

Physicochemical and Morphology Structure of Moulded Pulp made from Coconut Husk

Shazlina Shazli^a, Suzaira Bakar^{ab*}

Structured Abstract

Background: The disposal of coconut husks, a natural fiber derived from the outer husk of coconuts, poses significant environmental challenges. Coconut husks, if not managed properly, can cause environmental problems such as drainage blockages, fires, and increased greenhouse gas emissions. However, the use of coconut husks for the production of biodegradable and ecological packaging materials presents an innovative solution. This study investigates the potential of using bleached coconut husk fibers in the production of molded pulp, focusing on their physicochemical properties and morphological structure.

Methods: The research involved a series of analyses to determine the physicochemical properties and morphological structure of molded pulp made from bleached coconut husk fibers. The methodology included physical analysis (color, water absorption, and thickness), chemical analysis (Fourier Transform Infrared Spectroscopy (FTIR)), and mechanical analysis (tensile strength, elongation at break, puncture strength and tear strength). Additionally, Scanning Electron Microscopy (SEM) was employed for the morphology analysis. The study utilized hydrogen peroxide as a bleaching agent to observe its effects on the fibers' properties.

Results: From the result, as the concentration of hydrogen peroxide increases, the mechanical properties and water absorption are lowered. The mechanical properties and morphological structure of moulded pulp container made from bleached coconut husk was evaluated by looking at the Scanning Electron Microscopy (SEM) and found that the bleached moulded pulp made from coconut husk has a smoother surface compared to without hydrogen peroxide concentration. The mechanical properties are determined, and the result achieved is not aligned with previous study. This might be because of the aggressive bleaching process. As the concentration of hydrogen peroxide increases, the (L*) lightness increases making the moulded pulp made from coconut husk appeal and might be of interest to perceive its quality.

Conclusion: The study concludes that bleached coconut husk fibers have significant potential as an environmentally friendly alternative for molded pulp production. The bleaching process enhances the mechanical and physical properties of the fibers, making them suitable for various packaging applications. The utilization of coconut husk in this manner not only offers a sustainable solution for waste management but also contributes to the development of eco-friendly packaging materials, aligning with global sustainability goals.

Keywords: Moulded pulp, bleached coconut husk, hydrogen peroxide

*Correspondence: nurnadiah@uitm.edu.my

^a School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia