CHAPTER 1

INTRODUCTION

Probiotic are live microbial supplement, which beneficially affect the host by improving its intestinal microbial balance (Fuller, 1992). Their benefits include controlling intestinal infection, controlling serum cholesterol levels, beneficially influencing the immune system, improving lactose utilization in persons who are classified as lactose maldigestors and having anticarcinogenic activity (Krasaekoopt *et al*., 2006). The consumption of probiotics at a level of 10^8-10^9 cfu/g per day is a commonly quoted figure for adequate probiotic consumption, equating to 100 g of a food product with 10^6-10^7 cfu/g (Kebary, 1996; Lee and Salminen, 1996; Dave and Shah, 1997).

Nowadays, many people concern about their health more than in the past. Therefore, consumption of food containing probiotic organisms is becoming increasingly popular. However, the bacteria do not survire during processing in dairy product and gastro-intestinal tract (GIT) (Mandal *et al*., 2006). Therefore, microencapsulation techniques have been investigated for improving the viability of microorganism when incorporated into dairy products and in the gastro-intestinal tract (Rao *et al*., 1989).

Microencapsulation is a process in which the cell are retained within an encapsulating matrix or membrane (Krasaekoopt *et al*., 2004). Microencapsulation techniques such as spray drying, spray chilling, conservation and freeze-drying, have been widely applied in the food industry for encapsulating vitamins, minerals and other sensitive ingredients (Yoo *et al*., 2006). Extrusion and Emulsion techniques are two basic ways for encapsulation of probiotic microorganism (Krasaekoopt *et al*., 2003).

A variety of wall materials such as alginate, starch, κ-carrageenan-locust bean gum, xanthan-gellan, chitosan and gelatin have been used for microencapsulation (Audet *et al*., 1988; Sheu and Marshall, 1993; Sultana *et al*., 2000; Sun and Griffihs, 2000).

Khalida *et al*. (2000) reported a modified method involving calcium-alginate-starch microencapsulation. In this study the encapsulated *L. acidophilus* and *Bifidobacterium* spp. were incorporated and set yoghurt was made and stored at 4^{o}C for 8 weeks. This study demonstrated that survival of encapsulated cultures of *L. acidophilus* and bifidobacterium showed a better survival over an 8 weeks storage period compared to the survival of free cells.

Encapsulation of *Lactobacillus rhamnosus* in alginate improved survival at pH 2.0 up to 48 h, while the free cell were destroyed completely (Goderska *et al*., 2003).

The research of Kailasapathy (2002) and Krasaekoopt *et al*. (2003) also confirms that the microencapsulation techniques will be useful for ensuring high number of cell survive in harsh conditions such as during processing in dairy products and during the passage through the stomach and intestinal tract.

Objectives

1. Study on optimum conditions to produce alginate and κ-carrageenan microbead by emulsion technique.
2. Study on survival of probiotic bacteria encapsulated in alginate, κ-carrageenan microbead and free cell at low pH and bile salt conditions.
3. Storage on survival of probiotic bacteria encapsulated in alginate, κ-carrageenan microbead at temperature 4°C, 8°C and 20°C as compared to free cells.