

شبكة المعلومات الحامعية

# بسم الله الرحمن الرحيم



-Caro-



شبكة المعلومات الحامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم





ببكة المعلم مات المامعية

## hossam maghraby

# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

## قسو

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة يعبدا عن الغيار





شبكة المعلومات الجامعية





شبكة المعلومات الحامعية



بالرسالة صفحات لم ترد بالأصل



## Prevelance of Campylobacter jejuni in fresh and frozen meat in Assiut governorate

B16684

#### THESIS

Submitted for fulfilment of Master Degree In Microbiology

SAMEH SAMIR HALIME B. V. Sc.

#### Supervised By

Prof. Dr. Shaban H. Ahmed
Professor of Microbiology
Faculty of Medicine
Assiut University

Prof.Dr. Abd-ELKalik A.ELTimawy

Professor of Microbiology Faculty of Medicine Assiut University

Dr.Ahmed Sadek Ahmed

Assistant Professor of Microbiology Faculty of Medicine Assiut University

Department of Microbiology and Immunology
Faculty of Medicine
Assiut University

1997

#### **ACKNOWLEDGMENT**

I would like to express my sincere thanks and deep appreciation to Professor Dr. *Shaban Hashem Ahmed*, professor of Microbiology, Faculty of Medicine, Assiut University, for his unlimited help, profound supervision, valuable advice and providing the facilities that made it possible to continue this work.

Words can never express my deepest gratitude to Professor Dr. *Abd ELKhalik A.ELTimawy*, Professor of Microbiology, Faculty of Medicine, Assiut University, for his continuous supervision, constant encouragement and valuable assistance.

I wish to express my deep thanks to Dr. Ahmed Sadek Ahmed Assitant Professor of Microbiology, Faculty of Medicine, Assiut University, for his kind help and constant encouragement. I am indebted to his as he didn't hesitate to give a great deal of his time, his knowledge and experience, during perparation of this work.

My best thanks also to Professor Dr. *Maher Mokhtar Zaki*, Professor of Microbiology, Faculty of Medicine, Assiut University, for his sincere help and co-operation.

Deepest gratitude also goes to Professor Dr. Z. M. Kholeaf, Head of animal reproduction disease department, animal reproduction research institute, Cairo. And also to Dr. Mona M. Sobhy, for the help and directions in carring out this study.

The encouragement, suggestions as well as the advice and support given by Dr. *Mohamed Saad Badary*, Lecturer of Microbiology, Faculty of Medicine, Assiut University.

Finally, I can not deny the role of my Professors and colleagues in the Microbiology and Immunology Department who helped and supported me in every possible way.

## **CONTENTS**

îN	TRODUCTION
,#L,L *	Aim of the work
Đi	FVIEW OF LITEDATIDE
I/N/I	EVIEW OF LITERATURE
	Taxonomy.
	Differentiation of Campylobacter
	Charaterization of C. jejuni
	A- Morphology
	B - Growth requirements
	1- Gaseous and oxidation reduction requirements
	2- Temperature and pH requirements
	3- Nutrition requirements
	4- Cultivation media
ŀ	Effect of temperature
(	Campylobacter from meats
M	ATERIALS AND METHODS
Par	rt I
	Frequency of C.jejuni in meat
Ma	terials
	Collection of different samples
Me	thods
	Incubation of culture.
	Purification of isolates
	Microscopic examintion
	Scheme for identification of Campylobacter
Par	
	tors affecting the growth and survival of C.jejuni in
rela	tion to temperature
	A- Effect of heat on survival and growth of C. jejuni
	1- Effect of boiling on minced meat (cooking)
	2- Effect of boiling on sausage
	3- Effect of frying on hamburger
	4- Thermal inactivation
	B- Influence of cold storage on survival and growth of C.jejuni
	1- Effect of chilling storage at 4°C
	2- Effect of freezing at -18°C
	6

RESULTS	
Part I	
I-Frequency of C.jejuni in meat	<b></b>
1- Frequency of C.jejuni in frozen meat	
2- Frequency of C.jejuni in fresh meat	
3- Comparison between C.jejuni in fresh and fromeat	zen
4- Effect of climate on fresh meat	
II- Frequency of C.jejuni in different organs	
A- C. jejuni in different organs of cattle carcasses	S
B- C. jejuni in different organs of buffalo carcass	es
C- Comparison between rate of isolation of C.jej from different organs	uni
	• • • • • • • • •
III- Frequency of C.jejuni in meat products	••••••
III- Frequency of C.jejuni in meat products  Part II  A) Effect of heat on survival of C.jejuni	*******
Part II  A) Effect of heat on survival of C.jejuni	••••••••••••••••••••••••••••••••••••••
Part II A) Effect of heat on survival of C.jejuni	••••••••••••••••••••••••••••••••••••••
Part II A) Effect of heat on survival of C.jejuni	
Part II A) Effect of heat on survival of C.jejuni	••••••
Part II A) Effect of heat on survival of C.jejuni	••••••
Part II A) Effect of heat on survival of C.jejuni	••••••
Part II A) Effect of heat on survival of C.jejuni	••••••
Part II A) Effect of heat on survival of C.jejuni	••••••
Part II A) Effect of heat on survival of C.jejuni	

