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PRELIMINARY RESULTS REGARDING THE ANTIBACTERIAL EFFECT OF BIODEGRADABLE CHITOSAN-BASED FILMS

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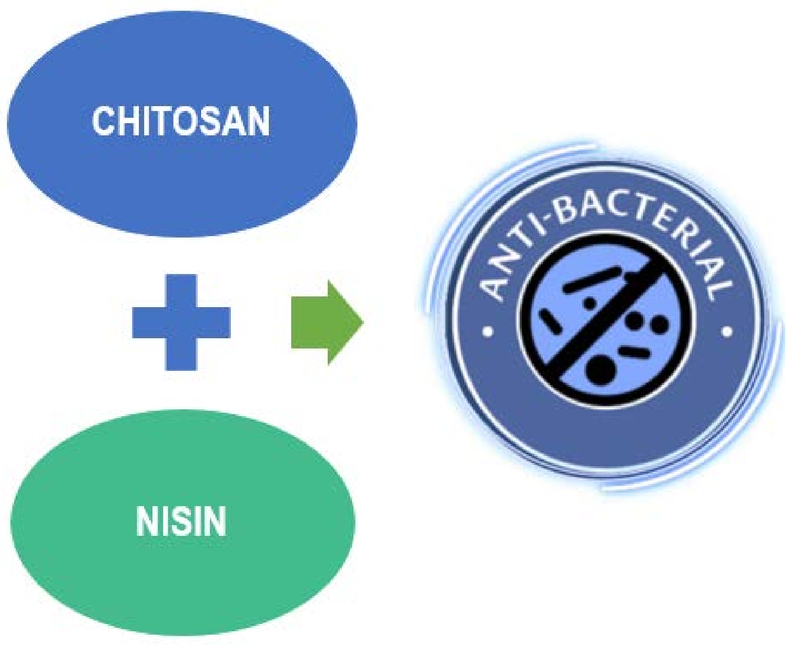
Abstract: *Polymeric matrices used for drug-delivery are an emerging tool for biomedical fields, especially when considering the slow release of different drugs. Chitosan is a versatile polymer often used as a matrix for delivering different antibacterial compounds.*

• Introduction

Chitosan film-forming capacity makes it a suitable polymer for various applications. The use of antimicrobial peptides in order to enhance the pristine antibacterial effect of chitosan led to the development of bioactive materials, biodegradable and biocompatible as well.

• Material and method

In this study, we investigated the physico-chemical properties and biodegradability of chitosan-based films as well as the effect of different chitosan-nisin films against Gram-positive and Gram-negative bacteria, correlated with the release of nisin from the polymeric matrix.



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• Results and discussions

The results obtained showed that chitosan-based films are o suitable matrix for the delivery of nisin (Figure 2), a polycationic antimicrobial peptide intensively used as food preservative, and more recently as an antimicrobial agent in wound healing applications. The mechanical properties of chitosan were enhanced by the addition of glycerol and all polymeric films proved to be biodegradable, losing almost their entire mass after 28 days (Figure 3). Nisin enhanced significantly the antibacterial and antibiofilm activity of chitosan and the effect was dependent on the concentration of the peptide (Table 1).

