

EFFECT OF RICE ENDOPHYTIC BACTERIA ON GRAIN YIELD WITH THE INTERVENTION OF BIOFILM BIOFERTILIZERS

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Rice (*Oryzasativa*) is the staple food crop in Sri Lanka. Hence, its yield must be increased annually to meet the growing demand. However, this should be achieved with the minimal use of chemical inputs to minimize environmental pollution. Incorporation of Biofilm Biofertilizer (BFBF) is a better strategy to reduce the use of Chemical Fertilizers (CF) and increase productivity of paddy lands. BFBFs influence positively on plant-microbe interactions. In addition to that, rice endophytes, microorganisms found inside the rice plant also play a major role in plant growth and yield. Therefore, this study was carried out to evaluate the effect of rice endophytic bacteria on grain yield under farmer field conditions with the interaction of BFBFs. Field experiments were conducted in ten randomly selected farmer fields at Dehiattakandiya in Mahaweli System C. Two treatments viz Department of Agriculture (DOA) recommended rate of CF (T1 as the control) and half of the DOA recommended rate of CF with BFBF (T2) were tested in each field. Microbial, soil and plant parameters were recorded and analysed to find out the relationship between grain yield and measured parameters. Results revealed that endophytic bacterial colony count has increased by about 10% in T2 compared to T1. In addition to that, a positive correlation was observed between shoot endophytic bacterial count (x) and grain yield (y), in T2 ($y = 0.0091x^2 - 0.9809x + 4611$; $R^2=0.89$). Mode of action of BFBF is the activation of dormant soil microbes and increasing soil microbial diversity and their functions. Possibly, the same scenario may have been applied to the action of shoot endophytic bacterial community, which leads to improve the grain yield. Further experiments under field conditions and microbial analyses are needed to confirm the effect of endophytes on rice cultivation with the interaction of BFBFs.

Keywords: Biofilm biofertilizers, Chemical fertilizers, Endophytes, Rice grain yield, Soil microbes