

CHAPTER 1

INTRODUCTION

Preservation of foods by fermentation is a widely practiced and ancient technology. Fermentation ensures not only increased shelf life and microbiological safety of a food but may also make some foods more digestible (Caplice, 1999). Lactic acid bacteria (LAB) play an important role in fermented food products such as dairy, meat, cereals, vegetables and other fermented food. In addition, LAB are responsible for contributing to the flavour and preservation of fermented food by producing antimicrobial substances such as lactic and acetic acid, hydrogen peroxide (H_2O_2), carbon dioxide (CO_2), diacetyl (2,3-butanedione), antibiotics and bacteriocins (Stiles and Hastings, 1991; Ray, 1992). Bacteriocins are a extracellularly released peptides or proteins molecules, with a bactericidal or bacteriostatic mode of action against closely related species. The inhibitory spectrum of some bacteriocin also includes food spoilage and/or food borne pathogenic microorganisms (Schillinger *et al*, 1996). During the past decade a general consumer demand to decrease the use of chemical additives in food has developed. Many studies have focused on natural antimicrobial substances secreted by fermented food bacteria to inhibit undesirable microorganisms (Berry *et al*, 1991; Schillinger *et al*, 1991; Foegeding *et al*, 1992; Hugas *et al*, 1995; 1996). Many bacteriocins have received increased attention for use as starter culture for fermentation in many food industries to control of food-borne spoilage and pathogenic bacteria. Bacteriocins of LAB are considered as safe natural preservatives or biopreservatives, as it is assumed that they are degraded by the proteases in gastrointestinal tract (Cleveland *et al*, 2001). The bacteriocin nisin, which is produce by *Lactococcus lactis* ssp. *lactis*, has been extensively studied and use as a food preservative because of its lethal action and wide spectrum of activity (Hurst, 1981; Delves-Broughton *et al*, 1996). The discovery of nisin, the first bacteriocin use on a commercial scale as a food preservative dates back to first half of

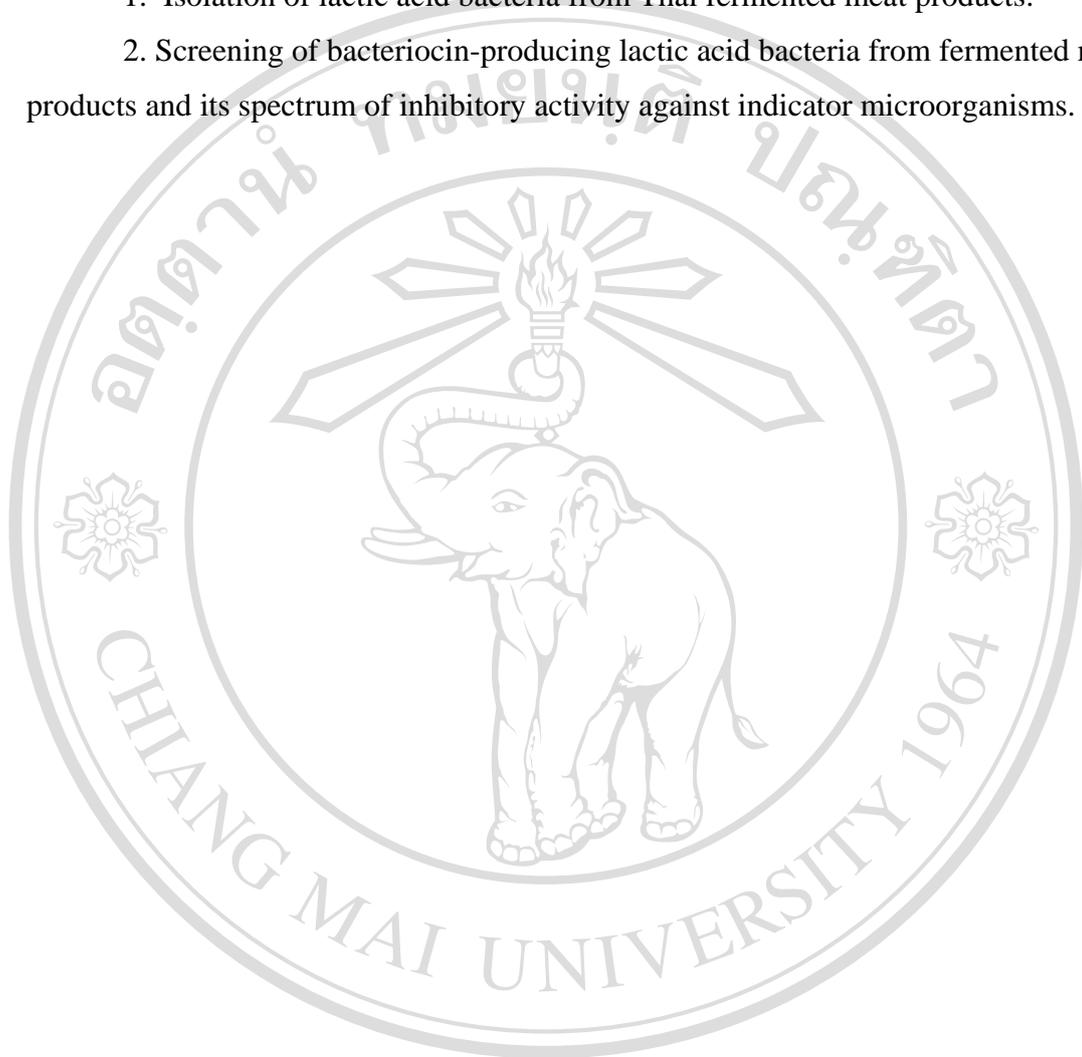
last century but research on bacteriocin of LAB has expanded in the last two decades, searching for novel bacteriocin producing strains from dairy, meat and vegetable products, as well as traditional fermented products. Many bacteriocins have been isolated and characterized (Cleveland *et al*, 2001). Therefore, in the future, bacteriocins may be replaced chemical preservatives such as sulphur dioxide, benzoic and sorbic acids, nitrate and nitrite (Lloyd and Drake, 1995). Nevertheless, some bacteriocin is not effective in fermented food application. Thus, the search for new bacteriocin-producing culture should continue.

The some of Thai traditional fermented meat products have developed to fullscale commercialization, but the technology of fermentation is still mediated by indigenous bacteria rather than added starter cultures. The bacteria found most commonly in Thai fermented meat products are lactobacilli, pediococci and micrococci, but the precise role of these bacteria in the quality of the products is not known (Thiravattanamontri *et al*, 1998). Developments in this meat fermentation have been focusing on application of defined starter culture to increase process control and product consistency (Campbell-Platt, 1995). In addition to difficulties in obtaining product consistency, pathogens in raw material still cause food safety problems. The use of bacteriocin producing strains as starter cultures or protective cocultures in the situ control of food pathogens is one of the possible ways to improve food safety (Kim, 1993; Holzapfel *et al*, 1995; Stiles, 1996; Caplice and Fitzgerald, 1999; Hugas, 1999).

The purpose of the present study was to screen a range of fermented meat products for the presence of bacteriocin-producing strains that might be valuable for use in biopreservation strategies for fermented meat products. Thus, the potential of the isolates to inhibit food spoilage and foodborne pathogenic bacteria was evaluated.

The Objectives of this study

1. Isolation of lactic acid bacteria from Thai fermented meat products.
2. Screening of bacteriocin-producing lactic acid bacteria from fermented meat products and its spectrum of inhibitory activity against indicator microorganisms.



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