UNIVERSITI TEKNOLOGI MARA

THE CHARACTERIZATION AND COMPARISON OF CHITIN AND CHITOSAN FROM DIFFERENT SOURCES BY FOURIER TRANSFORM INFRARED

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The accumulation of domestic wastes throughout the world has become a serious environmental concern due to the inappropriate disposal management. Thus, one of the proper ways to control the local pollution is to transform the industrial byproducts into more usable form. Shrimp shell is one of the abundant potential wastes from the shellfish industry, that also known commonly as the source for chitin. The chitin and its derivative, chitosan are polymers that can be extracted from crustacean, arthropods, and fungi. The natural biomaterials are well known with wide capabilities in various industries due to its nontoxicity, antimicrobials, biocompatible, and biodegradable features. The main purpose of the study is to characterize and compare the chitin and chitosan driven from different sources by analysis of chemical components. In addition, chitin and chitosan have different polymorphs distinguish by dissimilar structural components. Thus, different type of chitin and chitosan from different sources will give distinct results. In this study, the chitins are obtained from the shrimp shells, lobster shells, and cicada sloughs. From the procedures, the chitins were extracted before being characterized by Fourier Transformation Infrared spectroscopy to receive the transmittance readings. Then, the chitin samples were undergoes treatment of acidic demineralization, alkali deproteinization, and depigmentation before treated with deacetylation to obtain the chitosan. Next, the chitosan samples were analyzed using Fourier Transformation Infrared spectroscopy readings too. The comparison between the analysis of chitin and chitosan from different sources are discussed to determine the differences and relationship in extraction yields and chemical components for both types of polymer driven from different sources. Thus, the qualitative results for each sample are obtained uniquely. The research implemented the degree of acetylation and degree of deacetylation for the samples in order to analyse more on the industrial viability for chitin and chitosan polymers respectively. The quantitative results of the study also suggested that the suitability of chitin driven from shrimp only with 66% DA value that does fit the range for commercial usage of below 90%. Other than that, all of the chitosan samples are in common range of 56% to 99%, with the DD values of 61%, 64%, and 64% for shrimp shells, lobster shells, and cicada sloughs respectively. Hopefully, the study can contribute as references on future polymer researches and for contribution on the biomaterials that can be commercial and industrialized.

TABLE OF CONTENT