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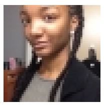
Tensile Properties of Nanocomposites for Food Packaging Applications- An Abstract [1]

Submitted by Milan T Brown [2] on 4 August 2016 - 2:58pm

 [2]

This research creates, tests, and analyzes chitosan-talc composite films for the intended development ad usage in the food science industry. Food packaging alone accounts for 570 million pounds of plastic being thrown away in the United States each day[1]. Due to its inability to degrade, much of this packaging ends up in landfills and our water supply. One solution to this crisis is replacing petroleum based plastics with biopolymers with applications in food packaging. However there are disadvantages to using pure biopolymers for this purpose. Many feasible options have low tensile strength and high hydro-permeability[1]. These detrimental factors make them unsuitable for use as a food packaging material without modification. Chitosan is a biopolymer made from deacetylated chitin, the exoskeletons of crustaceans[2], and is being heavily researched by food science and food packaging industries to determine if it will be an adequate replacement for petroleum based plastics. With the addition of different quantities of minerals, it is predicted that chitosan's ability to withstand various conditions and its suitability for widespread consumer use will increase[3]. Pure chitosan has limitations such as substandard shelf stability as well as high gaseous, thermal, and water permeability[4]. These problems have led researchers to add fillers, specifically clays and minerals, to create suitable nanocomposites with increased tensile properties and decreased permeability.[3,5] There have been several studies done in the area of nanocomposites for food packaging, most using chitosan mixed with some minerals or silicates to create a desired film. The motivation behind this project is attributed to the lack of focus on chitosan-talc composite films compared to other minerals. The solvent intercalation method created samples of 1, 3, and 5% talc and tested the tensile strength, strain, and elongation using the Instron Tensile Testing machine. It was found that compound films consisting of 1% untreated talc resulted in films that have the greatest tensile strength.

Tags:

- #RSMS #UPRM #REU #NSF #SummerResearch [3]