CHARACTERIZATION AND FABRICATION OF TAPIOCA STARCH BIOPLASTICS ENHANCED WITH CELLULOSE ACETATE FROM PINEAPPLE LEAVES

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This Final Year Project Report entitled **" Characterization and Fabrication of Tapioca Starch Bioplastics Enhanced with Cellulose Acetate from Pineapple Leaves"** was submitted by Nur Syazana binti Mohammed Yusri in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

CHARACTERIZATION AND FABRICATION OF TAPIOCA STARCH BIOPLASTICS ENHANCED WITH CELLULOSE ACETATE FROM PINEAPPLE LEAVES

This study focuses on the characterization and fabrication of an eco-friendly bioplastic derived from tapioca starch, fortified with cellulose acetate extracted from pineapple leaves. The aim is to develop a sustainable alternative to conventional plastics by incorporating natural and renewable resources. The addition of glycerol and varying concentrations of acetic acid serves as plasticizers to enhance the flexibility and mechanical properties of the bioplastic. The characterization process involves analyzing the mechanical properties and water absorption of the tapioca starch bioplastic. The cellulose acetate from pineapple leaves contributes to reinforcing the bioplastic, improving its strength and durability. Through spectroscopic techniques such as Fourier-transform infrared (FTIR) spectroscopy, researchers examine the molecular structure, chemical structure of biopolymers that opens up possibilities to their reactive modification between the components. Mechanical tests, including tensile strength, elongation at break, and Young' modulus, are conducted to evaluate the performance of the bioplastic under different formulations. The results provide insights into the influence of acetic acid on the properties of the bioplastic. Glycerol is introduced as a plasticizer to impart flexibility, while varying concentrations of acetic acid are used to fine-tune the mechanical properties. In conclusion, the incorporation of different concentrations of acetic acid into the bioplastics results in both favorable and unfavorable impacts on the mechanical properties of the bioplastic films. This research contributes valuable insights into the development of biodegradable materials, promoting a greener approach to packaging and reducing the ecological footprint of traditional plastics.