# EXTRACTION AND COMPARISON OF PHYSICOCHEMICAL PROPERTIES OF NATIVE AND PREGELATINIZED BREADFRUIT (*Artocarpus altilis)* STARCHES

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## ABSTRACT

## EXTRACTION AND COMPARISON OF PHYSICOCHEMICAL PROPERTIES OF NATIVE AND PREGELATINIZED BREADFRUIT (*Artocarpus altilis*) STARCHES

Starch from breadfruit (*Artocarpus altilis*) was extracted and modified by pregelatinization. The physicochemical properties of native and pregelatinized breadfruit starches were analysed and compared based on granule morphology, colour, paste clarity, gel strength, swelling power, water absorption capacity, oil absorption capacity, dispersibility and gelatinization temperature by using diffrential scanning calorimetry (DSC). Granules morphology was observed by using a scanning electron microscope (SEM) and found that native starch had smooth surface structure, spherical and irregular shape while pregelatinized starch had porous, rough surface structure and irregular shape. Pregelatinized breadfruit starch had decreased in L* value and increased a* and b* values ($p<0.05$). Pregelatinized starch also had higher swelling power ($p<0.05$) than native starch. Both native and pregelatinized starches increased in swelling power as the temperature increased from 50 to 90 °C. Gel strength, paste clarity, water absorption capacity and oil absorption capacity of pregelatinized starch was higher ($p<0.05$) compared to those of native breadfruit starch, while pregelatinized breadfruit had a lower ($p<0.05$) paste clarity. Gelatinization temperature of pregelatinized breadfruit starch was lower than that of native breadfruit starch.

# CHAPTER 1

# INTRODUCTION

## 1.1 Background and Problem Statement

Starch is a carbohydrate composed of high chains of glucose units that join by glycosidic bonds. It consists of unbranched amylose and branched form of amylopectin. Starch can be produced by green plants and acts as an energy source. Starch can be found in cereal, legumes, palm and tubers or root starches (Shariffa *et al.*, 2009).

Starch is one of important ingredients in the food industry as well as in the pharmaceutical industry. Starch gives better texture and sensory attributes in food (Tharanathan, 2005). Sago, tapioca, and maize (corn) become the common source of starch used by factories for glucose production (Schenck and Hebeda, 1992). The wide application on starch contributes to starch isolation from new sources and increases the research on developing new starch based materials (Kittipongpatana and Kittipongpatana, 2010).

Starch can absorb water, swell, and leach soluble materials if subjected to heat treatment above its gelatinization temperature. This is an important property of starch which can determine the specific functional property in food processing. Different starches have different physicochemical characteristics. Starch derived from potato is stringy in nature while corn is clumpy (Noranizan *et al.*, 2010). The distribution of chain of amylopectin also can influence the property of starch (Huang *et al.*, 2007).