ROLE OF DEVELOPED MICROBIAL BIOFILMS ON GROWTH AND YIELD OF RICE

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Biofilms are aggregates of multiple microbial communities, attached to each other or to a surface. *In vitro* developed beneficial biofilms can be used as biofertilizers, which are then called biofilm biofertilizers (BFBF). Pseudonodules like structures produced by BFBF on rice roots increase available nutrients and hormones in rhizosphere resulting reduced usage of chemical fertilizers. Therefore, this study was conducted to evaluate the effect of BFBF on growth and yield of rice, when applied with new fertilizer recommendation introduced in 2013 by Department of Agriculture. A field experiment was conducted at the Rice Research and Development Institute at Bathalagoda. Five treatments were tested with a control. Treatments consisted of different levels of chemical fertilizers alone and their combined application with BFBF. The experiment was arranged in Randomized Complete Block Design (RCBD) with three replicates to each treatment. Plant soil and nutritional parameters were recorded and analysed to find out the relationship between grain yield and the measured parameters. The results revealed that shoot endophytic bacterial communities affect panicle formation of rice plants. There was a significant positive relationship ($p<0.05$) between the count of shoot endophytic bacterial community and panicle formation, which was positively related to grain yield. Similarly, rhizosphere organic matter content showed a significant positive relationship ($p<0.05$) with spikelet formation and grain yield. Treatments with the application of BFBF showed increasing trend of organic matter, grain filling, panicle formation and root growth, probably due to increased microbial functions in the rhizosphere. However, further studies under the same field conditions are required to confirm the best combination of BFBF with newly introduced chemical fertilizer recommendation, for the optimum growth and yield of rice.

Keywords Biofilm biofertilizer, Endophytic bacteria, Microbial functions, Rice yield