

THE EFFECT OF FILTER CAKE FERTILIZER AND ROCK PHOSPHATE ON THE PHOSPHORUS FIXATION CAPACITY OF LATOSOL SOIL

By: Septiyani Nur Widyastuti
Supervised by: Susila Herlambang

ABSTRACT

Latosol soil is an acidic soil type that generally experiences phosphorus (P) deficiency due to the high phosphorus fixation capacity by sesquioxides and clay minerals such as kaolinite. Phosphorus is an essential macronutrient needed by plants, but its availability in the soil is often low. Filter cake is a solid waste by-product from the sugarcane juice filtration process in sugar mills and is utilized as an organic fertilizer. Filter cake fertilizer contains nutrients such as nitrogen, phosphorus, calcium, and other organic compounds that can improve the chemical properties of the soil. The application of rock phosphate combined with organic materials such as filter cake fertilizer on acidic soil has the potential to reduce the soil's capacity to fix phosphorus, thereby increasing phosphorus availability. This study aimed to determine the effect of applying filter cake fertilizer and rock phosphate on the phosphorus fixation capacity (PFC) of Latosol soil. The research used a factorial Completely Randomized Design (CRD) with two factors, namely filter cake fertilizer doses (0, 5, 10, and 15 tons/ha) and rock phosphate doses (0, 200, and 400 kg/ha). Data were analyzed using analysis of variance (ANOVA), followed by Duncan's Multiple Range Test (DMRT) at the 5% significance level to observe differences among treatments. The results showed that both filter cake fertilizer and rock phosphate treatments had a significant effect on reducing the PFC value of Latosol soil. In addition, there was an interaction between the two treatments in reducing the PFC value. The best treatment was obtained from the combination of 15 tons/ha of filter cake fertilizer (B3) and 400 kg/ha of rock phosphate (F2), which was able to reduce the PFC value by 2.65%, from 265.02 ppm to 257.99 ppm.

Keywords: Filter Cake Fertilizer, Rock Phosphate, P-Fixation Capacity (PFC), Latosol