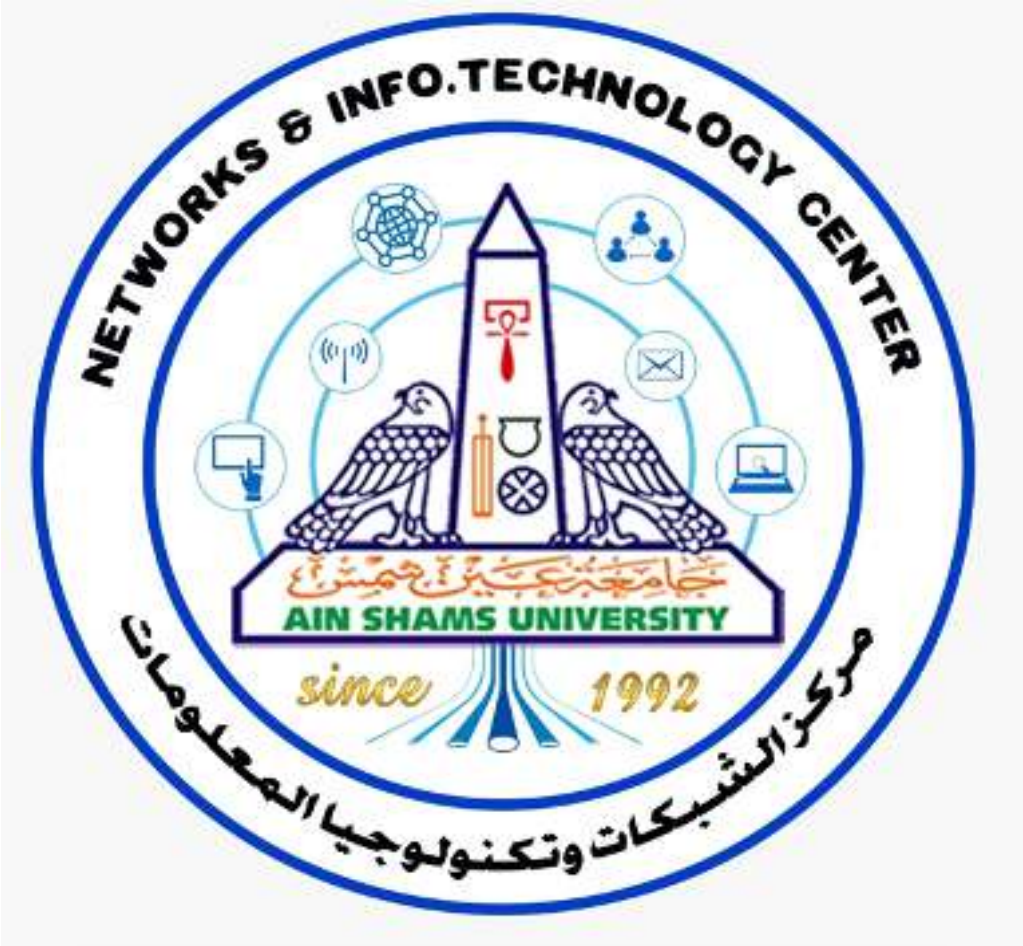
Mona Maghraby

بسم اللّه الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني



Mona Maghraby

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم باللّه العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

STRAINS OF *Erwinia carotovora* THE CAUSAL AGENT OF SOFT ROT OF SOME VEGETABLES AND ITS CONTROL IN EGYPT

By

TAREK GOMAA ABDEL- GAIED ABDOU

B.Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Cairo Univ., 2008

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Agricultural Sciences

(Plant Pathology)

Department of Plant Pathology
Faculty of Agriculture
Cairo University
EGYPT

2019

Format Reviewers Vice Dean of Graduate Studies

APPROVAL SHEET

STRAINS OF *Erwinia carotovora* THE CAUSAL AGENT OF SOFT ROT OF SOME VEGETABLES AND ITS CONTROL IN EGYPT

M.Sc. Thesis
In
Agric.Sci. (Plant Pathology)

By

TAREK GOMAA ABDEL- GAIED ABDOU
B.Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Cairo Univ., 2008

APPROVAL COMMITTEE

Dr. NADER ABDEL- WAHAB ASHMAWY.....
Associate Professor of Plant Pathology, Fac. Agric., Alexandria University

Dr. MOHSIN AHMED MOSTAFA.....
Professor of Plant Pathology, Fac. Agric., Cairo University

Dr. MAURICE SABRY MIKHAIL.....
Professor of Plant Pathology, Fac. Agric., Cairo University

Date: 2 / 5 / 2019

SUPERVISION SHEET

STRAINS OF *Erwinia carotovora* THE CAUSAL AGENT OF SOFT ROT OF SOME VEGETABLES AND ITS CONTROL IN EGYPT

M.Sc. Thesis
In
Agric.Sci. (Plant Pathology)

By

TAREK GOMAA ABDEL- GAIED ABDOU

B.Sc. Agric. Sci. (Plant Pathology), Fac. Agric., Cairo Univ., 2008

SUPERVISION COMMITTEE

Dr. MAURICE SABRY MIKHAIL
Professor of Plant Pathology, Fac.Agric., Cairo University

Dr. AHMED ISMAIL ABDEL-ALIM
Lecturer of Plant Pathology, Fac.Agric., Cairo University

Dr. HASSAN ABD-EL-KHAIR HASSAN
Researcher Professor of Plant Pathology, National Research Center

Name of Candidate: Tarek Gomaa Abdel- Gaied Abdou **Degree:** M.Sc.

