14th Annual Research Symposium Proceedings

Faculty of Agriculture
Rajarata University of Sri Lanka
2022

POTENTIAL OF BIOFILM BIOFERTILIZER COUPLED WITH NUTRIENT-RICH COMPOSTS TO BREAK THE YIELD BARRIER IN HIGH-YIELDING ORGANIC RICE CULTIVATION

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Biofilm biofertilizers (BFBFs) are being popularized among farmers due to their ability to improve plant growth and crop yields along with soil fertility. The BFBFs are reported to increase paddy yield on average by 20-30% while cutting down chemical fertilizers or even organic fertilizers up to 50%. There is no published research on the effect of BFBFs on soil quality and crop productivity in organic rice cultivation. Therefore, the present study was designed to investigate the above phenomena in lowland rice farming in Sri Lanka using a BFBF developed for rice (biofilm R), nutrient-rich composts, and biofilm-treated Eppawala Rock Phosphate (Biofilm-ERP). The study was carried out in three high-yielding (9,000 kg paddy h^{-1}) organic rice fields in Ampara district. In each field, four consecutive, uniform paddy plots (each of 18 m^2) were applied separately with three organic practices namely 1) Enriched compost + Biofilm R + Biofilm-ERP; 2) Hybrid compost + Biofilm R + Biofilm-ERP; 3) Newly developed compost (Gliricidia and *Mana* ash)+ Biofilm R + Biofilm-ERP, and a control with no amendments. The four plots were taken as a randomized block design in each site. Plant samples with root-zone soil were collected at 50% flowering and analysed for 15 soil, plant, and microbial parameters. The grain yield was recorded at harvest. Results revealed that newly developed compost + Rice BFBF + Biofilm-ERP produced the highest yield (13,083 kg paddy h^{-1}) with the increased levels of soil carbon, nitrogen, phosphorus, and potassium simultaneously ($p<0.05$). It is concluded that the reinstated microbial action of BFBF is capable enough to break the yield barrier of even in high-yielding organic rice fields. This will eventually lead to the design of super-productive BFBF coupled organic rice cultivation for eco-friendly agriculture.

Keywords: Biofilm-ERP, Biofilm R, Nutrient-enriched composts, Organic rice production