

Chapter 1

Introduction

Lactic acid bacteria (LAB) constitute a group of Gram-positive bacteria that share the ability to ferment sugars primarily into lactic acid. Several species of LAB have a long history of uses in the traditional production of fermented foods, beverages and animal feeds (Davidson *et al.*, 1996; Stiles and Holzapel, 1997; Axelsson, 1998). LAB are also used as producing organisms for various food ingredients such as preservatives, flavor compounds, gums and thickeners, and some cheese flavoring enzymes.

Lactobacillus, a member of lactic acid bacteria, is a commercially important bacterium with a wide variety of applications, both in food and non-food industries (Conway *et al.* 1987; Cebeci and Gurakan, 2003). Due to its “Generally Regarded As Safe” (GRAS) status, *Lactobacillus* has been extensively studied its molecular biology in order to improve the specific beneficial characteristics (Wang and Lee, 1997).

Most *Lactobacillus* strains harbor at least one indigenous plasmid and often more (Pouwels and Leer, 1993). These plasmids may not only interfere with the stability of the recombinant plasmids, but also harbor undesirable traits such as antibiotic resistance (Posno *et al.*, 1991). Many cryptic plasmids originating from *Lactobacillus* have been isolated and characterized (Wang and Lee, 1997). Several of these plasmids have been used for construction of cloning vectors or for heterologous gene expression in lactobacilli (Sudhamani *et al.*, 2008).

Kullen and Klaenhammer (2000) reported that plasmid vectors most widely used for lactobacilli were of three groups: (i) plasmids based on rolling circle replication (RCR) replicons, (ii) plasmids with two origins of replication (one for *Escherichia coli* and a second for Gram-positive bacteria), and (iii) *Lactobacillus* vectors with an alternative replication origin for gram-negative bacteria. Therefore, this growing interest in characterization of *Lactobacillus* plasmids themselves as potential useful vectors.

Objectives

1. To investigate the diversity of plasmids in lactobacilli isolated from fermented foods
2. To characterize *Lactobacillus* plasmids