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EFFECT OF FUNGAL-BACTERIAL BIOFILMS ON TUBERIZATION OF POTATO (*SOLANUM TUBEROSUM* L.)

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Use of chemical fertilizers (CF) to increase crop production is common, though it has been proven that excessive and imbalanced use of these synthetic inputs creates devastating impacts on soil biological properties. Like for most agricultural crops, large amounts of nitrogen and phosphorus inputs are usually used in potato cropping systems in order to enhance the yield. Collapse of beneficial soil microbial communities due to the long term application of such inputs causes general decline in the yields of major cash crops like potato. To address this, beneficial microbial combinations can be developed in the form of biofilmed biofertilizers (BFBFs), and be applied to enhance the crop productivity. Therefore, the objective of the current study is to assess the potential application of fungal-bacterial biofilm combinations as BFBFs to improve potato crop production. Microbial isolations were carried out using soil samples obtained from potato rhizosphere in an abandoned potato crop land at the Agriculture Research Center, Bandarawela. Biofilms were developed by combining fungal and bacterial strains isolated from the potato rhizosphere. Fungal- bacterial biofilm cultures were selected (BFBF1 and BFBF2) through screening experiments and were evaluated for their growth performance on potato plants using a pot experiment under greenhouse conditions as follows. Three disease free potato seed tubers were grown in each pot with loamy soil medium and the pots were kept inside the greenhouse till harvesting. Different fertilizer combinations (100% CF, 50% CF, 50% CF + BFBF1, 50% CF + BFBF2, BFBF1 alone, BFBF2 alone, No amendments) were applied as separate treatments two weeks after the seeds were sown. Effects of different treatments were evaluated on the growth performance of the potato, *viz;* number of tubers, dry weights of tubers, shoots and roots. Results of the ANOVA revealed that the fresh weight of the tubers for the treatment 50% CF + BFBF1 (TR3a) was significantly higher than that of the other treatments ($P = 0.000$). Furthermore, the highest number of tubers was also observed in the TR3a treatment. Further, number of tubers and the fresh weight of the tubers for the treatment TR3a were significantly higher ($P = 0.000$) than that of the 100% CF (TR1). Fifty percent CF + BFBF2 did not show any significant enhancement for the number of tubers and the fresh weight of tubers of potato. Thus, it can be concluded that treatment TR3a is the best combination to enhance the potato tuber initiation and development and this combination should be further evaluated under field conditions.

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