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**BIOMANAGEMENT OF POTATO WILT DISEASE
USING INNOVATIVE BIOCONTROL
FORMULATIONS**

By

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B. Sci. Agric. Sci. (Plant Protection), Fac. Agric., Cairo Univ., 2005

M. Sci. Agric. Sci. (Agricultural Microbiology), Fac. Agric., Cairo Univ., 2014

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ABSTRACT

Potato crop is economically necessary for Egypt and any disturbance in its manufacturing impacts over severely affected. As its infected with bacterial wilt (potato brown rot) cause losses of a lot of million worldwide. Therefor is necessary to evaluate the ability of some strains of plant growth-promoting rhizobacteria (PGPR) to control the pathogenicity of *Ralstonia solanacearum* in Laboratory and greenhouse experiments. These experiments were conducted at the Potato Brown Rot Project (PBRP), Giza, Egypt. Isolates of pathogenic bacteria collected from three Egyptian governments (Menofia, Gharbia, and Beheria) from potato tubers, soil, water, and weeds samples were identified by morphological characteristics, physiological, and biochemical. were identified by PCR and Real-time technique and classified as a *Ralstonia solanacearum* race 3 biovar2. Effective ways of creating sustainable agriculture for enhancing crop productiveness with a minimal disturbance to the surroundings is the exploration of plant growth-promoting rhizobacteria and some different microbe-based symbioses in plants.

The antagonistic activity of (PGPR) strains used (*Bacillus circulans*, *Paenibacillus polymyxa*, *Bacillus megatherium*, *Pseudomonas fluorescence*, *Azotobacter spp.*, and *Azospirillum brasilense* (N040) as single and mixid cultures against the bacterial pathogen (*Ralstonia solanacearum*) showed that all the tested bioagent exhibited antibacterial effect against *Ralstonia solanacearum*. The positive response was recorded on the NPK content of plant Shoot and Root as a result of inoculation *Ralstonia solanacearum* with the biocontrol agents of PGPR strains. The percentage of disease severity was reduced in disease symptoms according to the inoculation of potato tubers with different bioagents (PGPR). The counts of pathogenic bacteria of *Ralstonia solanacearum* in rhizosphere soil were reduced. In addition, the tested PGPR against *R. solanacearum* using non-sterilized soil were evaluated for their abilities on reducing potato brown rot or wilt infection caused by *R. solanacearum* on two potato cultivars (Bellini and Hermes) under greenhouse conditions showed that the individual treating with the biotic treatments before cultivation in non-sterilized inoculated soil with *R. solanacearum* prevented the appearance of wilt infection for 60 days of cultivation. The ability of the antagonistic bacterial (PGPR) isolates to produce siderophores with *R. Solanacearum* was also studies.

Key words: PGPR, *Ralstonia solanacearum*, Potato Brown Rot, siderophores, Bellini CV, Hermes CV, Biological control.

DEDICATION

I dedicate this work to express my greatest thanks and my greatest love to my family for their continuous patience, encouragement, support and for the unforgettable pleasant and hard moments we had shared.

A special gift and thanks to my late father and gift a special thanks to my mother for all her efforts and encouragement to me.

At last, I'm deeply thanks full to all my friends and colleagues who helped me during this research.

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