

## INTISARI

Andisol merupakan jenis tanah yang memiliki potensi pengembangan sektor pertanian yang baik karena sifat tanahnya yang dapat mendukung pertumbuhan tanaman. Namun Andisol memiliki mineral amorf yang dapat meretensi P sehingga tidak tersedia bagi tanaman. Penggunaan bahan organik dan pemberian mikrobial dapat membantu pelepasan retensi P di Andisol. Penelitian ini bertujuan untuk mengetahui pengaruh kombinasi biochar, mikoriza, dan pupuk kandang terhadap ketersediaan P di Andisol, pertumbuhan dan hasil, serta infeksi akar jagung manis di Ngablak, Magelang, Jawa Tengah. Penelitian dilakukan di lahan pertanian Gunung Merbabu Jawa Tengah pada bulan September 2023 - Januari 2024 dan Laboratorium Tanah, Fakultas Pertanian, UGM. Rancangan penelitian menggunakan RAKL Split Plot yang terdiri atas tiga faktor dan tiga blok/ulangan. Faktor pertama yaitu dosis biochar 0 ton ha<sup>-1</sup> dan 10 ton ha<sup>-1</sup>. Faktor kedua yaitu dosis mikoriza 0 g tanaman<sup>-1</sup> dan 10 g tanaman<sup>-1</sup>. Faktor ketiga yaitu dosis pupuk kandang sebesar 0, 10, 15, dan 20 ton ha<sup>-1</sup>. Hasil penelitian menunjukkan interaksi kombinasi dari ketiga faktor perlakuan terhadap P-total tanah inkubasi, P-tersedia tanah fase akhir vegetatif dan generatif tanaman, serta infeksi mikoriza pada akar tanaman jagung manis. Perlakuan yang diberikan dapat meningkatkan nilai pH H<sub>2</sub>O, KPK, P-tersedia, dan P-total tanah serta menurunkan nilai retensi P di Andisol. Pemberian ketiga faktor perlakuan secara individu dapat meningkatkan pertumbuhan, hasil, dan serapan P tanaman jagung manis. Pemberian dosis pupuk kandang sebesar 20 ton ha<sup>-1</sup> memberikan hasil produktivitas tertinggi sebesar 25,52 ton ha<sup>-1</sup>.

**Kata Kunci: Fosfor, Biochar, Mikoriza, Pupuk Kandang, Jagung Manis**

## ABSTRACT

Andisol is a type of soil with great potential for enhancing the agricultural sector due to its soil properties that support plant growth. However, Andisol contains amorphous minerals that can retain phosphorus (P), making it unavailable to plants. The application of organic materials and the introduction of microbes can help release the retained P in Andisol. This study aims to investigate the impact of a combination of biochar, mycorrhiza, and manure on P availability in Andisol, as well as on the growth, yield, and root infection of sweet corn in Ngablak, Magelang, Central Java. The research was conducted in the agricultural area of Mount Merbabu, Central Java, from September 2023 to January 2024, and at the Soil Laboratory, Faculty of Agriculture, UGM. The research utilized a Split Plot Randomized Complete Block Design with three factors and three blocks/replications. The first factor was the biochar application rate of 0 tons ha<sup>-1</sup> and 10 tons ha<sup>-1</sup>. The second factor was the mycorrhizal application rate of 0 g plant<sup>-1</sup> and 10 g plant<sup>-1</sup>. The third factor was the manure application rate of 0, 10, 15, and 20 tons ha<sup>-1</sup>. The results indicated a significant combined effect of the three treatment factors on total P-incubated soil, P availability in the late vegetative and generative stages, and mycorrhizal infection on sweet corn roots. The treatments led to an increase in soil pH, cation exchange capacity (CEC), available P, and total P, while reducing P retention in Andisol. Applying the three treatment factors individually resulted in improved growth, yield, and P uptake in sweet corn plants. The application of 20 tons ha<sup>-1</sup> of manure showed the highest productivity, yielding 25,52 tons ha<sup>-1</sup>.

**Keywords: Phosphorus, Biochar, Mycorrhiza, Manure, Sweet corn**