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SOIL PHYSICO-CHEMICAL PARAMETERS ALONE DO NOT REFLECT PADDY YIELD INCREASE UNDER BIOFILM BIOFERTILIZER APPLICATION: A CASE STUDY IN AMPARA DISTRICT

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Soil physico-chemical parameters, which reflect nutrient-supplying capacity, determine crop yields under chemical and organic fertilizer practices. Soil nutrient availability can also be enhanced by biofilm biofertilizer (BFBF), thus used as an effective alternative to reduce chemical fertilizer (CF) in Sri Lanka. The present study was designed to assess the effect of BFBF practice [i.e. 65% of farmers' conventional rate of CF + BFBF (2.5 L ha-1 of BFBF with Urea 150, TSP 35 and MOP 40 kg ha-1] in comparison to farmers' conventional practice of 100% CF application (Urea 222, TSP 54 and MOP 60 kg ha-1) in terms of selected soil physico-chemical parameters and paddy grain yield in large-scale farmer-managed paddy fields in the Ampara District. Results revealed that the BFBF with the reduced CF rate significantly ($p = 0.03$) increased soil organic carbon (SOC) over that of 100% CF. Moreover, the BFBF practice enhanced ($p = 0.07$) paddy yield by ca. 15% compared to 100% CF practice. However, no significant differences were observed in terms of total soil nitrogen, phosphorus, moisture, pH and electrical conductivity between the two practices, possibly due to the short span of the study. The results indicate that the soil physico-chemical parameters alone do not reflect the positive impacts of BFBF application. Therefore, long-term studies together with microbial and plant parameters are needed to evaluate the effects of BFBF on creating eco-friendly and sustainable agricultural systems.

Keywords: Biofilm biofertilizers, Chemical fertilizers, Paddy, Soil organic carbon.