THE EFFECT OF DIFFERENT PLASTICIZERS ON THE PROPERTIES OF SAGO-BASED EDIBLE FILM

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ABSTRACT

Sago starch films with glycerol, sorbitol and polyethylene glycol (PEG) as plasticizers were developed in this study. Edible films were characterized with respect to solubility, water vapor permeability (WVP) and mechanical properties. Sago starch membrane was plasticized with different percentage of glycerol/sorbitol/PEG which are 0% (as a control membrane), 10%, 15%, 20%, 25%, 30% and 35%. The objectives of this study is to develop Sago-based edible film based on the different types of plasticizers, investigate the physical and mechanical properties of the edible film produced and determine the best plasticizer used for Sago-based edible film. The Sago starch and plasticizers with varied compositions was left for constant stirring for 30 minutes in order to make a homogeneous solution. The mechanical properties of film were tested for tensile strength and elongation at break. From the results, the plasticized Sago starch film are much stronger but a little bit more brittle compared to the non-plasticized film. It was found that the glycerol plasticized Sago film have better mechanical resistance compared to sorbitol and PEG plasticized Sago film. Increasing plasticizer concentration tends to increase the film thickness, solubility, WVP and elongation, but decrease the TS of the film. The best combination of Sago starch and plasticizer in this study was glycerol with the concentration of 35% respectively.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDIES

Edible films have been used for centuries in the food industry to preserve food - products. Hence, this is not a new preservation technique. For examples of the common application of edible films are waxing on the fruits and vegetables and cellulose coating in meat casings (Jamie, 2012). Edible films have been used since 12^{th} century in China. At the time of purchasing fruits and vegetables, consumer judge the freshness and quality of the produce on the basis of its appearance (Kader,2002). The most common and challenging problem in the food industry is to maintain and control the fresh quality, hence prolong the shelf-life of the food. One of the solutions to this problem is edible coating or edible film (Rojas *et.al*, 2007). Edible films are defined as the thin layer of material which can be produced and provide a barrier to oxygen, moisture, microbes of external source and solute movement for food. Generally, thickness of edible film is less than 0.3mm (Attila *et.al*, 2009). Coating usually has being diffentiate its properties from a film where the film use as wrapping material while coating are applied and formed on the surface during application (Attila *et.al*, 2009).

Several studies were conducted on starch based films as potential substitute for conventional packaging plastics or can be called as biodegradable films (Sanyang *et.al*). Starch has been categorized as one of the most promising natural renewable resources. This is due to its large availability, biodegradability and relatively cheap. Starch is often used in industrial foods. Starch is a polysaccharides with high molecular weight polymer of anhydroglucose units and linked by alpha-D glycoside bonds. The two major polymers in starch are amylose and amylopectin. Amylose is composed of unbranced chains of glucose monomers connected by α- 1,4 glycosidic linkages (Figure 1.1). Amylopectin is composed of branced chains of glucose