

ANTIMICROBIAL ACTIVITY OF NISIN IN FILM AND COATING CHITOSAN

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Packaging for being part of the food preparation chain, whether processed or not, has been studied to provide conditions to increase food safety. In this context, the aim of this study was to evaluate the antimicrobial effect of nisin on the growth of Gram positive bacteria in a chitosan polymeric matrix to be used in films and coatings. Initially, we evaluated different concentrations of nisin solutions (5.000 to 150.000UI) by diffusion on Mueller-Hinton agar inoculated with *Staphylococcus aureus* and *Listeria monocytogenes* (106 cells / mL) cultures. After inoculation, the agar was pierced with wells with 5 mm diameter, to which 60 µL of concentrations of nisin solutions were added. Then the plates were incubated at 35 °C / 24 h following by measurement of the diameter of inhibition zones (mm). Based on the antimicrobial effect of nisin solutions, the dilution level was selected to be used in the polymeric matrix. The film solution was prepared in the same way for both the coating and the film, which was produced by using the "casting" method. The diameter of the inhibition zones resulted from the nisin solutions ranged from 12-19 mm, however above 60.000UI they remained similar. For chitosan films, inhibition was observed only in the contact area for all concentrations, indicating no antimicrobial diffusion into the agar. The coating concentration 150.000UI had better antimicrobial effect for both microorganisms, although for *L. monocytogenes* it was observed the presence of opaque halo. Based on the different antimicrobial responses in the same chitosan polymeric matrix, further studies are necessary to determine the best way to incorporate nisin into the chitosan polymeric matrix to be used in active food packaging.

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