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Faculty of Veterinary Medicine
Department of Microbiology

Bacteriological and Molecular Studies on Salmonella species Isolated from Beef Meat Products in El-Gharbia Governorate

A Thesis
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(Microbiology)

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Approval Sheet

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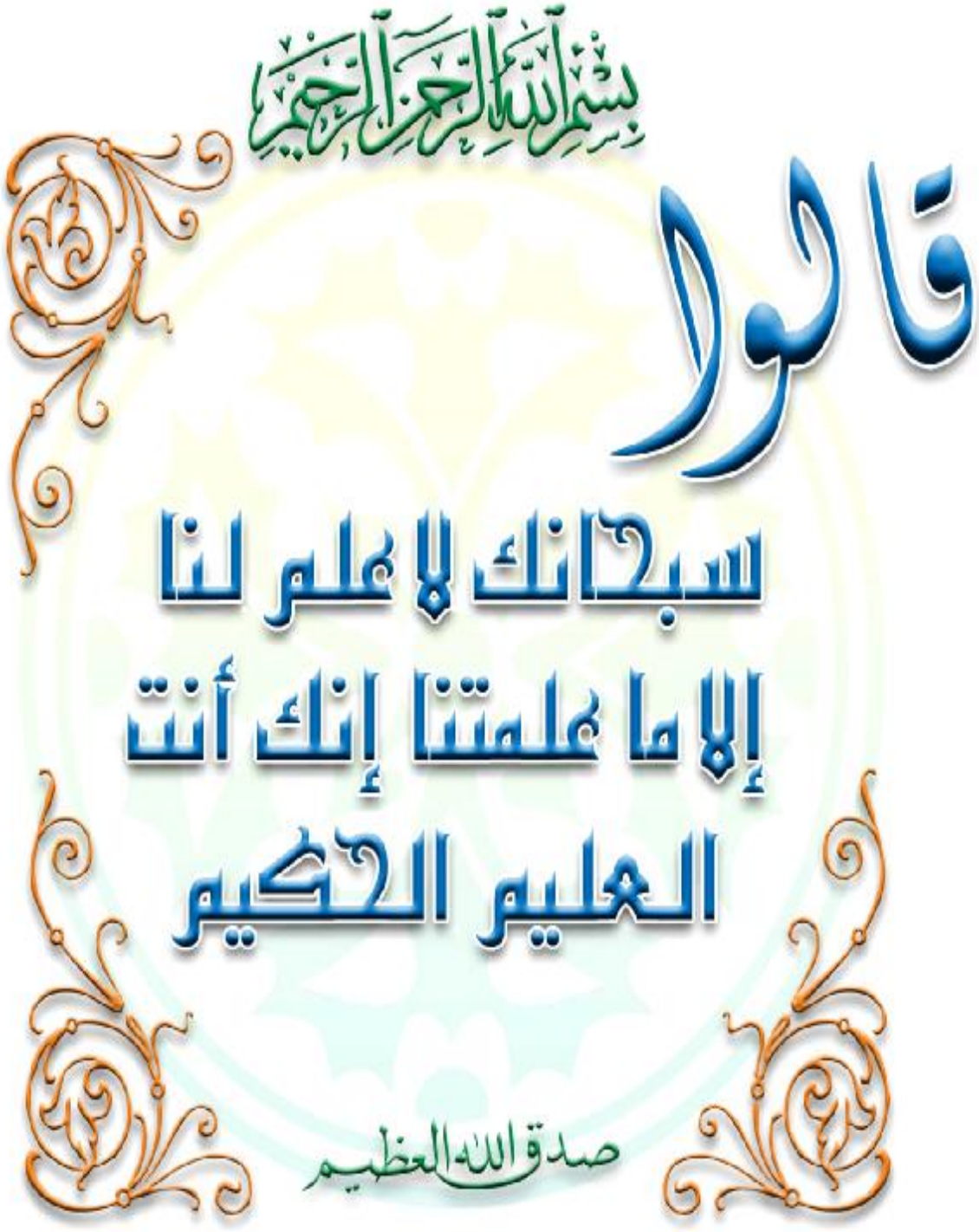

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Ahmed Abo El yazeed Fawaz Ahmed Fawaz