## LIST OF TABLES

Table		Page
No		<b></b>
1	Biotypes of Vibrio fetus.	6
2	Classification of genus Campylobacter.	8
3	Variation of nomenclature of Campylobacter sp. according to location.	9
4a	Differentiation of genus Campylobacter	13
4b	Differentiation of genus Campylobacter	14
5	Frequency of isolation of C.jejuni from fresh and frozen meat samples.	52
6	Type of samples examined for Campylobacter jejuni and their origin.	57
7	Type of meat products examined for C jejuni.	58
8	Frequency of Campylobacter jejuni in frozen meat .	-69
9	Frequency of Campylobacter jejuni in fresh meat.	69
10	Comparison between C jejuni in fresh and frozen meat.	69
11	Effect of climate on rate of isolation of Campylobacter jejuni from fresh meat	69
12	Frequency of C. jejuni isolated from different organs of cattle.	75
13	Frequency of C. jejuni isolated from different organs of buffalo.	75
14	Comparison between rate of isolation of C.jejuni from different organs in cattle and buffalo.	75
15	Frequency of C.jejuni in examined meat products	78
16	Effect of boiling on survival of C. jejuni inoculated into sausage	82
17	Effect of boiling on survival of C jejuni inoculated into minced meat.	82
18	Effect of frying on the survival of C.jejuni inoculated into beef burger of different thickness.	84
19	Effect of temperature on survival of C jejuni inoculated into minced meat (Thermal inactivation)	87
20	Effect of chilling at 4°C on the survival of C.jejuni experimentally inoculated into minced meat.	89
21	Effect of freezing at - 18°C on the survival of C.jejuni inoculated into minced meat	91

### LIST OF FIGURES

Fig.		Page
No.		
1	Type of samples examined for C.jejuni and their origin.	70
2	Frequency of C.jejuni in fresh and frozen meat.	71
3	Effect of climate on rate of isolation of C.jejuni in fresh meat.	72
4	Frequnecy of C. jejuni in different organs	76
5	Comparison between rate of isolation of C.jejuni in different organs of cattle and buffalo.	77
6	Type and origin of samples examined for C.jejuni.	79
7	Frequncy of C. jejuni in meat product	80
8	Effect of boiling on survival of C jejuni inoculated into sausage and minced meat.	83
9	Effect of frying on the survival of C.jejuni inoculated into beef burger of different thickness.	85
10	Effect of temperature on the survival of C jejuni inoculated into minced meat.	88
11,	Effect of chilling at 4°C on the survival of C.jejuni in- oculated into minced meat.	90
12	Effect of freezing at-18°C on the survival of C.jejuni in- oculated into minced meat	92

### LIST OF ABBREVIATIONS

C.fetus = Campylobacter fetus

C.jejuni = Campylobacter jejuni

Gr. = Gram

I.U. = international units

L. = litre

Min. = minutes

ml. = milli litre

Sp.= species

Subsp. = subspecies

## INTRODUCTION

#### INTRODUCTION

Meat of animal origin is the main source of food protein in the human nutrition, the safety and wholesomeness of meat are the responsibility of the veterinary food hygienist all over the world.

It is now well known that Campylobacter fetus subspecies jejuni is a common cause of human enteric disease. Red meats are recognized as a vehicle of Salmonellosis but today, there is evidence to implicate a wide spread association between red meats and Campylobacter infection Butzler and Skirrow (1979).

The term Campylobacter (Greek name, compound of campy = curved, and bacter = rod = "curved rod"), was proposed by Sebald and Veron (1963) as a generic name for the *Microaerophilic vibrios*, on the bases that organisms differ in the growth, biochemical character, and in DNA base content between *True vibrios* on one hand, and *Related vibrios* and *Vibrio fetus* on the other hand. *True vibrios* are strictly aerobic, ferment selected sugars with acid production, can grow on 3 % sodium chloride, have G+C content of 47.2 mol %. On the other hand *Vibrio fetus* and *Retaled vibrio* are microaerophilic, neither ferment nor oxidize carbohydrates and have G+C content of 30-36 mol %. In light of these distinct differences a new genus named "Campylobacter" was proposed.

In recent years, reports from around the world have demonstrated beyond doubt the importance of Campylohacter jejuni was recognized as an enteric pathogen in human beings. There is also an increasing concern over the role of food animals as reservoirs of these organisms with the implication that Campylobacter diarrhoea is a zoonotic infection. However, the organism has been isolated from most common domestic animal species, so it has been inferred that direct transmission of the disease to human might occur via consumption of animal products especially raw or under cooked food of animal origin. (Garcia et al. 1985 and Altekruse et al. 1994).

Furthermore, a number of studies showed that Campylobacter jejuni is commonly found in healthy as well as diarrheatic animals and that the organism can be easly isolated from gall bladders and intestinal contents of pigs, sheeps and cattles (Smibert 1965, Blaser et al. 1980 and Munrose et al. 1983).