CHAPTER I

INTRODUCTION

Urinary tract infections (UTI) are still a major medical problem each year. UTIs are common bacterial infection, particularly in women (1). Causes of infections may usually infect the host through ascension from the rectum, vagina to the urethra and bladder (2, 3). Bacterial UTIs also remain the most important cause of nosocomial or hospital - acquired infection. A report of nosocomial infection exhibited that there were 31%, caused from UTIs (4). The victims of nosocomial infections in USA were approximately 2,000,000 and 90,000 cases for patients and deaths, respectively (5). It is estimated that the nosocomial infection cost is 4.5 to 5.7 billion dollars per year. The economic burden of the nosocomial infection in 2001 A.D. was performed for the high prevalence than 300,000 cases per year (6, 7). The pathogenic bacteria in family Enterobacteriaceae are most commonly caused to the infection, particularly, *Escherichia coli* (8). Although antimicrobial therapy is generally an effective eradicating way of these infections, a current problem is the increasing emergence of microbial resistance to antimicrobial agents. Bacteria can be resistant to antimicrobial agents by various mechanisms. β - lactamase production is the most important mechanism to destroy the β - lactams (9). This antimicrobial resistance affects to the discovery of therapeutic agents, long term of hospital admission, loss of effective work, more expenses of health organizations (10). Normally, human bacterial flora can survive with the host balance of flora. The

protective role of lactobacillus is generally accepted to act as the promising probiotic bacteria, which is defined as "a group of microorganisms that can maintain the balance of indigenous microflora and protect the overgrowth of pathogens" (11). *Lactobacillus* can colonize as the normal flora in human mouth (12), intestine (11) and vagina (13). It were reported that they could adhere to cells and tissues as well and always survive in these organs (14). It predominated in the vagina of healthy women, spread from the rectum and perineum and form a barrier in the vagina to protect the entrance of uropathogens (13). Likewise, it produced some extracellular active substances, namely lactic acid, hydrogen peroxide and bacteriocins to inhibit the growth and/or killed pathogens (13 - 15). Many studies reported the effectiveness of lactobacilli and other closely probiotics to inhibit the pathogenic bacteria in each organ (13 - 15). While there was no study to report about this activity against the antibiotic - resistant bacteria. If the pathogens exhibit the antibiotic degrading enzymes, the effectiveness of lactobacillus active agent to these enzymes are still questionable. In the present study, the antimicrobial activity of lactobacillus was proved and determined to their antimicrobial substances and mechanisms. Acceptably, amounts of lactobacilli which count in urogenital organs can use as the index of urogenital hygiene (16). The antimicrobial substance should be applied as biotherapeutic agent in forms of drugs, nutritions and cosmetics. Moreover, lactobacilli are the generally recognized as safe (GRAS) agent approved by the Food and Drug Administration (FDA) (17), include the industrial foods, neutraceutics and drug ingredients (17, 18). As the cause of nosocomial infection, emergence of antibiotic resistance, the effect of antimicrobial activity of lactobacillus toward the multidrug resistant uropathogenic Enterobacteriaceae was so mentioned as the

interesting points in the present study, especially the antibiotic resistant uropathogens of family Enterobacteriaceae. The knowledge from the present study can be explained the antimicrobial targets, cellular or proteinaceus manners, and lead to the novel application for the therapeutic agents.