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Biofilm biofertilizer increases drought tolerance in rice: an observational study

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Drought is becoming more acute with intensifying global climate change, and it severely limits rice production, resulting in significant economic losses. Search for alternative agricultural practices that increase crop productivity, especially in drought conditions is an urgent need. At present, eco-friendly biofilm biofertilizer (BFBF) practice seems to be a good candidate for this due to its potential to restore agroecosystems leading to improved soil quality and crop yields while cutting down chemical fertilizer (CF) use. The present study aimed to investigate the effect of BFBF on drought tolerance in rice by conducting a pot experiment (on variety At 314) having two fertilizer practices viz. (a) CF practice (340 kg NPK ha⁻¹, recommended by the Department of Agriculture, Sri Lanka) and (b) BFBF practice (225 kg NPK ha⁻¹ + 2.5 L BFBF ha⁻¹) each with two water regimes i.e. (a) field capacity and (b) 65% field capacity in a completely randomized design with three replicates. During the reproductive stage of the plants, irrigation water was withheld until wilting (leaf rolling) was observed, and the percentage of rolled leaves per plant (PRLPP) was calculated. One-way ANOVA followed by Tukey's HSD test was performed for the mean comparison. The results showed that leaf rolling occurs two and three days after withholding irrigation water in the CF and BFBF practices, respectively. After four days, all the leaves of the CF practice rolled, whereas the PRLPP in the BFBF practice was significantly (p = 0.015) low by ca. 16% compared to the CF practice in the 65% field capacity. This indicates the potential of BFBF in increasing drought tolerance in rice, within the limitations of the study. Further research is recommended to investigate and confirm this using larger sample sizes, different rice varieties, and also in farmers' fields under different soil and climatic conditions.

Keywords: BFBF, drought resistance, rice paddy

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