Mechanical Properties of Antimicrobial Starch-Based Plastic Food Storage Films Phase II

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An increase of natural polymer-based film materials in the food packaging industry has occurred in recent years to help reduce petroleum-based plastic accumulation. Previous research developed a starch-based food packaging film while incorporating antimicrobial agents. The films were examined for microbial growth on fresh foods and successfully reduced or prevented bacterial and fungal presence. The focus of this research is to evaluate the tensile strength, elongation/ductility, biodegradability, and impact resistance of the starch-based plastic food storage films created. New films were fabricated and examined in comparison to old films from the previous year. The tensile strength was examined using a Vernier Structures and Materials Tester (VSMT). This assessed samples at fracture point with force in newtons. Displacement in centimeters was recorded. The biodegradability of films was tested by placing strips of each film treatment in distilled water and white vinegar, then assessing degradation of the films. It was hypothesized that the treated films would have a stronger tensile strength and a higher impact resistance to puncture as compared to petroleum-based cling wrap and that the treated starch-based films would be biodegradable based on the content as an alternative for the food industry. Hypotheses were supported as the treated starch-based films significantly showed a higher fracture stress and force. Hypotheses related to degradation were also supported as films deteriorated in high moisture conditions as compared to petroleum-based films.

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