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PHYSICAL, MECHANICAL AND ANTIMICROBIAL PROPERTIES OF EDIBLE SAGO STARCH-OIL COMPOSITE FILM CONTAINING GARLIC OIL AS ANTIMICROBIAL AGENT FOR FOOD PACKAGING

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ABSTRACT

The problem that arise from the usage of plastics especially used for food packaging, for example, the increase amount of waste produced and the usage of non-renewable materials have led to the growing concern due their possibilities to cause serious environmental problem. In order to reduce the problems caused by conventional plastics, the innovative idea of producing the edible film is investigated. There is various studies of edible film can be made from polysaccharide, fat, protein or combination of all three classes of materials. Therefore, in this study the composite films that made from sago starch (polysaccharide) and corn oil (fat) was studied. The plasticizer used in this study is glycerol to help improved the mechanical properties. In order to prevent microbial contamination on the food, garlic oil was also added to the film. The garlic oil is extracted with hydro distillation process. The composite edible film is being done by using the casting process. The film is being characteristic with physical properties, mechanical properties and antimicrobial test. Thickness of the film is measured by using the micrometer. The tensile test and elongation to break is measure by using the universal testing apparatus. The solubility and water vapor permeability can be calculated. The effectiveness of antimicrobial agent is determined by the diffusion method.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

In food industry, packaging is essential in order to ensure the safety and the quality of the food. The roles of food packaging are to protect the food products from outside influences and damage, to contain the food and to provide consumers with ingredient and nutritional information. In United State, according to Marsh and Bugusu (2007), the advances in food processing and food packaging play an important role to keep the food. Food packaging is among the safest because it helps to maintain the benefits of the food, enable the food to travel safely for long distance and still be wholesome at the time of consumption.

According to Slavutsky and Bertuzzi (2016), the plastics produced in the world nowadays are about 150 million tonnes per year. These tons of plastics produced are a conventional plastic that are basically petroleum based product. Since the demand of plastics production keep on growing, it results in increasing usage of non-renewable resources and lead to a serious environmental pollution problem such as increase in waste produce and climate change. Therefore, the initiatives need to be developed in order to reduce or solve this problem. One of the problem-solving strategies is to replace the conventional plastic packaging with biodegradable materials (Paj, Madej, & Krystyjan, 2013). The sources of the biodegradable materials that is suitable for this new idea is from natural biopolymer such as polysaccharides, lipids and proteins.

The edible film is one of the examples of biopolymer products. Biopolymers are produced from renewable resources and due to this characteristic, they are considered as an innovative solution to replace the plastics that are widely used in food packaging industry (Slavutsky & Bertuzzi, 2016). Based on Suput, Lazic, Popovic, & Hromis (2015), this type of packaging material should be able to ultimately degraded by