

SYNTHESIS AND CHARACTERIZATION OF STARCH-CHITOSAN COMPOSITES

Emma S¹; Natalia S¹.; Tokok A²; Wulandari¹, Kenfat¹

¹Chemical Engineering Department, University of Surabaya, Indonesia

²Department of Chemistry, University of Airlangga, Indonesia

Email : natalia@ubaya.ac.id

Keywords: biodegradable plastic; mechanical properties; swelling

ABSTRACT

In this experiment, the composites based on chitosan-starch were synthesized at different weight ratios (3/7, 4/6, 5/5, 6/4, 7/3, 8/2, 9/1) by using 4 %v of glycerol as plasticizer. The influence of composition and the degree of deacetylation of chitosan on the properties of starch-chitosan composites film were studied. The films were observed on the aspect of mechanical characteristic, and % swelling, and biodegradability. Tensile strength of the composite films first increased and then decreased with chitosan addition. Otherwise, the addition of chitosan increased the elasticity of film and decreased % swelling. Films made of chitosan with the higher degree of deacetylation were found to have higher tensile strength and elongation in a tensile test.

INTRODUCTION

In recent years, the increasing environmental consciousness has been directing attention to utilizing of biodegradable resins to packaging containers for foods and commodities. After disposal, containers made of biodegradable resins can be decomposed by bacteria and return to soil even buried in landfill or left to stand under environmental condition. In present invention provides natural sources such as starch, chitosan, etc as biopolymer used in biodegradable film packaging application.

Starch is the major source of nutritional energy for humans, and also has many advantages uses, such as the paper sizing (paper coating). It is a homopolymer of glucose and its molecular structure is complex. Starch consists of two types of molecules, amylose (normally 20-30%) which is largely straight with a few branched chains and amylopectin (normally 70-80%) which is highly branched.