Screening of Rice Rhizospheric Actinomycetes for Plant Growth Promoting and Plant Disease Suppressing Ability

Weerakkody U.R. and De Costa D.M.*
Department of Agricultural Biology,
Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka

The present study was focused on the screening of plant growth promotion and pathogen suppression abilities of 10 isolates of actinomycetes isolated from the rice rhizosphere. Phosphorus solubilizing and nitrogen-fixing abilities were assayed *in vitro* on selective media. Colony growth inhibition of rice pathogens, namely *Rhizoctonia solani* and *Bipolaris oryzae* by the actinomycetes was tested by dual culture plate technique on casein starch medium. Nine and one isolates/isolate respectively, demonstrated moderate and low nitrogen-fixing ability on Ashby's Mannitol agar medium. Nine isolates gave phosphorus solubilization indices ranging from 1.3 – 4. 05 on NBRIP medium. Colony growth of the two pathogens was inhibited (15-71%) by nine isolates. After confirming the compatibility, a consortium was prepared using all the isolates, each having a cell concentration of 1 x 106 cfu/mL. Growth promotion ability of the consortium was evaluated using rice seedlings (var. Bg 360) providing three basal fertilizer levels, namely recommended nitrogen (T1), ½ recommended nitrogen + actinomycete consortium (T2) and actinomycete consortium only (T3). Controls were maintained with no nitrogen fertilizer or actinomycete consortium. Plant height, root and shoot dry weights, number of leaves/seedlings and leaf area were significantly higher ($P<0.05$) in the three treatments than the control. Seedlings treated with T3 reported the highest root dry weight. Plant height, shoot dry weight and leaf area values were significantly higher in T1 ($P<0.05$). The second-highest shoot dry weight and leaf area values were reported by seedlings in T2 and were significantly higher than those in T3 ($P<0.05$). No. of leaves had no significant difference among the three treatments and the control. The tested actinomycetes, as a consortium, can be integrated as a promising biological input in rice cultivation for growth promotion, especially the root growth and suppression of the tested fungal pathogens.

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*dmdcosta@agri.pdn.ac.lk