Cairo University
Faculty of Veterinary Medicine
Department of Microbiology

Bacteriological study on Salmonella in slaughter cows

A Thesis Presented By

Ahmed Maher Maher
(B.V.Sc., Cairo University, 2005)

For The Degree of
Master in Veterinary Medical sciences
(Bacteriology, Immunology and Mycology)

Under The Supervision Of

Prof. Dr. Saad Ahmed Attia Said
Professor of Microbiology Faculty of
Veterinary Medicine, Cairo University

Lt. Colonel. Dr. Wael Abdelmordy El- Nyaad

Veterinary Service Department
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Approval Sheet

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Supervision Sheet

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ABSTRACT

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The aim of this study was to isolate, cultivate and identify of ***Salmonella*** recovered from slaughtered cows. In the present study standard ISO 6579 method was used to investigate the presence of salmonellae in slaughtered cattle. Salmonellae were detected in 28 % gall bladder samples, 24 % duodenum samples, 10 % hide swabs,10 % liver samples, 8 % Pre-femoral (pre-crural) lymph node swabs, 6 % Pre-scapular lymph node swabs and 0 % raw muscle meat samples. *Salmonella* isolates were identified as *Salmonella* Muenster *(17), S.* Typhimurium *(15), S.* Kentucky *(4), S.* Anatum *(3), S.* Nyborg *(3) and S.* Livingstone *(1).* All isolates were sensitive to azithromycin, Most isolates were sensitive to ceftriaxone (77 %), sulfa-trimethoprim and cefotaxime (67% each), cephalexin 63% and cefoperazone 58%. On the other hand, all isolates were resistant to Rifampin and Clindamycin. Most *Salmonella* isolates were resistant to amoxicillin (81%) and cefepime (72%). Confirmation of 43 recovered *Salmonella* serovars by Matrix-assisted laser desorption ionization time of flight mass spectrometry (MALDI-TOF MS) which used as a reliable fast and economic tool for the identification of Gram-negative bacteria especially *Salmonella* which could be used as an alternative diagnostic tool for routine identification and differentiation of clinical isolates.

Key words (*Salmonella,* slaughtered cows and MALDI-TOF MS).

بسم الله الرحمن الرحيم

(وَمَا أُوتِيتُمْ مِنْ الْعِلْمِ إِلاَّ قَلِيلاً)

سورة الإسراء ٨٥

صدق الله العظيم

Dedication

To my precious father, mother and whole family

To my lovely wife Hend Abu Elhassan and my two children Rana and Yara.

To my friends and colleagues

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I wish first to thank **Allah** for ever for helping me to complete this work.

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Introduction

Food-borne diseases represent an important public health problem, significantly affecting the health of the population with major economic consequences **(FAO, 2002).** Bacterial pathogens are especially of most serious concern regarding the issues of meat safety to consumers **(Sofos, 2008).** Human pathogen contamination of raw meat products is caused by a wide array of pre-harvest, harvest, and post-harvest processes **(Li & Mustapha, 2005).**

The main reservoir of zoonotic *Salmonella* is food animals and beef represents one well recognized source of human infection **(USDA, 2007);** and the main sources of infections in industrialized countries are animal-derived products, notably fresh meat products and eggs. In developing countries, contaminated vegetables, water, and human-to-human transmission are believed to contribute to comparatively larger proportion of human cases than those in industrialized countries **(Acha & Szyfres, 2001**).

Salmonella is an infectious agent causing typhoid, paratyphoid and enteritis (food poisoning) in human and many other diseases in domestic and wild animals as well as birds. The genus *Salmonella* is a member of the bacterial family Enterobacteriacae. It is a Gram negative, straight, non-spore forming rods peritrichous flagellated, facultative anaerobic and can grow well under both aerobic and anaerobic conditions **(Wagner, 2010).**

More than 2400 serovars of *Salmonella enterica* are recognized now and are capable of infecting a variety of animal species, poultry as well as human. *Salmonella enterica* serovars, Typhimurium**,** Enteritidis**,** Agona**,** Virchow**,** Montevideo**,** Hadar.....etc. are the serotypes most commonly associated with human salmonellosis **(Rajashekara, *et al*., 2000 and Cormican *et al*., 2002).**

The incidence of human salmonellosis is rising in most countries where surveillance networks have been set up and World Health Organization (WHO) recorded that the problem becomes one of the diseases of public health significance, while multiple drug resistant *S.* Typhi (the causative agent of typhoid fever in man) is responsible for numerous outbreaks possessing a major threat to the affected persons due to failure of treatment of the disease **(Breuil *et al*., 2000 and Wain *et al*., 2003)**.

In the European Union, meat products were the second most common food group contributing to human salmonellosis in 2005, Contamination of beef during slaughter and processing is a major risk of subsequent food-borne infection of the consumers **(Norrung and Buncic 2008).**

Cattle may be reservoir of several bacterial pathogens that are present in their gastrointestinal tract without any clinical signs in animals shedded microorganisms in the feces may infect other animals as well as contaminate hides in abattoirs. Furthermore, the bacteria can be also transferred to the carcasses during the slaughter and dressing processes **(Bell, 1997).**