FINAL PROJECT

THE EFFECT OF GAMBIR LEAF EXTRACT CONCENTRATION ON THE TENSILE STRENGTH OF CMC–CHITOSAN BLEND BIOPLASTIC FILMS

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ABSTRACT

Environmental problems caused by the extensive use of synthetic plastics have encouraged the development of biodegradable materials as sustainable alternatives. Carboxymethyl cellulose and chitosan are biodegradable biopolymers with good film forming ability; however, their mechanical properties still need improvement for practical applications. This study aims to investigate the effect of gambir (*Uncaria gambir Roxb*.) leaf extract concentration on the tensile strength of CMC and chitosan blend bioplastic films. The films were prepared using the solution casting method with variations in gambir leaf extract content and tested using a tensile testing machine following the ASTM D638-14 Type V standard. The results show that the addition of chitosan improved the tensile strength of the CMC film. Furthermore, the incorporation of gambir leaf extract significantly influenced the tensile strength of the CMC and chitosan films. An increase in tensile strength was observed with the addition of 0.5 grams gambir leaf extract, indicating enhanced mechanical performance, while a further increase to 1 gram resulted in a decrease in tensile strength. This behavior suggests that an optimum concentration of gambir leaf extract is required to achieve the best tensile properties.

Keywords: Bioplastics Carboxymethly Cellulose; Chitosan; Gambir Leaf extract; Tensile Testing