

Research Article

Biochemical and Molecular Characterization of *Streptomyces* species Isolated from Agricultural Field of North Bengal and Evaluation for Growth Improvement and Suppression of Sclerotial Blight Diseases of *Vigna radiata*

Pushpanjali Ray, Arka Pratim Chakraborty and Bishwanath Chakraborty*

Immuno-Phytopathology Laboratory, Department of Botany, University of North Bengal, Siliguri-734013, West Bengal, *email:bncnbu@gmail.com

Abstract

Seventeen streptomycetes isolates were obtained from the rhizosphere of *Solanum tuberosum*. Their morphological attributes such as the colony colour, pigment production in culture media, colour of the aerial spore mass and a number of biochemical tests were executed to determine whether the isolates have the ability to hydrolyze starch, produce catalase and indole ring, which confirmed them as being streptomycetes. Among these, 15 isolates showed the ability of solubilizing phosphate by producing a transparent halo zone around the colony in Pikovskaya agar medium. *In vitro* antagonistic activity of some of these isolates against fungal pathogens (*Fusarium graminearum*, *F. solani* and *Sclerotium rolfsii*) were also confirmed by dual culture method. Three potent isolates were identified as *Streptomyces tricolor* (NCBI KX894280), *S. flavogriseus* (NCBI KX894281) and *S. griseus* (NCBI KX894282) by 16S rDNA technology. Phylogenetic analysis of the three isolates were conducted in MEGA4 and *Streptomyces tricolor* (NCBI KX894280), *S. flavogriseus* (NCBI KX894281) and *S. griseus* (NCBI KX894282) showed similarity with D44434.1 (*S. tricolor*), KC113491.1 (*S. flavogriseus*) and KJ623766.1 (*S. griseus*). *In vivo* evaluation of the growth promoting activity of the isolates on *Vigna radiata* revealed that *S. tricolor* (NCBI KX894280) and *S. flavogriseus* (NCBI KX894281) showed comparatively better growth promotion in comparison with the untreated control. These three *Streptomyces* isolates also enhances key defense enzymes like chitinase, β 1-3 glucanase, and peroxidase in field condition which help in suppression of sclerotial blight disease.

Key words: *Fusarium graminearum*, *F. solani* and *Sclerotium rolfsii*, Gram positive actinomycetes, *Streptomyces griseus*, *S. flavogriseus*, *S. tricolor*, 16S rDNA sequences

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