ANTAGONISTIC EFFECT OF SOME RHIZOBACTERIA ON THE BIOLOGICAL ACTIVITYOF *RALESTONIA SOLANISEARUM*

By

NERHAN ABD ELSALAM EID ABD ELAAL

B.Sc. Agric. Sc. (Plant Pathology), Ain Shams Univ., 2005

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ABSTRACT

Nerhan Abd El Salam Eid Abd El Aal. Antagonistic Effect of some Rhizobacteria on the Biological Activity of *Ralestonia solanisearum*". Unpublished M.Sc. Thesis. Department of Microbiology, Faculty of Agriculture, Ain Shams University, 2015.

Bacterial wilt caused by *Ralstonia solanacearum* phylotypeII sequevarI (race 3 biovar 2), is considered one of the most destructive bacterial diseases of potato plant. The aim of this study was to evaluate the potential of bacterial antagonists to suppress the causative bacteria. In this regard, 420 isolates of *R.solanacearum* were recovered from different habitats at different Egyptian districts. The variation between isolates was assessed on the basis of pathogenic potentials to tomato seedlings in the greenhouse. The evaluation indicated that, the highest potential, as shown by the wilt severity was obtained by 11 out of 420 isolates. The most virulent *R.solanacearum* isolates were identified by special techniques. To lay down a biological control protocol, a collection of 318 isolates of rhizobacteria from rhizosphere of different plants, were tested for antibiosis against *R.solanacearum* selected strains. *In vitro*, 14 isolates were more effective in suppressing the pathogen at different levels of relative power of antibiosis. These isolates were categorized into three groups according to their Gram-staining reaction, cell morphology and cultural characteristics. Further evaluation, under the greenhouse condition, has shown that six of the isolates were effective in suppressing disease development, as expressed by the Area Under Disease Progress Curve (AUDPC).The assessment of cyanide and siderophore production for selected antagonistis revealed that M3 and M5 isolates gave the highest values of HCN wheaeas maximum siderophore production was recorded by M4, M5 isolates. The selected isolates were identified as: *Streptomyces toxytricini*, *Stenotrophomonas maltophilia* strain IAM 12423 , *Stenotrophomonas maltophilia* strain ATCC 19861 , *Bacillus*

pseudomycoides and *Brevibacillus brevis*. The recovered of antimicrobial compounds from supernatants of these strains were conducted using chlorophorm, petroleum ether and ethylacetat individually to find that chlorophorm phase at 100 ppm for *Bacillus pseudomycoides* M3 , *Streptomyces toxitricini* C5 and *Stenotrophomonas maltophilia* M5 gave high broad spectrum of antagonistic effect against selected *R.solanacearum* strains wheras petroleum ether phase at 50 ppm inhibited the most selected strains of *R. solanacearum in vitro*.The efficient organic phase of each strain was separated to many fractionated bands by Thin Layer Chromatography(TLC).The antagonistic bacteria promoted the potato growth and inhibited the bacterial pathogens under semi field conditions. The total count of *R.solanacearum* in the rhizosphere decreased gradually during three months and the count of antagonistic bacteria didn't change. The growth parameters were improved by the tested rhizobacteria.

Keywords: Microbial antagonists, biological control, *B. pseudomycoides*, *Brevibacillus brevis*, *Ralstonia solanacearum*, *Streptomyces toxytricini* and *Stenotrophomonas maltophilia*, PCR, 16S rDNA

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