

Genipin Cross-Linked Nanocomposite Films for the Immobilization of Antimicrobial Agent

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ABSTRACT: Cellulose nanocrystal (CNC) reinforced chitosan based antimicrobial films were prepared by immobilizing nisin on the surface of the films. Nanocomposite films containing 18.65 $\mu\text{g}/\text{cm}^2$ of nisin reduced the count of *L. monocytogenes* by 6.73 log CFU/g, compared to the control meat samples (8.54 log CFU/g) during storage at 4 °C in a Ready-To-Eat (RTE) meat system. Film formulations containing 9.33 $\mu\text{g}/\text{cm}^2$ of nisin increased the lag phase of *L. monocytogenes* on meat by more than 21 days, whereas formulations with 18.65 $\mu\text{g}/\text{cm}^2$ completely inhibited the growth of *L. monocytogenes* during storage. Genipin was used to cross-link and protect

