I. INTRODUCTION

1.1 BACKGROUND

It has been established that carbohydrates are excellent source of human energy, providing 70-80% of calories in the human diet worldwide (BeMiller and Whistler, 1996). It can be shown that grains as the source of carbohydrates have bigger proportion than that of vegetables, fruits, milk, meat and beans in the MyPyramid Food Intake Patterns (USDA, 2005). In cereal grains, carbohydrates are presented in the form of starch, playing role natively as energy storage (Collado & Corke, 2003). The amount of starch contained in a cereal grain varies but is generally between 60 and 75% of the weight of the grain, thus much of the food that humans consume is in the form of starch (Hoseney, 1998).

In addition to its nutritive value, starch is important because of its effect upon physical properties of many of our foods. Hence, it is not surprising that starches have an enormous number of food uses, including adhesive, binding, clouding, dusting, film forming, foam strengthening, anti-staling, gelling, glazing, moisture retaining, stabilizing, texturizing, and thickening applications (BeMiller and Whistler, 1996).

The commercial and technological uses of starch are extremely numerous, and as a result the academic aspects of the subject have received much attention. Starch has probably been investigated to a greater extent than any other biopolymer (Greenwood, 1976). Eyaru et al. (2009) reported the effect of various processing techniques on digestibility of starch in red kidney bean (Phaseolus vulgaris) and two varieties of peas (Pisum sativum). Chung et al. (2008) also reported the in vitro starch digestibility and some physicochemical properties of starch from common bean (Phaseolus vulgaris L.). Again, the influence of physicochemical properties to the in vitro digestibility of waxy rice starch gel was reported (Sasaki et al., 2009).

Physicochemical properties and enzymatic digestibility, and their correlation are likely to be the most important aspect at which many investigations have been conducted. Physicochemical properties are closely related to the processing condition, machinability, and quality of products, whereas starch digestion is a highly important metabolic response and the rate and extent of starch digestibility and absorption are nutritionally important as numerous studies have been carried out (Sasaki et al., 2009). The most desirable starch ingredient, from the nutritional point of view, is believed to be slowly digestible or even resistant. Many investigations concluded that generally, the amount of resistant starch (RS) increase on storage, especially low temperature storage (Sajilata et al., 2006).

Several studies of starch have concentrated on the raw materials. However, little emphasis has been given to the specific product. Therefore, investigating the physicochemical properties of starch based product is becoming important as well as its in vitro digestibility.

As widely known, rice is one of the leading food crops in Southeast Asia including China. China, India, Indonesia, Bangladesh, Vietnam, and Thailand are the top rice producing countries respectively as can be shown in the statistical report presented by FAOSTAT (2010). Rice can be ground into powder and utilized to produce many kinds of foods, including several types of cake. Rice cake is the most widespread of these types of cake. It is indigenous food of many countries in Asia and Southeast Asia.

In Thailand, especially in the North, rice cake (kao ram phune) is very popular. In certain parts, this type of cake is also made from pea (Pisum sativum). The processing aspect mainly comprises starch gelatinization (cooking) and retrogradation (cold setting). These processes may contribute to
the change in properties of starch, in particular digestibility. Until now, there is dearth information on the experimental data, how the process parameters contribute to the change of starch properties in the product of rice and pea cake.

Therefore this research was carried out to investigate how the starch properties in rice cake and pea cake comprising physicochemical aspects and enzymatic digestibility will be influenced by process parameters. The gained information would be very useful for developing these products.

1.2 OBJECTIVES

1. To investigate the effect of flour type and mixed flour on physicochemical properties and starch digestibility of the corresponding pea cake and rice cake.

2. To investigate the effect of cold setting conditions on physicochemical properties and starch digestibility of pea cake and rice cake.