

Title Antimicrobial activity against foodborne pathogens of chitosan biopolymer films of different molecular weights

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Abstract

Antimicrobial activity against *Listeria monocytogenes*, *Escherichia coli* 0157:H7 and *Salmonella typhimurium* of chitosan biopolymer films (CBFs) prepared with four different viscosities of chitosans (10, 40, 100 and 200 mPa s) were investigated by agar diffusion assay. The films were also characterized with measurements of color, tensile strength (TS), % elongation (EL), water vapor permeability and oxygen permeability. CBFs prepared with 100 mPa s chitosan showed an antimicrobial effect only on 10^4 cfu/mL inoculation of *L. monocytogenes* while other viscosities showed an antilisterial effect on all concentrations (10^4 – 10^6 cfu/mL) of *L. monocytogenes*. CBFs prepared with 10 mPa s (CBF-10) and 40 mPa s (CBF-40) chitosans showed an inhibitory effect against *E. coli* 0157:H7 and *S. typhimurium* only at the 10^4 cfu/mL concentration. CBFs prepared with the two higher viscosity chitosans did not show any effect regardless of bacterial level. TS and EL of the CBFs increased with increasing viscosity up to 100 mPa s. Molecular weight distribution was found to be positively correlated with viscosity. The oxygen permeability of the CBFs increased with increasing viscosity of chitosans, but water vapor transmission rate was not similarly affected. In conclusion, CBFs were more effective at inhibition of *L. monocytogenes* than *S. typhimurium* and *E. Coli* O157:H7. Molecular weight of chitosan must be chosen selectively to control the target foodborne pathogens.