

Biocontrol Potential of Growth Promoting Rhizobacteria against Root Rot of Chili and Enhancement of Plant Growth

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Abstract : Plant growth promoting rhizobacteria (PGPR) have been extensively studied and applied for the biocontrol of many soilborne diseases. These rhizobacteria are very efficient against root rot and many other foliar diseases associated with solanaceous plants. These bacteria may inhibit the growth of various pathogens through direct inhibition of target pathogens or indirectly by the initiation of systemic resistance (ISR) which is active all over the complete plant. In the present study, 20 different rhizobacterial isolates were recovered from the root zone of healthy chili plants. All soil samples were collected from various chili-growing areas in Punjab. All isolated rhizobacteria species were evaluated in vitro and in vivo against *Phytophthora capsici*. Different species of *Bacillus* and *Pseudomonas* were tested for the antifungal activity against *P. capsici* the causal organism of Root rot disease in different crops together with chili. Dual culture and distance culture bioassay were carried out to study the antifungal potential of volatile and diffusible metabolites secreted from rhizobacteria. After seven days of incubation at 22°C, growth inhibition rate was recorded. Growth inhibition rate depended greatly on the tested bacteria and screening methods used. For diffusible metabolites, inhibition rate was 35-62% and 20-45% for volatile metabolites. The screening assay for plant growth promoting and disease inhibition potential of chili associated PGPR indicated 42-100% reduction in disease severity and considerable enhancement in roots fresh weight by 55-87%, aerial parts fresh weight by 35-65% and plant height by 65-76% as compared to untreated control and pathogen-inoculated plants. *Pseudomonas fluorescens*, *B. thuringiensis*, and *B. subtilis* were found to be the most efficient isolates in inhibiting *P. capsici* radial growth, increase plant growth and suppress disease severity.

Keywords : rhizobacteria, chili, phytophthora, root rot

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