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BIOFILM BIOFERTILIZER-BASED MODERN BIO-ORGANO-MINERAL FERTILIZER PRACTICES UNVEIL THE POTENTIAL FOR ORGANIC RICE CULTIVATION

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Rice (*Oryza sativa* L.) cultivation in Sri Lanka heavily relies on chemical fertilizers (CF), which raises significant concerns for both human health and the environment. This study investigated the effect of biofilm biofertilizer (BFBF)-based modern bio-organo-mineral fertilizers (BOMF) on the growth and yield of rice in organic farming. Field trials were conducted in Anuradhapura, Puttalam, Polonnaruwa, and Ampara districts in Sri Lanka, employing four treatments i.e. (a) BOMF practice (500 kg NPK BOMF/ha + 2.5 L BFBF/ha), (b) hybrid practice (225 kg PK BOMF/ha) + CF N (62.5 kg/ha) + (2.5 L BFBF/ha), (c) CF practice (340 kg CF NPK/ha, as recommended by the Department of Agriculture, Sri Lanka), and (d) control (no fertilizer) in a complete block design with three replicates in each location. Plant samples were collected at the 50% flowering stage and analysed for shoot dry weight (SDW) and root dry weight (RDW). Grain yield was measured at harvest. After confirming the normality of the data, ANOVA followed by Tukey's HSD test was performed to compare the means. The results revealed a significantly ($p < 0.05$) higher yield (9,056 kg dry weight/ha) produced by the hybrid practice, while BOMF (5,874 kg dry weight/ha) and CF (5,394 kg dry weight/ha) practices produced comparable yields. As such, the hybrid practice showed about 67% increase in grain yield compared to the CF practice. In addition, the two practices with BOMF showed significantly ($p < 0.05$) higher RDWs compared to the CF practice and the control, with no differences in SDWs across the treatments. In conclusion, BOMF practice exhibited the potential to replace the conventional CF-only practice to mitigate some consequences of the high usage of CF in rice cultivation. Comprehensive field trials are required to confirm these findings.

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