CHAPTER 1

INTRODUCTION

1.1 Principle, Rationale, and Hypotheses

Campylobacter infection in humans results in an acute gastroenteritis illness, which causes diarrhea, fever, and abdominal cramps. Most diarrheas are either loose or watery or grossly bloody with mild to severe abdominal pain. More than 90% of patients have fever and persist up to 1 week (Allos,2001). However, *Campylobacter spp.* is one of the 4 most importance food-borne bacteria that causes 3.10 times higher mortality than the background population similar to zoonotic *Salmonella* serotype, *Campylobacter* infections significantly increase mortality rate for up to one year after infection, whereas *Yersinia enterocolitica* increases mortality rate for up to six months and *Shigella* was mainly associated with death on acute phase (Helms, et al.,2003).

Many developing countries do not have national surveillance programs for *Campylobacter* infection. The incidence estimates depend on laboratory-based surveillance of pathogens responsible for diarrhea, which indicate that the *Campylobacter* isolation rates range from 5 to 20%. Despite the lack of incidence data from national surveys, case-control community- based studies have provided the

estimates of the incidence of *Campylobacter* infection in children under 5 years old to be 40,000 to 60,000 cases per 100,000 population in developing countries, while the incidence of *Campylobacter* infection in developed countries is estimated to be 300 cases per 100,000 population. Moreover, the incidence rates of *Campylobacter* infection in the general population are approximately at the same level in either developed or developing countries, which is approximately 90 cases per 100,000 population. This observation suggested that *Campylobacter* infection is often a pediatric disease in developing countries. The isolation and incidence rates of *Campylobacter* infection in some developing countries have increased recently, which has often been attributed to improved diagnostic methods (Cocker, et al.,2002).

The risk factors for campylobacteriosis reported previously include consumption of contaminated chicken meat, contact with animals particularly farm or zoo animals, attending a party, and partaking in water sports (Sopwith, et al.,2003). Children age 0-35 months had higher probability of being infected with *Campylobacter* if they owned pet puppies (OR=16.58), pet chicken (OR=11.80) and consumed mayonnaise (OR = 4.13) (Taylor, et al.,1987).

The consumption of chicken was identified as an important risk factor for *Campylobacter* infection in sporadic cases, while consumption of milk was usually found to be the cause of outbreak of infection (Adegbola, et al.,1990), (Chattopadhyay, et al.,2001), (Michino and Otsuki,2000). However, the evidence of prospective study did not show a temporal association between contamination of chickens and human campylobateriosis particularly, during seasonal peaks, which suggested that many cases did not originate from chickens (Wilson,2002). In Thailand, prevalence of *Campylobacter* in chickens was found to be 85% at the farm,

37% at the slaughterhouse and as high as 47% in chicken meat sold at fresh market (Padungtod, et al.,2002). The comparable prevalence of *Campylobacter* has been reported elsewhere in both chicken production 66.3% (Denis, et al.,2001) and raw retail chicken 57%(Wilson,2002).

During the past 3 years, the Faculty of Veterinary Medicine at Chiang Mai University, in cooperation with the Population Medicine Center at Michigan State University (USA), has been studying the epidemiology and antimicrobial resistance of *Campylobacter* in Northern Thailand. Samples were collected from chickens at the farm, slaughterhouses and chickens sold at the market. Samples were also taken from farm workers and non- farming neighbors. From these samples, *Campylobacter spp.* was isolated, and antimicrobial susceptibility profiles were determined. However, the species of those *Campylobacter* were not identified, which would be essential in order to complete the picture of the risk that *Campylobacter* infections pose to the consumer by consumption of contaminated chicken. Therefore, this study proposes to identify the species of *Campylobacter* isolated from chicken and humans working with these animals in Northern Thailand.

This study aimed at identifying species of *Campylobacter* isolated from chicken at the farms, slaughterhouse and meat sold at the market and from chicken farm workers.

Objectives: specific objectives of the study were to:

1. Compare species of *Campylobacter* isolated from chickens at the farms, slaughterhouse, and the market and farm workers.
2. Compare antimicrobial susceptibility profiles among *Campylobacter species*.

Hypotheses:

1. The molecular *Campylobacter* types isolated from chickens and chicken meat are identical to those isolated from the chicken farm workers.
2. The antimicrobial susceptibility profiles of *Campylobacter* species isolated from chicken, chicken meat and farm worker are similar.

1.2 Purposes of the Study

1.2.1 Identify species of *Campylobacter* isolated from chicken through the production chain from farm to market.

1.2.2 Identify species of *Campylobacter* isolated from humans in farming community.

1.2.3 Comparing antimicrobial susceptibility profile among *Campylobacter* species isolated from chickens, slaughter house, market, and chicken farm workers.