</sup>), and K-dd (cmol(+) kg<sup>-1</sup>) as well as P uptake of edamame plants. The data were analyzed using ANOVA test at 5% error level. If the results of the analysis showed a significant effect, it was continued with Duncan's Multiple Range Test (s) at the 5% error level.*

*The results showed that the maggot frass formula enriched with ameliorant materials was able to increase the P uptake of edamame plants with the highest value in the 88% maggot frass formulation + 5% biochar + 2% legumes + 5% zeolite by 1.81%. However, the maggot frass formulation enriched with ameliorant materials has not been able to improve the chemical properties of Ultisol such as pH H<sub>2</sub>O, pH KCl, C-organic, P-available, P-total, CEC, and K-dd.*