CHAPTER I
INTRODUCTION

1.1 Background

Taro contains 70-80% starch and gum. The gum is mostly used as binder, emulsifier, and filler in polyethylene film that can be biologically degraded due to its small granule size. Taro starch also has higher gelatinization and pasting point in comparison to starch from other sources. Starch from taro is also easier to be digested with pancreatic enzyme compared to other root vegetables (Ridal, 2003).

Starch is the main carbohydrate source in human nutrition and can be classified as rapidly digestible starch (RDS), slowly digestible starch (SDS), and resistant starch (RS). Rapidly digestible starch is responsible to the immediate increase in blood glucose level after consumption, while slowly digestible starch is the starch fraction that is completely digested in the small intestines. Resistant starch is the starch fraction that cannot be digested by small intestines and would instead start fermentation in the colon (Simsek and Sadif, 2012).

Resistant starch is a type of starch that cannot be digested by the small intestine in human body, it divided into 4 types. Type I resistant starch is the starch that is physically trap in the cell matrices, type II is starch granule that is naturally resistant to enzyme digestion. Type III is starch resulting from retrogradation caused by high heat and cooling, while type IV is starch that have been chemically modified. Since resistant starch cannot be digested by human body, any RS that enter the human body would be fermented in the colon to form

short chain fatty acid (Purba, 2007). Resistant starch is highly desirable due to its white coloring, bland flavor, swelling, gel formation, pasting strength, water binding capacity, and viscosity increase. Resistant starch also have the added health benefit of increasing absorption of minerals, improving colonic health,, and lowering plasma triglyceride and cholesterol levels (Simsek and Sadif, 2012).

1.2 Research problem

Taro contains 70%-80% starch and gum. The starch in taro is easily digestible by the pancreatic enzyme in comparison to other tuber (Ridal, 2013). Thus there is not much research in modifying taro starch into resistant starch even though resistant starch work as functional food because of its indigestibility by the gastrointestinal tract which act as dietary fiber. The method used to formulate resistant starch in this thesis is oxidation method in which its result shown to have desirable physicochemical characteristics. This thesis was done with the intention to determine best possible condition through several factors affecting the RS production using oxidation method.

1.3 Objective

1.3.1 General objective

General Objective of this experiment is to formulate resistant starch type IV with the goal of lowering starch hydrolysis.

1.3.2 Specific objective

Specific objectives of this experiment are:

1. To determine the physicochemical properties of resistant starch type IV formulated by oxidation (degree of hydrolysis, water binding capacity, pasting properties, and swelling power).
2. To determine the effect of different concentration toward starch digestibility of modified Bogor taro starch.
3. To determine the effect of different pH toward starch digestibility of modified Bogor taro starch
4. To determine the effect of different reaction time toward starch digestibility of modified Bogor taro starch