Dedication

- *This work is dedicated to those who gave meaning to my life.*
- *To my Father and Mother who gave me every thing and took nothing.*
- *To my brothers (Hany- Ibrahim -Mostafa).*
- *To my future wife soad who gave a smile to my life.*

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Contents

List of Abbreviations

bp	**:**	base pair.
CDC	**:**	Center of Disease Control and Prevention
CIDRAP	**:**	Center for Disease Research and Policy Academic Health Center.
DW	**:**	Distilled Water.
E. coli	**:**	Escherichia coli.
ELISA	**:**	Enzyme-Linkad Immunosorbant assay.
FAO	**:**	Food and Agriculture Organization.
FSIS	**:**	Food Safety and Inspection Service.
HACCP	**:**	Hazard Analysis and Critical Control Point.
ICMSF	**:**	International Commission on Micropiological Specification for Foods.
MR	**:**	Methyl Red.
PCR	**:**	Polymerase Chain Reaction.
S.Arizonae	**:**	Salmonella Arizonae.
S.enterica	**:**	Salmonella Enterica.
S.Typhimurium	**:**	Salmonella Typhimurium.
SS	**:**	Salmonella-Shigella agar.

List of Abbreviations

TSI	**:**	Triple Sugar Iron Agar.
VP	**:**	Voges Proskauer.
WHO	**:**	World Health Organization.
XLD	**:**	Xylose Lysine Desoxycholate.

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Introduction

Introduction

Bacteria of the genus Salmonella are members of the family Enterobacteriaceae. They are rod-shaped gram-negative, facultative anaerobes and inhabit the intestinal tract of animals and may be thus recovered from a wide variety of hosts, specially poultry , swine, humans, foods and environment. Besides, these bacteria may be pathogenic to wild and domestic animals, and humans **(Holt et al., 1994).** Salmonella bacteria are between 2 and 5 μm long and 0.7 to 1.5 μm in diameter. They have flagella, which are tail-like projections made of proteins that help the bacteria to move. There is not a single method that can assure that Salmonella is found if it is present. Finding Salmonella is in many cases like finding a needle in a hay stack. Therefore, if a detection method does not find Salmonella, it does not mean that the bacteria are not there **(Hendriksen, 2003)**.

Salmonellosis is a zoonotic bacterial disease of national and international importance. The worldwide distribution of salmonellosis often parallels the patterns of trade of animal products and food and the migration patterns of human and animals **(Gilbert et al., 2010)**. Consumption of raw or undercooked contaminated poultry products can induce acute gastroenteritis in humans. Faced with the public health concerns associated with salmonellosis, the European Union has established a European regulation forcing member states to implement control programs aimed at reducing Salmonella prevalence in poultry production especially at the primary production level **(Fica et al., 2012)**.

More than 2,500 different serovars of *S.enterica* have been identified and most of them have been described as the cause of human infections,

but only a limited number of serovars are of public health importance. Most reports have mentioned *S.enterica* serovar Typhimurium and *S.enterica* serovar Enteritidis as the most common causes of human salmonellosis worldwide **(Tavechio et al., 1996)**.

In recent years, problems related to Salmonella have increased significally, both in terms of incidence and severity of cases of human and animal salmonellosis, new concerns have been identified . Since the beginning of the 1990s, strains of Salmonella which are resistant to a range of antimicrobials, including first-choice agents or the treatment of human and animals, have emerged and are threatening to become a serious public health problem. This resistance results from the use of antimicrobials both in human and animal husbandry **(WHO, 2006)**.

Differences in virulence among Salmonella serovars and in the course of Salmonella infections in various host species have been attributed to the variable acquisition and evolvement of virulence genes **(Falkow, 1996)**.

For Salmonella to be virulent, the expression of numerous genes is necessary, which encode some factors with the ability to be located in transmissible genetic elements such as plasmids, bacteriophages and transposons and may be part of specific regions in the chromosome of the bacterium **(Hacker et al., 1997)**.

A wide range of food has been implicated in food borne Salmonellosis. However, as the disease is primarly zoonotic, food of animal origin has been consistently implicated as the main source of human salmonellosis **(FAO/WHO, 2002)**. Salmonellosis is considered to be one