UNIVERSITI TEKNOLOGI MARA

THE EFFECT OF DIFFERENT PLASTICIZER ON THE PROPERTIES OF STARCH-PROTEIN BASED EDIBLE FILM

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ABSTRACT

The purpose of this study is to produce edible films from starch, protein, and combination of both. Also, the aim is to investigate the effect of different types of plasticizer and their concentration on the properties of the edible film produced as well as to compare the properties of composite edible film the one made from starch and protein. Plasticizers like glycerol, sorbitol and polyethylene glycol (PEG_{200}) were added into formulation at various concentration (10, 15, 20, 25%) to increase the properties of edible films. Then the combination of starch, gelatin and plasticizers were formulated and cast on petri dish to produce composite edible films and their mechanical properties (tensile strength and elongation at break, EAB), solubility and water vapour permeability (WVP) were tested. The findings showed that, The addition of gelatin into the formulation increased the tensile strength of glycerol and sorbitol plasticized film, solubility and WVP of all types of plasticized films. Besides, the increasing of concentration of plasticizers will decreased the tensile strength and solubility of glycerol and sorbitol plasticized films. The EAB of the edible films increased when the concentration of sorbitol and PEG_{200} increased as well as when concentration of glycerol decreased. The increasing of concentration of plasticizers did not produce significant trend on the WVP of the composite edible films. It was observed that, the edible films plasticized with glycerol has higher EAB and higher solubility when plasticized with PEG_{200} compared to others. However, the addition of plasticizers into the formulation does not bring significant change to the WVP of the films.

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INTRODUCTION

1.1 BACKGROUND STUDY

Nowadays, people all over the world tend to use products that are environmental friendly in order to reduce the pollution. Therefore, edible film for packaging has been developed as another option for synthetic plastic production and has received extensive global attention over the year because of their advantages over synthetic films. Sabina *et al* (2013) stated that edible film and coatings are proven to have functional properties as a barrier to solute and gasses and to extend food quality and shelf life. The main benefit of edible film compared to traditional synthetic is that they can be consumed together with the food products. Consequently, there is no waste to dispose and even if the films are not consumed, they could still contribute to the reduction of environmental pollution (Aruna *et al*., 2012).

The edible film can be produced from polysaccharides, proteins and lipids. Edible film may be also made from the combination of those major groups of material. There are various sources from these groups and they are all natural. Sources of polysaccharides are corn starch, tapioca starch, and cellulose while proteins are from animal gelatin, and whey powder. Furthermore, lipids film are made from waxes and paraffin as well as shellac resins. Composite film is the combination of starch and protein and it has a capability to enhance the strength of the film. The polysaccharides provide a minimum barrier to moisture due to its hydrophobicity properties. On the other hand, proteins generally give film with suitable optical and mechanical properties, however poor water vapor barrier and very sensitive to moisture. The composite films are believed to serve as good barrier to water vapor permeability and effective as gas barrier with improved strength (Al-Hassan & Norziah, 2012).