Cairo University
Faculty of Veterinary Medicine
Microbiology Department

Identification and characterization of bacteriocin producing bacteria capable of inhibiting bovine mastitis pathogens

Presented by

Rasha Hamdy Abd El-Hamid Eid

(B.V.Sc. -2002)

(M.V.Sc. 2009)

For the degree of Ph.D.

(Bacteriology, Immunology and Mycology)

Under the supervision of

Prof. Dr. Jakeen Kamal Abd ElHaleem Eljakee

Prof. of Microbiology and Vice Dean for graduate studies and research affairs Faculty of Veterinary Medicine Cairo University

Dr. Amal Aziz El-Rashidy

Chief researcher of Animal Reproduction Research Institute

(2016)

Cairo University
Faculty of Veterinary Medicine
Microbiology Department

Name: Rasha Hamdy Abd-El_hamid Eid .
Date of birth: 4 /8 / 1980**.**
Place of birth: Giza
Degree: PhD in Veterinary Medical Sciences.
Specialization: Microbiology (Bacteriology, Immunology and Mycology)
Supervisors:

Prof. Dr. Jakeen Kamal Abdel-Haleem El-Jakee
Professor of Microbiology and Vice Dean for graduate studies and research affairs
Faculty of Veterinary Medicine, Cairo University

Dr. Amal Aziz El-Rashidy
Chief researcher in udder health and neonatal diseases department
Animal Reproduction Research Institute (ARRI).

Title of Thesis: **Identification and characterization of bacteriocin producing bacteria capable of inhibiting of bovine mastitis pathogens.**

Abstract

Mastitis most prevalent disease specially sub clinical mastitis which have economic loss ,decrease milk production and increase antibiotic resistant, so we use probioic in treatment of mastitis instead of antibiotic to treatment of mastitis pathogen .Isolation of Lactobacillus spp. from milk *L.pentosus* ,*L.plantarum* isolated from ewe milk ,*L.acidophillus* and *L.salivarious* from cow ,*L.fermentum* ,*L.helveticus* from buffaloes and *L.bulgaricus* ,*L.brevis* from goat then measurement of molecular weight of bacteriocin by SDS – PAGE isolated from bovine and ovine milk. Bacteriocin are highly specific antibacterial proteins which are produced by strains of *Lactobacillus* spp. and showed broad range of antibacterial activity against some mastitis pathogens (*S. aureus*, *E. coli*, *Y. enterocolitica*, *S. uberis* and *S. xylosus*). High thermal stability (up to 100°C) and was active over wide range of pH (3 to 10) by agar diffusion method.

Key words: Bacteriocin ,*Lactobacillus* ,mastitis pathogen ,SDS-PAGE

Supervision committee

Prof. Dr. Jakeen Kamal Abdel-Haleem El-Jakee
Professor of Microbiology and Vice Dean for graduate studies and research affairs - Faculty of Veterinary Medicine, Cairo University

Dr. Amal Aziz El-Rashidy
Chief Researcher of Microbiology of udder health and neonate disease department -Animal Reproduction Research Institute, El-Harm

Acknowledgement

*Firstly, my deepest prayerful thanks to our merciful "**ALLAH**" who gives me every thing I have.*

*I wish to express my sincere gratitude and sincere thanks to **Professor Dr. Jakeen Kamal El Jakee.** Professor of Microbiology and Vice Dean for graduate studies and research affairs, Faculty of Veterinary Medicine Cairo University, for her valuable supervision, ideal guidance , criticism and encouragement through this work. She gave me the best example of what a university professor should be. She encouraged me and gave me ideal responses for my asking about the work.*

*I wish to express my thanks to **Dr. Amal Aziz El-Rashidy** Chief researcher at Mastitis and neonatal diseases department Animal Reproduction Research Institute (ARRI) for her kind supervision and valuable help and support during this work.*

*I express deepest gratitude and appreciation to **Dr. Ibrahim Gad** head of Animal reproduction Research Institute for his supportive attitude and sustained encouragement.*

*I express deepest gratitude to **Dr. Allaa Gomaa** head of Mastitis and neonatal diseases Department Animal Reproduction Research Institute (ARRI) for his kindly guidance.*

*I express my sincere gratitude and thanks to **Dr. Hanaa Asfour** senior researcher in Mastitis and neonatal diseases Department Animal Reproduction Research Institute (ARRI) for her caring attitude and counsel through out the course of this study and all members of Mastitis and neonatal diseases Department, Animal reproduction Research Institute.*

*I am very grateful to **Dr. Enas Mohamed Gamal El-Dien** senior researcher in immunology unit, Animal reproduction Research Institute for her kind guidance and valuable help during this work.*

I am deeply thanking all stuff members in Mastitis and neonatal diseases Department

CONTENTS

CONTENTS	Page

List of Tables

List of Figures

1- INTRODUCTION

Mastitis is one of the most prevalent and economically significant diseases in dairy herds' worldwide that reduced milk production, discarded milk, replacement cost, extra labor, treatment by extra using of antibiotic and veterinary services. In the history, milk played a major role as nutritional source and since 1900's the start of golden era of industrial microbiology. It was also economically significant because larger quantity of milk was being processed daily in factories for the fermented food products (**Singh and Sharma, 2009**).

A probiotic is defined classically as a viable microbial dietary supplement that beneficially affects the host through its effects in the intestinal tract. This definition, however, was initially intended for use with animal feed products. For human nutrition, the following definition has been proposed: Probiotics are viable microorganisms that are beneficial to the host when administered in appropriate quantities **(FAO/WHO, 2002).**

The relationship between certain food and health benefits has been investigated for many years. In recent years, there have been a lot of active researches in the field of probiotic, due to the growing commercial interest in the probioteic food. The research work has also resulted in the understanding and ability to characterize specific probioteic organisms and their health benefits (**Stanton *et al*., 2001).**

Probiotic microorganisms are often incorporated in food in the form of milk, yoghurt and yoghurt type fermented food. Recently, there are probiotic ice cream, cheese, infant formulas, breakfast cereals, sausages, luncheon meats, chocolate and puddings. Non-