

IMPROVING BIOACTIVITIES OF SOME BACTERIAL BIOCONTROL AGENTS AGAINST CHICKPEA ROOT ROT AND WILT CAUSAL ORGANISMS USING SKIMMED MILK.

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ABSTRACT

Biocontrol activities of *Pseudomonas* spp. are widely accepted as biocontrol agents for many diseases. The main target of this research work was to find out a proper and effective formula for the bio-agents which enhance, survivability, rhizosphere competence and biological control of chickpea root rot and wilt. The results obtained revealed that the use of skimmed milk and whey as nutrients and protectants improved the survivability of *Pseudomonas fluorescens* and *P. putida* up to 180 days without any dramatic decline when stored at room temperature ($25 \pm 5^{\circ}\text{C}$). The formulation enhanced the rhizosphere competence of *P. fluorescens* and *P. putida* which increased the population in the rhizosphere of chickpea up to 75 days from sowing. The formulated isolates were used as seed coating or soil treatment or combined seed and soil treatments for biocontrol of fusarial wilt and rhizoctonia root rot of chickpea. Results showed a significant reduction of the percentages of infected plants. Seed treatment followed by soil application gave the lowest percentages of infection compared to the control. The saprophytic growth of *Fusarium oxysporum* f. sp. *ciceri* and *Rhizoctonia solani* in the experimental soil was significantly reduced after the application of powder formulation of the biocontrol agents.

Keywords: Powder formulation, Skimmed milk, *Pseudomonas* spp., Chickpea, *Fusarium oxysporum* f. sp. *ciceri* and *Rhizoctonia solani*, rhizosphere competence.