

# **The Impact of *Musa paradisiaca* on the Tensile Strength, Water Resistance and Biodegradability of Shrimp-Shell Based Plastic of Tissue Packaging**

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## **Abstract**

*In the 21st century, petroleum-based plastics have become widespread but remain harmful due to their toxicity and slow degradation. One significant source of plastic waste is tissue packaging, which accumulates rapidly in the environment. This research aims to develop a sustainable alternative in the form of biodegradable and water-resistant tissue packaging, designed to be safe for human contact. The study utilizes chitosan-based bioplastics reinforced with banana peel powder to enhance material properties. This method uses wastes that are very common in Indonesia, helping reduce both agricultural and fisheries waste. The mechanical and water resistance properties of these bioplastics were analyzed. Tensile strength tests revealed that banana peel powder reduced chitosan density, resulting in a lightweight material while maintaining sufficient strength for tissue packaging applications. Water resistance tests showed that banana peel-enhanced samples effectively repelled water without significant degradation. Statistical analysis ( $p = 0.040$ ) confirmed a significant difference in tensile strength between the formulations. Additionally, adjusting their tensile can contribute to their biodegradability, ensures that they break down naturally without contributing to long-term pollution, making them a promising solution for industries seeking sustainable and functional alternatives to conventional plastics*

**Keywords: Chitosan, *Musa paradisiaca*, Tensile Strength, Water Resistance, Biodegradability**