

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background information

At present, people have a better understanding about the importance of body health. This understanding is increasing with a better knowledge in the human health. Selection and consumption of good food products, e.g. healthy food products, are one of the elements to support a good body health. From the wide variety of healthy and supplement food product yogurt is one type of food products that has been worldly known. Yogurt is a fermented milk product produced by an addition of starter cultures in milk. The product is a nutritional source both from the starter cultures and the raw material.

In the past, cow's milk is the main ingredient to produce yogurt. However, it is found out later on that cow's milk may contain residual antibiotics and these residues can give a negative effect for consumers. Therefore, efforts have been done to use cereals to produce milks than can replace cow's milk. From different types of cereals, the popular ones are soybean, corn and peanut. The other reason for using cereals to produce milks is due to agriculture is the main occupation in Thailand, which will provide easy availability of the raw material at low cost.

Soy milk is one type of cereal milks that has taken interests of a number of scientists. Plenty of research has been done to this milk to be used as a raw material for yogurt production because of its protein content and several other nutritional compounds. Reports also mentioned that soy milk was an appropriate growth medium for some lactic acid bacteria, such as *Streptococcus salivarius* subsp. *thermophilus*, *Lactobacillus delbrueckii* subsp. *bulgaricus*, *Lactobacillus pentosus*, *Lactococcus lactis* subsp. *lactis*, *Lactococcus lactis* subsp. *cremoris*, *Lactobacillus casei* subsp. *casei* and *Lactobacillus*

*helveticus* (Kamaly, 1997). The growth of these microorganisms during yogurt fermentation was usually supported by the presence of the traditional yogurt starter cultures, which were a mixture between *S. thermophilus* and *L. delbrueckii* subsp. *bulgaricus*. Previous studies also showed that the traditional yogurt starter cultures could not be alive and grow in the gastrointestinal tract of human (Tamine and Robinson, 1999). Therefore, an addition of starter cultures bacteria, which can grow in the gastrointestinal tract, will give extra advantages for consumers that consume soymilk yogurt. This type of starter cultures is regarded as probiotic bacteria.

The benefits of probiotic bacteria include (Ziemer and Gibson, 1998);

1. Increase nutritional value (better digestibility, increase absorption of vitamins and minerals);
2. Promotion of intestinal lactose digestion;
3. Positive influence on intestinal and urogenital flora (antibiotics and radiation induced colitis, yeast infections and vaginitis in women);
4. Prevention and reduction of intestinal tract infections (bacteria or virus induced, *Candida enteritis*, *Helicobacter pylori*);
5. Regulation of intestinal motility (constipation, irritable bowel syndrome);
6. Decrease incidence and duration of diarrhea (antibiotic associated, *Clostridium difficile*, travelers, and rotaviral);
7. Maintenance of mucosal integrity;
8. Improvement of immune system;
9. Prevention of colon cancer;
10. Reduction of catabolic products eliminated by kidney and liver;
11. Prevention of osteoporosis;
12. Better development (growth);
13. Anti-carcinogenic, anti-mutagenic and anti-allergic activities;
14. Feeling of well-being;

15. Anti-Candida properties;
16. Hepatic encephalopathy;
17. Regulation of inflammatory conditions such as Inflammatory Bowel Disease (Crohn's disease and Ulcerative Colitis);
18. Reduction and elimination of small bowel bacterial overgrowth;
19. Relieving urinary tract infections;
20. Positive influence on autistic children;
21. Provides antagonistic environment for pathogens;
22. Blocking adhesion sites from pathogens; and
23. Inactivating enterotoxins.

An addition of probiotic bacteria into yogurt products should ensure that the bacteria will remain alive until the time of consumption. Therefore, factors that can maintain the viability of the probiotic bacteria in yogurt need to be studied. These factors include the type of strains, the presence of different species, culture conditions and chemical composition of the fermentation medium, e.g. carbohydrates sources (Lourens-Hattingh and Viljoen, 2001). One example is the acidity of medium. Most strains of bifidobacteria are sensitive to pH values below 4.6. Therefore, in practical the pH value of the final product must be maintained above 4.6 to prevent a decline of bifidobacteria population. For the growth of probiotic bacteria in milk, factors that affected their growth included solid contents, availability of sugars (osmotic pressure), dissolved oxygen (particularly for *Bifidobacterium* spp.), level of inoculation, incubation temperatures, fermentation time and storage temperature (Lourens-Hattingh and Viljoen, 2001).

The present work was aimed to investigate several factors including soymilk yogurt ingredients and an addition of nutrient compounds that affected the viability of probiotic bacteria in soymilk yogurt during storage at 4°C.

## 1.2 Objectives

- 1.2.1 Study important ingredients of soymilk yogurt that could support the growth of probiotic bacteria.
- 1.2.2 Study the viability of probiotic bacteria in soymilk yogurt during storage at 4°C.
- 1.2.3 Study nutrient compounds that could maintain the viability of probiotic bacteria during refrigerated storage.

## 1.3 Education / application advantages

- 1.3.1 To expand the production of healthy food products in Thailand and elevate the Thai's people awareness regarding healthy food products.
- 1.3.2 To increase the commercial value of soybean and support the soybean farmers.
- 1.3.3 To raise the nutritional value of soybean products in the market.