# STUDIES ON THE EFFICACY OF SOME CHEMICALS AND PLANT EXTRACTS IN THE CONTROL OF PLANT PATHOGENIC BACTERIA

**BY**

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B.Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Cairo University, 1990
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## THESIS

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APPROVAL SHEET

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SUPERVISION SHEET

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**Title of Thesis:** Studies on the Efficacy of Some Chemicals and Plant Extracts in the Control of Plant Pathogenic Bacteria
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**Department**: Plant Pathology
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**ABSTRACT**

The study was conducted to study the effect of eighteen different aromatic and medicinal plants extracts, chemical compounds, 3 antibiotics, and 9 bioagents for controlling the causal agent of fire blight of pear *in vitro*, controlling of streptomycin resistant isolates of fire blight and controlling the causal agent of brown rot of potato *in vitro* and *in vivo*. Samples of aromatic and medicinal plants were used to prepare cold water, hot water, ethanolic and chloroform extracts at 15% concentrations.

*In vitro* study, madder, ribwort, harmel, garlic, thyme and garden sage water extracts were more effective on suppresive the growth of *E. amylovora* and *R. solanacearum*. All concentrations of thymol ( purified from garden thyme )and Alkaloids (purified from harmel seedes ) were appeared to inhibit growth of the two pathogens. As well as, all the concentrations of sulfur compound from garlic were appeared to inhibit the growth of *Erwinia amylovora,* however, the crude extract only inhibit growth of *Ralstonia solanacearum*. The leaves of pear that treated with plant extracts pre-inoculation with *E. amylovora* have less development of symptoms than treated with plant extracts post-inoculation with *E. amylovora.*

Seven isolates were collected and tested to tolerant 50µg /ml of streptomycin, cold water extract of harmel, alkaloids and hot water extracts from madder(30%) suppressive the growth of streptomycin resistant isolates of *E. amylovora* on immature fruitlets of pear. Protein banding pattern for resistant isolates revealed that there are some protein were present in all resistant and sensitive isolates either treated with madder extract or extract-free. However, they absent in the same isolates treated with harmel extract, also harmel extract inhibited synthesis of some protein that have low molecular weight in either resistant or sensitive isolates. Madder extract activates the production of a protein in streptomycin sensitive isolates and suppressed synthesis of other protein in same isolates. However, madder extract has also inhibited production of low molecular weight protein in streptomycin

resistant isolates.

All the tested chemical compounds inhibited growth of the two pathogen. Bafry D 50/500 and Virucidal extra were used as new chemical compounds. All concentrations of Virucidal extra were suppressed to growth of the two pathogens, but Bafry D 50/500 was reduced growth of *R. solanacearum* in all concentrations used, while the crude only reduced growth of *E. amylovora*.Ofloxacin was the best antibiotic to reduce the growth of the two pathogens compared with erythromycin and ampicillin.

All bioagents inhibited growth of *E. amylovora in vitro* , but an isolate of *Pantoea agglomerans*, *Pseudomonas fluorescens*, *Bacillus subtilis* and *P. putida* were only inhibited growth of *E.amylovora* on pear fruitlets.

*In vivo* study, ribwort, garden thyme, garlic and extract had most effective on reduced the disease index of bacterial wilt disease of tomato. Starner (0.15%) had inhibitory effect on disease index. The antibiotic streptomycin 200 ppm was the most effective on reduce the disease index than other antibiotics, followed by ofloxacin (100 ppm).

Concentration of Virucidal extra 1:100 gave the best effect to reduce the disease index of bacterial wilt disease of tomato. Only *P. agglomerans* reduced the wilt development by of *R. solanacearum* on seedlings of tomato.

In this investigation, effect of plant extracts and chemical compounds were studied on the growth of bioagents.

**Key words:** *Ralstonia solanacearum*, *Erwinia amylovora*, resistant isolates of *Erwinia amylovora*, plant extracts, chemical control, biological control.

# *DEDICATION*

*I dedicate this work to whom my heart felt thanks; to my son Ayman and my daughters Nada and Nermen for their patience and help, as well as to my parents, brothers and my husband for all the support they lovely offered along the period of my post graduation.*

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