

Effect of microbial exudates on breaking dormancy of soil microbial seed bank

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Soil ecosystem deteriorates due to natural and anthropogenic disturbances, which interrupt the ecosystem functions and its sustainability. As a consequence of this disturbed soil system, plant and microbial seed bank may become dormant contributing to low below-and above-ground diversity. The present experiment was conducted to observe the effect of microbial exudates on rejuvenating a deteriorated soil system by activating the dormant microbial seed bank. Bacterial and fungal-bacterial biofilm exudates were used as treatments with a control (sterilized distilled water). Microbial exudates were applied to 2mm sieved soil in trays and incubated for 7 days at room temperature. Three replicates per treatment were arranged according to completely randomized design. Bacterial colony counts were taken from all treatments after 24 hours and 7 days of incubation. The functional groups present in microbial exudates and emerged bacterial colonies were analysed using Fourier Transform Infrared (FTIR) spectroscopy. Data were analyzed using ANOVA by Minitab (version 16). Significantly higher number of bacterial colonies was observed in soils applied with biofilm exudates than soils applied with bacterial exudates and the control. Cluster analysis demonstrated bacterial cultures emerged from soils applied with biofilm exudates were clustered separately from those emerged from other treatments, implying that it was a different group of bacteria. The results suggested that there is a possibility of using microbial biofilms to break the dormant microbial seed bank to enhance microbial diversity in soil.

Key words: Fungal - bacterial biofilms, soil microbial seed bank, soil ecosystem, microbial exudates

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