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Modern BFBF-based bio-organo-mineral fertilizer practice maintains major nutrient availability in organic rice soil

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Availability of major nutrients nitrogen (N), phosphorus (P), and potassium (K) at sufficient rates in the soil ensures optimal crop yield and quality. Organic fertilizers with their slower nutrient release and the requirement of bulky quantities make them challenging to use for annual crops like rice (Oryza sativa L.) compared to chemical fertilizers. This study assessed the effectiveness of Biofilm biofertilizer (BFBF)-based bio-organo-mineral fertilizer (BOMF) for the major nutrient availability in organic rice soil. Field experiments were conducted in Anuradhapura, Polonnaruwa, Ampara, and Puttalam during the 2023/2024 wet season. Three treatments viz. (a) BOMF practice (500 kg BOMF/ha + 2.5 L BFBF/ha), (b) chemical fertilizer (CF) practice (340 kg NPK/ha), and (c) control (no fertilizers) were applied to experimental plots, each 100 m² arranged in randomized complete block design with three replicates in each location. Soil moisture, pH, and available N, P, and K were measured at the 50% flowering stage of the crop using a portable soil meter. Crop yields were recorded at the harvest. After confirming the normal distribution of the data, one-way ANOVA followed by Tukey's HSD test was done. Pearson correlation analysis was performed to reveal the interactions between the parameters. Results revealed that crop yields were comparable between the two fertilization practices. The BOMF practice was found to maintain soil available N, P, and K comparable to the CF practice. Soil moisture was significantly correlated with available N (r = 0.775, p =0.014), P (r = 0.779, p = 0.013), and K (r = 0.774, p = 0.014) only in the BOMF practice suggesting that optimizing soil moisture can enhance nutrient availability. It can be concluded that the eco-friendly BOMF practice with manageable organic fertilizer rates can sustain soil nutrient levels and achieve yields comparable to conventional CF practice.

Keywords: Biofilm biofertilizer, organic agriculture, rice, soil fertility

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