

**PREPARATION AND CHARACTERIZATION OF BIOPLASTIC FROM  
CASSAVA PEEL WITH ANTIMICROBIAL PROPERTIES**

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This Final Year Project Report entitled “**Preparation and Characterization of Bioplastic from Cassava Peel with Antimicrobial Properties**” was submitted by Noor Azuawani Binti Az-har in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

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## ABSTRACT

### PREPARATION AND CHARACTERIZATION OF BIOPLASTIC FROM CASSAVA PEEL WITH ANTIMICROBIAL PROPERTIES

The objective of this study was to investigate the impact of adding betel leaf extract to cassava peel starch bioplastic and its effect on antimicrobial properties. The study encompassed various analyses including thickness measurement, water solubility assessment, FTIR analysis, and antimicrobial testing. The research was conducted in three stages, involving the extraction of betel leaf extract and cassava peel starch, preparation of cassava peel bioplastic, and the addition of different concentrations of betel leaf extract to the bioplastic. The results indicated that the bioplastic without the addition of betel leaf extract had a thickness of 0.58 mm. The highest water solubility percentage was observed in samples with a 2.0% betel leaf extract addition, reaching 79.23%. Regarding antimicrobial properties, the antimicrobial analysis revealed that the addition of betel leaf extract to the bioplastic only exhibited inhibitory effects against *S. aureus*, a gram-positive bacterium. The best inhibition results were observed in the variation with a 2.0% betel leaf extract concentration. However, none of the variations showed inhibition against *E. coli*, a gram-negative bacterium. FTIR analysis was employed to identify the chemical bonding present within the bioplastic molecules. Overall, the study demonstrated that the addition of glycerol and betel leaf extract enhanced the properties of cassava starch-based bioplastic derived from cassava peel. This suggests the potential of using betel leaf extract as an additive to improve the characteristics and antimicrobial properties of cassava peel starch bioplastic.

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