

Gelatin/chitosan-lactate/curcuma hydroethanolic extract-based antimicrobial films: Preparation, characterization, and application on chicken meat

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Abstract

The demand for active food packaging to extend the shelf-life of food products is increasing worldwide. The target of this work was to prepare and characterize the gelatin (G), gelatin/chitosan-lactate (G/ChL), and gelatin/chitosan-lactate incorporated with Curcuma hydroethanolic extract (G/ChL/CEE) based films with different formulations. Furthermore, the films were used to wrap the fresh chicken meat to study its shelf-life during storage. The rheological properties demonstrated an improvement in dynamic moduli and apparent viscosity in G/ChL as compared to the G-based film-forming solution (FFS). Simultaneously, a slight improvement in apparent viscosity was observed in G/ChL/CEE-based FFS. The addition of ChL in the film increases the percentage elongation of the film due to its hydrophilic nature. Stress relaxation study revealed that the films blended with ChL and CEE showed better resistance to stress relaxation. FTIR results demonstrated an increase in hydrogen bonding between G, ChL, and phenolic compounds of CEE. XRD results revealed that the incorporation of ChL reduced the crystallinity of G/ChL films, whereas the addition of CEE increased the crystallinity of G/ChL/CEE films. DSC results showed that adding ChL reduced the T_g while incorporating CEE slightly increased it. The G/ChL/CEE-based films demonstrated improved antioxidant, antimicrobial, and water vapor barrier properties compared to G and G/ChL films. The wrapping of chicken meat with G, G/ChL, and G/ChL/CEE films significantly prevented the quality parameters (in terms of pH, color,

TBARS, and total aerobic bacterial count) of chicken as compared to unwrapped chicken meat.

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