Title of Thesis: Strains of *Erwinia carotovora* The Causal Agent of Soft Rot of Some Vegetables and Its Control in Egypt.

Supervisors: Dr. Maurice Sabry Mikhail
Dr. Ahmed Ismail Abdel-Alim
Dr. Hassan Abd-EL-Khair Hassan

Department: Plant Pathology **Approval:** **2 / 5 / 2019**

ABSTRACT

The aim of this study is to isolation and identification *Erwinia carotovora* bacteria as causal agent of soft rot disease in some vegetables. Samples were collected from the storage and marketing places in Giza and Beni Suef governorates. Four isolates (potato tubers); one isolate (sweet potato); three isolates (cucumber); three isolates (carrot); two isolates (eggplant); one isolate (red sweet pepper); two isolates (chili) and one isolate (tomato) were isolated, from naturally infected plant samples according to standard bacteriological methods, on nutrient glucose (2%) agar medium. These bacterial isolates were showed a variation in their pathogenicty on host range or their ability for fermentation of tested sugars. According to cultural, physiological and biochemical characters 15 bacterial isolates were defined as *E. carotovora* subsp. *carotovora*, while two isolates as *Erwinia. chrysanthemi*. The protein fingerprint of isolates differed in their number of discrete protein bands, their molecular weight and the similarity between them. The tree dendrogram showed that bacterial isolates can be divided into two main groups. *In vitro* tests, bio-agents, aqueous plant extracts and chemicals, using filter paper disc plate method in Petri dish, had different antagonistic effects against bacterial soft rot isolates. *In vivo* tests, the above materials by using artificially inoculation on potato slices, the crude cultural filtrates of bacterial bio-agents were highly efficacy in reducing the symptoms of soft rot on potato slices, when applied 2h.before or at the same time of inoculation, while treatment potato slices with *Trichoderma* spp. were highly effective when applied 2h.after or at the same time of inoculation. Aqueous plant extracts also showed high efficacy in inhibiting the soft rot incidence on potato slices, when applied 2h.before or 2h.after of inoculation. The tested chemicals were limited in their effectiveness aganist soft rot incidence at the inoculation times. In *vivo* tests by using whole potato tubers, the treatments were able to protect the stored potato tubers for different times. Field experiment treatments protected the daughter potato tubers against soft rot infection, enhanced the plant growth and yield parameters of potato plants as well as activation of some defense related enzymes (*i.e*. peroxidase, polyphenole oxidase & chitinas). Storage results showed that the treatments, as soil or foliar spray, enhanced the quality parameters of stored potato tubers *viz.* dry matter, reducing sugars, carbohydrates, specific gravity and starch content. The foliar spray was the better than soil treatment for protection of stored potato tubers.

Key words: *Erwinia carotovora* strains, Control, Field application, Host range, Potato tubers quality, Protein fingerprints, Storage.

DEDICATION

I dedicate this work to those my heartfelt thanks; to loving my father, my mother, my sisters, my brothers, for their continuous love and their supports in my decisions. Without them I could not have made it here. I also dedicate; my lovely wife and my children's, her love, patience, support and understanding, which have lightened up my sprint to finish this study and this thesis.

ACKNOWLEDGEMENT

All thanks and praying is to Almighy ***Allah.*** *By this will, I got a lot of help, support and encouragement. I am deeply grateful to my major* ***Dr. Maurice Sabry Mikhail,*** *Professor of Plant Pathology, Faculty of Agriculture, Cairo University, for his detailed and constructive comments, and for his important support throughout this work. I would like to thank* ***Dr. Ahmed Ismail Abdel-Alim*** *Lecturer of Plant Pathology, Faculty of Agriculture, Cairo Univ. I wish to record my deeps gratitude and greatest thanks to* ***Dr. Hassan Abd-EL-Khair,*** *Professor of Plant Pathology, NRC, Dokki, Giza for helping throughout my this work. He always has been there to answer any questions that I may have had, support and help for write and discussion of this work. I warmaly thank* ***Dr. Hamdy Ibrahim Seif-El-Nasr,*** *Professor of Plant Pathology, NRC, Dokki, Giza for helping throughout my this work. I would also like to thank* ***Dr.Shereen Abdel-hamed Mohamed,*** *Researcher in Microbial Genetics Department, NRC, Dokki, Giza for their helping in protein fingerprint study. I wish to thank* ***Dr. Neama Mohamed El-Tohmy,*** *Assistant Researcher Professor in vegetables Department, NRC, Dokki, Giza for their helping throughout the stored potato quality characters study.*

Special gratitude is extended to the staff members and technicians in Plant Pathology Department, National Research Center, Dokki, Giza.

CONTENTS