

## CHAPTER 1

### INTRODUCTION

Rice is an important economical agriculture product of Thailand. The rice is exported to other countries and gives revenue to the country for over 80,000 – 100,000 million baths each year (Saipang et al., 2010). Although most of the rice is directly exported, a further rice processing can produce a higher and better quality alternative product. The most common rice that is widely consumed is white rice. However, there are many special cultivars of rice that contain colour pigments, such as black rice, red rice and brown rice. These names refer to their kernel color (black, red or purple), which is formed by deposits of anthocyanins in different layers of the pericarp, seedcoat and aleurone (Sompong et al., 2011). The pigments of black rice (purple rice), especially anthocyanin, promote antioxidative effects, scavenge active oxygen generated in the body, are useful for preventing carcinogenesis and aging, and promote recovery of asthenopia. Anthocyanin pigments are also contained in blueberries. They can strengthen the capillaries and improve blood flow, being effective against eye fatigue, watery eye, and bleary eye (Brouillard and Delaporte, 1977; Abdel-Aal et al., 2006). Black rice is one of the many native rice varieties and widely grown in Thailand. It can be classified into two groups, normal and sticky (waxy or glutinous) rice. This classification is based on the way of the rice behaves during cooking, which is related to the amylose content in the rice grain. Black sticky rice has long been involved in the Thai way of life (Phengrat and Jearakongman, 2009; Usansa et al., 2011). The rice has purple-red color. It has a native gene and is a popular crop in the north and northeast of Thailand. There are several researches about black glutinous rice and the rice has been applied in different products such as cosmetic, drug, supplementary food, and dessert (Palaglang, 1998; Phengrat and Jearakongman, 2009). Up to now, there is scarce, almost none, information that utilizes the black glutinous rice as part of the main ingredients to manufacture fermented rice

products using common yoghurt cultures.

Yoghurt is usually classified in two types, according to its physical state in the retail container; set and stirred yoghurts (Afonso and Maia, 1999). Stirred yoghurt is a non-Newtonian fluid, obtained by promoting the growth of *Streptococcus salivarius* subsp. *thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* in milk at temperatures between 40 and 43°C until a desired acidity level is reached (Fernandes et al., 2005). Yoghurt-like products have been produced from various kinds of cereals such as liquefied starch, prefermented and extruded rice flour, and cooked maize meal mixture (Wongkhalaung and Boonyaratanakornkit, 2000). The current interest in rice milk and cereal milk products is motivated by the fact that dairy and dairy products are always priced too high for the low income earners. Another factor, that is not less important, is the growing awareness of the nutritional benefits of vegetable proteins in low cholesterol diets by health conscious people.

This study was aimed to find the optimum conditions to produce enzymatically extracted black glutinous rice milk as a base for fermented rice product. The factors that were investigated during the preparation of black glutinous rice milk were the ratio of soaking water to the rice, soaking time and the optimum conditions of  $\alpha$ -amylase and amyloglucosidase to extract nutritional components in the black glutinous rice. For the production of fermented rice, the effect of whole milk powder addition was studied. The successfulness of the project could increase the commercial value of Thai black glutinous rice and produce a functional fermented rice product.