## TABLE OF CONTENTS

	Page
Acknowledgements	iii
Abstract in English	iv
Abstract in Thai	vi
List of tables	xi
List of illustrations	xiii
Abbreviations	xiv
Chapter 1 Introduction	1
The Significance of the Study	4
Literature Review	5
Genus Salmonella	5
Morphology and function of the envelope in Salmonella	5
Diagnosis of Salmonella	11
Nomenclature for Salmonella and distribution of serotype	20
Salmonella infections in pigs	21
In apparent Salmonella-infections of Pigs	23
Salmonella as meat hygiene problem	27
Importance of Salmonella infections of pigs as zoonoses	28
Objectives of the study	29
Chapter 2 Research designs and metods	31
Study subjects	31

	Page
Slaughterhouse sampling	36
Sample size determination	36
Sampling frame	37
Information on farm of origin gathered on each group of	
Slaughter pigs and information of pre-slaughter risk factors	39
Places of investigations and data collection	39
Evaluation of the Danish Mix-ELISA	39
Data management and analysis	39
Chapter 3 Results	40
Salmonella bacteria prevalences	40
Herd level pre-slaughter infection of pigs with Salmonella bacteria	44
Chain of infection and their risk factors	44
Applicability of Danish Mix-ELISA for Salmonella Screening test	51
Chapter 4 Discussions	53
Pre-slaughter Salmonella infections of pigs at farm and slaughter levels	54
Contamination rates of pig carcasses in relation to pre-slaughter	
Salmonella infection levels	55
Probable risk factors of Salmonella infection in pigs and carcass	
contamination	56
Distribution of Salmonella serotypes chain of infection	
and theier risk factors	57

		Page
Applicability of Danish Mix ELISA	for screening	
Salmonella infections in pigs		57
Conclusion		58
References		60
Appendixes		69
Appendix A.		69
Appendix B.		71
Curriculum Vitae		74

## LIST OF TABLES

Ta	ble	Page
1.	Differential characters of Salmonella species and subspecies	7
2.	Biochemical tests in differentiating Salmonella from other	
	members and for identifying Salmonella serotypes Typhi and Paratyphi A	8
3.	Priciples of conventional culture for Salmonella	12
4.	Biochemical reactions of Salmonella and other commonly	
	bacteria	16
5.	Antigens of Some Salmonella serotypes	18
6.	Present number of serovars in each species and subspecies	22
7.	Salmonella detection in both slaughter pigs	41
8.	Comparison of slaughter pig sample-specific Salmonella	
	prevalences between Chiang Mai and Sansai slaughterhouses	42
9.	Statistical comparison od Salmonella identifications	
	between various tissuses samples	45
10	). Salmonella prevalences in Chiang Mai slaughterhouse by serogroups	46
11	. Salmonella prevalences in Sansai slaughterhouse by serogroups	47

	Page
12 A. Proportions of Salmonella serogroups in pig study herds of Muang	
slaughterhouse	48
12 B. Proportions of Salmonella serogroups in pig study herds of Sansai	
slaughterhouse	49
13. Account on Salmonella isolation from mesenteric lymph nodes,	
faeces and carcass surface swab samples in individual pigs	50
14. Percentages of Salmonella bacteria recovered by serogrouping	52
15. Most frequently isolated Salmonella serotypes from animal sources	
during Jan-Dec 1999	53

## LIST OF ILLUSTRATIONS

Figure	Page
1. Membrane Structure of Genus Salmonella	6
2. Schematic representation of the structure of S-form lipopolysaccharide.	10
3. Spread of Salmonellae and sources of contamination for human food	24
4. Pork production chain and the Salmonella transmission routes	25
5. Flow diagram of investigation of samples for the prevalence of Salmonella	ů.
in pigs	32
6. Bacteriological procedure for Salmonella detection (ISO 6579)	33
7. Prevalences of Salmonella in difference tissues of slaughter pigs	43

## Abbreviations and symbols

 $\infty$  = Alpha

 $\beta$  = Beta

∘c = degree Celsius

cm = centimeters

CDC = Center of Disease Control

DF = Degree of Freedom

ELISA = Enzyme Immunoaorbent Assay

EU = European Union

g = grams

hrs = hours

ISO = International Organization for Standardization

min = minute

ml = milliliters

mm = millimeters

P, P-Value = probability value

VS = Versus

WHO = World Health Organization

 $X^2$  = chi-square