

## **Determination of the tensile properties and biodegradability of cornstarch-based biopolymers plasticized with sorbitol and glycerol**

### **ABSTRACT**

In this study, the effects of various quantities of sorbitol and glycerol plasticizers (0%, 30%, 45%, and 60%) on cornstarch-based film were examined to develop a novel polymer for usage with biodegradable materials. The film was prepared using the casting process. According to the test findings, the application of the plasticizer concentrations affected the thickness, moisture content, and water absorption of the film. When plasticizer concentrations were increased to 60%, the tensile stress and Young's modulus of plasticized films dropped regardless of plasticizer type. However, the thin film with addition of 30% sorbitol plasticizer demonstrated a steady value of Young's modulus (60.17 MPa) with an increase in tensile strength (13.61 MPa) of 46%, while the lowest combination of tensile strength and Young's modulus is the film that was plasticized with 60% glycerol, with 2.33 MPa and 16.23 MPa, respectively. In summary, the properties and performance of cornstarch-based film were greatly influenced by plasticizer types and concentrations. The finest set of features in this research appeared in the film plasticized with 30% sorbitol, which achieved the best mechanical properties for food packaging applications.

**Keyword:** Cornstarch biopolymers; Plasticizers; Biodegradable film; Physical properties; Thermal properties; Tensile properties