

**PREPARATION AND CHARACTERIZATION OF CASSAVA PEEL
STARCH BIOPLASTIC REINFORCED WITH BENTONITE CLAY
LAYERED SILICATE**

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ABSTRACT

PREPARATION AND CHARACTERIZATION OF CASSAVA PEEL STARCH BIOPLASTIC REINFORCED WITH BENTONITE CLAY LAYERED SILICATE

Plastic has become an integral part of our life due to its durability, lightness, and flexibility. The benefits of plastic as a low-cost material have outweighed its negative impacts. However, their widespread use has a big impact on the environment, ecosystem, and human and animal health since plastic takes a long time to degrade. Therefore, these limitations become an important factor for developing biopolymers with degradable capabilities to prevent plastic pollution while preserving the flexibility, cost-effectiveness, and durability of plastics. In this research, bioplastic was formulated by using agricultural waste from cassava peel. Five different concentration of bentonite (filler) were set up at 0.5%, 1%, 1.5%, 2%, and 2.5%. The result showed that the highest thickness was 0.29 ± 0.012 mm on the additional 2.5% (C5) bentonite concentration. Moreover, the tensile stress (MPa) and Young' modulus (MPa) of C5 was improved significantly with the additional of bentonite clay powder but the elongation at break (%) of the bioplastic was decreased. The tensile stress, Young's modulus and elongation at break obtained was 1.95 ± 0.02 MPa, 36.90 ± 0.64 MPa and $13.87 \pm 0.006\%$ respectively. While the solubility of cassava peel starch film was decreased when the bentonite is added. The interaction between cassava peel starch, plasticizer and bentonite was observed by FTIR analysis. Therefore, the idea of using bentonite clay layered silicate as the reinforcement filler has shown promising and environmentally safe alternatives for overcoming the limitations of bioplastics, mainly due to the availability, biodegradability, and biocompatibility of such resources.