CHAPTER 1

INTRODUCTION

Probiotics have been defined as : “mono- or mixed culture of live microorganisms that applied to animal or man, affect beneficially by the host by improving the properties of the indigenous microflora (Havenaar et al., 1992). Probiotics are nonpathogenic and non-toxigenic, retain viability during storage, and survive passage through the stomach and small bowel (Macfarland and Cumming, 1999).

In recent year, probiotics are almost exclusively consumed as fermented dairy products such as yogurt or freeze-dried cultures, and in the future they may also be new ways to control and treat of infections. The application of probiotic microorganisms has been extended to use outside of human nutrition, including animal production and plant protections in agriculture.

Lactic acid bacteria (LAB) are common components of probiotics. The LAB group comprises of *Lactobacillus*, *Streptococcus*, *Enterococcus*, *Leuconostoc*, *Pediococcus*, and *Bifidobacterium*. Probiotics also contain bacteria belonging to the genera *Bacillus*. Yeasts (*Saccharomyces cerevisiae* and *Candida pintolopesii*) and moulds (*Aspergillus niger* and *A.oryzae*) are also used but mainly in animal products. The criteria for selecting probiotic strains are origin of strain, acid tolerance,

bile stability, adhesion to mucosal surfaces, safe for food and clinical use and good technological properties (Havenaar et al., 1992).

It is recommended that probiotic products contain at least 10^7 live microorganisms per gram or per millilitre (Havenaar et al., 1992). Therefore, from a commercial point of view, an inexpensive method for large-scale of cultures containing high levels of variable probiotics cells in a form suitable for product applications is highly desirable. Viability of probiotic bacteria is important in order to provide health benefits. Most technologies used to process probiotic products and most storage conditions for probiotic products are known to impose major stresses to microbial cells. Viability of probiotic bacteria can be improved by appropriate selection of acid and bile resistant strains, use of oxygen impermeable containers, micro-encapsulation, stress adaptation and incorporation of micronutrients such as peptides and amino acids.

In Thailand, various kinds of microbes are widely distributed naturally in various sources. Therefore, to isolate novel strain of high potential probiotics from various sources will open the new area of Thai industries. But there are many properties to be considered in selecting organisms for use as dietary adjuncts. Furthermore, formulations of probiotics are also an interesting and challenging task. The probiotic products available in the market nowadays are mostly in the form of liquid or semisolid formulations which show low cell viability after oral administration, mainly because the bacteria do not survive the harsh conditions in the stomach. The development of suitable dosage forms to give a higher bacterial survival is the main consideration. Tablets can be easily designed to control the release and enhance the adhesion and colonization of the probiotic microorganisms to the epithelial mucosa of

human host by using the proper kinds of tablet excipients (Maggi et al., 2000). The probiotic tablets with suitable excipients and optimum compression force were reported to preserve high stability of *Lactobacillus acidophilus* in artificial gastric juice (Stadler and Viernstein, 2003). In addition, tablets have advantages above other dosage forms e.g. accurate dosage, ease of administration, good patient acceptance and suitable for large scale production. Therefore, a study was done to evaluate whether it is possible to develop a tablet formulation of probiotics.

Aims of the study.

1. To isolate lactic acid bacteria from human feces and fermented foods
2. To screen high potential probiotic strains
2. To develop the probiotic tablets by direct compression technique