

POTENTIAL OF USING SINGLE SUPER PHOSPHATE AS A COST-EFFECTIVE PHOSPHORUS SOURCE IN RICE FARMING

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Phosphorus is a critical nutrient for rice *Oryza sativa* (L.) cultivation, and phosphorus fertilizer (P) application is essential for achieving optimal yields. In Sri Lanka, rice farmers primarily rely on Triple Super Phosphate (TSP) as a P source. However, local alternatives like Single Super Phosphate (SSP), derived from *Eppawala* Rock Phosphate, could offer a sustainable option. This study aimed to assess the effectiveness of SSP as a substitute for TSP in rice farming. A field experiment was conducted at the Rice Research Station, *Sammanthurai*, *Ampara* district, during the *Yala* season using the Bg 352 rice variety, which is known for its favorable response to P fertilization. The experiment included five treatments with varying ratios of TSP and SSP: 100% TSP (T1), 75% TSP with 25% SSP (T2), 50% TSP with 50% SSP (T3), 25% TSP with 75% SSP (T4), and 100% SSP (T5). The experiment followed a randomized complete block design with four replicates. Observations focused on vegetative growth, yield characteristics, and soil properties, including pH, electrical conductivity, and available P. Statistical analysis was conducted using analysis of variance (ANOVA), at a 95% confidence interval. Mean separation was performed using the LSD method. Among the treatments, T2 demonstrated notable improvements, showing an increase in both the number of tillers and panicles, which are crucial factors in maximizing yield. The soil data revealed that T2 maintained a pH of 4.79 ± 0.02 , an electrical conductivity of $22 \pm 0.07 \mu\text{S cm}^{-1}$, and an available P level of $3.14 \pm 0.02 \text{ mg kg}^{-1}$, indicating favorable conditions for plant growth. Furthermore, the final yield for T2 was $4.29 \pm 0.24 \text{ kg plot}^{-1}$, significantly higher than other treatments. This result suggests that a blend of 75% TSP and 25% SSP could effectively improve rice fields' productivity. The study's findings indicate that combining TSP with SSP supports phosphorus availability and improves plant performance and soil health, making this combination a viable and sustainable approach for Sri Lankan rice farming.

Keywords: Fertilization, Soil quality, Sustainable agriculture, Triple super phosphate, Yield characteristics