

# Enhancement of Suppressive Metabolites from *Pseudomonas fluorescens* Against Tomato Damping-off Pathogens

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## ABSTRACT

Biotechnology including biocontrol techniques leads to reduce pathogens densities and slows invasion of new areas. *Pseudomonas fluorescens* is considered now as a natural enemy against many plant pathogens through using biological control agents. *Pseudomonas fluorescens* is known as a strong producer of many antifungal metabolites including Phenazine, Pyrrolnitrin, Phloroglucinols, as well as a fluorescent siderophore that inhibit several soil-borne pathogens of tomato plants. Mutation technique was used to improve the production of important *P. fluorescens* antibiotics against some damping-off pathogens (*Fusarium solani*, *Fusarium oxysporum* f.sp. *lycopersici* and *Rhizoctonia solani*). The suppressive effect of antibiotics of *P. fluorescens*-mutant strains was adequately detected. Mutant strains increased the antibiosis (2.7%) and the *fluorescens* (13%) on King's medium comparing to the wild - type. Seven mutants inhibited hyphal growth and produced inhibition zones against the pathogens. Such zones were larger than those produced by the wild - type and over produced the siderophore pigment. An important mutant (M3) showed over production of Phenazine, Pyrrolnitrin and another different antibiotic i.e. Phloroglucinol that inhibits growth of the tested fungi. That mutant (M3) showed superiority over the wild-type in suppression of damping-off disease of tomato seedlings at high cell densities.

**Key words:** Biotechnology, disease biocontrol, *Pseudomonas fluorescens*, soil-borne pathogens, tomato, mutant, antibiotics, siderophore.

## INTRODUCTION

Biological control of pathogens occurs routinely in nature as total or partial destruction of pathogen populations by those antagonistic microorganisms. Biological control has recently been considered as one of the biotechnological techniques used to reduce pathogen densities and invasions of new areas. Therefore, many trials have been done for developing strategies by which biological control can be used effectively against several

plant pathogenic organisms. The fluorescent *Pseudomonas* bacteria were found to suppress many plant diseases. Such fluorescent *Pseudomonas* bacteria not only can be root-colonizing but also can be inoculated into the plant seeds at the time of planting and plant establishment. According to those facts, such fluorescent *Pseudomonas* bacteria can suppress soil-borne pathogens such as *Fusarium oxysporum*, *Fusarium solani* and *Rhizoctonia solani* (Rosales *et al.*, 1995; Sarniguet *et al.*, 1995; Leeman *et al.*, 1996; Schmid-Sacherer *et al.*, 1997; and Dekkers *et al.*, 1998). These previous fungi can infect the