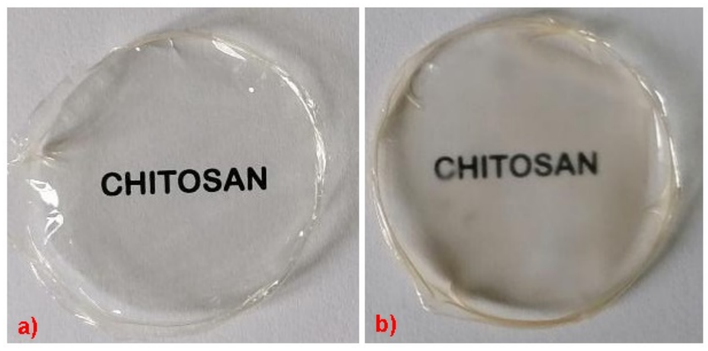

Figure 1. Digital images of the films: (a) chitosan and (b) chitosan-nisin

Tabel 1. Diameter of inhibition zone for chitosan and chitosan-nisin films

	Chitosan	Chitosan-nisin
E. coli	8 mm	10 mm
S. aureus	10 mm	15 mm

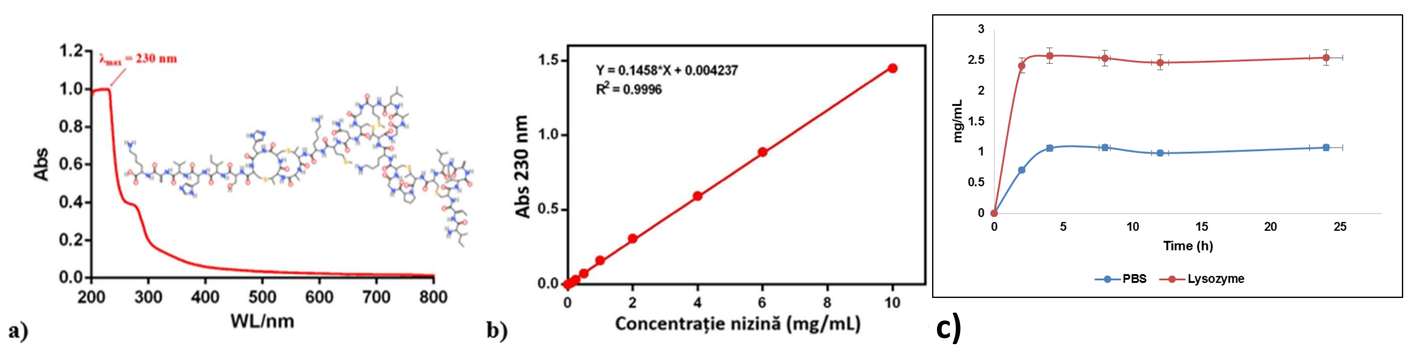

Figure 2. Spectrum (a), calibration curve (b), release of nisin (c)

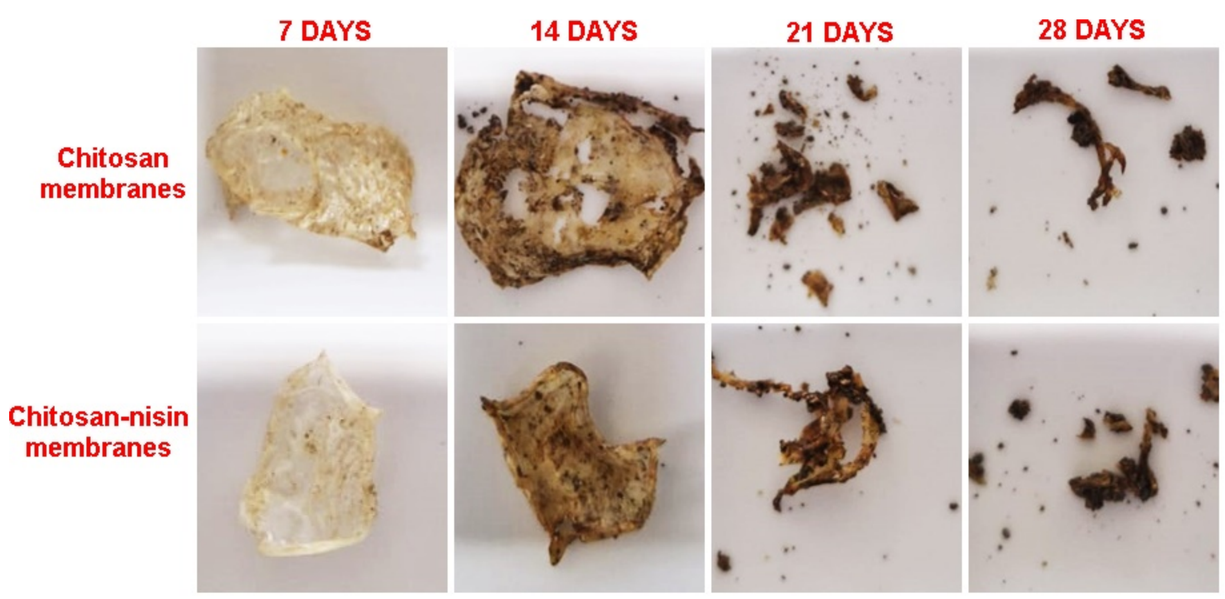

Figure 3. Biodegradability of chitosan and chitosan films

• Conclusions

The use of chitosan in biomedical applications offers a safer and environmentally friendly alternative for drug-delivery platform delivery and by the use of nisin, an antimicrobial peptide, we will overcome the main drawback represent by the use of conventional antibiotics, which is the rapid development of antibiotic resistance.