

Effect of Biofilm Biofertilizer Application on Soil Parameters and Grain Yield of Rice (*Oryza sativa* L.)

K.G. Ketippearachchi^{1*}, G. Seneviratne² and D.L.C.K. Fonseka¹

¹ Department of Crop Science, Faculty of Agriculture. University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

² Microbial Biotechnology Unit, National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka

Abstract

To increase agricultural harvest, growers have been using chemical fertilizers (CF), the amount of which has increased over time. The declined soil quality, fertility, microbial diversity and many health hazards have been reported as negative impacts of CF. Thus, there is an urgent need to find out alternative methods to reduce the CF usage. As a novel improvement in biotechnology, useful microbial communities in biofilm mode have been developed *in vitro* to be applied as biofertilizers, which are called as Biofilm Biofertilizer (BFBF). The usage of BFBF can reduce CF usage in rice. It has been shown in small scale that BFBFs can cut down CF use by farmers in rice up to 50% or more without affecting grain yield. Therefore, this study was conducted to evaluate the effect of BFBF on soil parameters and grain yield of rice. Field experiments were conducted in 12 farmer fields in Polonnaruwa district in yala season in 2018. The experiment was arranged in a randomized block design for paired comparison with two consecutive, uniform paddy fields applied with the BFBF practice (1 L BFBF with 90 kg NPK per acre) and the farmers' CF practice (195 kg NPK per acre) as treatments. There were 12 replicates for each treatment. Means of rhizosphere soil moisture (%), pH, total N (%), total P (%), organic C (%), exchangeable K (cmol/kg) and final yield (kg/acre) of the two practices were calculated. T-test was done for mean comparison. Results showed that there is a significant increase ($P < 0.05$) in grain yield (21%) in the BFBF with reduced dose of CF practice, compared to the CF practice. Furthermore, BFBF with reduced dose of CF practice showed significant increases ($P < 0.05$) in soil moisture (26%), total N (555%) and organic C (22%). Thus, it can be concluded that BFBF helps in cutting down CF while improving grain yield and soil conditions in farmers' fields.

Keywords: Biofilm Biofertilizer, Chemical fertilizer, Microbial biofilms, Rice

*Corresponding Author: kasunigk93@gmail.com