

**ENHANCEMENT OF THE MECHANICAL AND
PHYSICAL PROPERTIES OF THERMOPLASTIC
CASSAVA STARCH REINFORCED BY BANANA
PSEUDOSTEM FIBER**

NADHIRAH AISHAH BINTI KAMARUZAMAN

**BACHELOR OF SCIENCE (Hons.)
APPLIED CHEMISTRY
FACULTY OF APPLIED SCIENCES
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Name : NADHIRAH AISHAH BINTI KAMARUZAMAN
Student ID : 2022786139
Program : AS245
Course code : FSG671
Mobile Phone : 019-5413641
E-mail : 2022786139@student.uitm.edu.my

Approval by Main Supervisor :

I certify that the work conducted by the above student is completed and approve this report to be submitted for evaluation.

Supervisor's name : DR. NOR HAFIZAH BINTI CHE ISMAIL
Date : 26 July 2024
Turnitin Similarity % : 26%
Signature :

DR NOR HAFIZAH CHE ISMAIL
Senior Lecturer
Faculty Applied Sciences
Universiti Teknologi MARA, Perlis.

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NADHIRAH AISHAH BINTI KAMARUZAMAN

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ABSTRACT

ENHANCEMENT OF THE MECHANICAL AND PHYSICAL PROPERTIES OF THERMOPLASTIC CASSAVA STARCH REINFORCED BY BANANA PSEUDOSTEM FIBER

In this study, composite films were prepared by using cassava starch and banana pseudostem fiber as a reinforcing filler. The composite films were produced using a casting technique, with varying fiber loadings of banana pseudostem fiber (2%, 4%, 6%, and 8%) and glycerol as a plasticizer. The amount of glycerol used was fixed at 25% of the dry weight of starch. The aim of this study is to investigate the effect of untreated and treated banana pseudostem fiber loading on the mechanical and physical properties of thermoplastic cassava starch. The findings indicated that the incorporation of banana pseudostem fiber, in general, enhanced the performance of the composite films. In addition, the TPCS/UBPF and TPCS/TBPF films exhibited a significant decrease in both density and moisture content. Composites that were reinforced by treated fiber exhibited higher mechanical strengths in comparison to the untreated fibers. The morphological images exhibited a favorable compatibility between the treated fiber (reinforcing agent) and matrix, resulting in enhanced tensile strength and Young's modulus. The Fourier transform infrared spectroscopy (FTIR) revealed the removal of hemicellulose at certain wavelengths in the alkali-treated composites. In summary, the application of an alkaline treatment to BPF enhances the performance of the composites reinforced with banana pseudostem fiber.

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