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Investigation of chitosan's antibacterial activity against vancomycin resistant microorganisms and their biofilms

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Highlights

- Chitosan inhibited VRSA and VREF planktonic growth
- VREF was inhibited at 0.025 mg/mL of chitosan
- VREF counts were reduced by 6 log of CFU in 30 min
- Chitosan inhibited VRSA and VREF biofilm formation and growth
- Chitosan inhibited dual-species biofilms of VRSA and *S. aureus*

Abstract

Vancomycin-resistant microorganisms are a hurdle that traditional antibiotics struggle to overcome. These difficulties have led to search for new solutions based on natural products. Chitosan has been recognized as an effective antibacterial agent against a vast array of microorganisms including antibiotic resistant ones. As such, this work aimed to evaluate chitosan as an alternative to traditional antibiotics in the management/control of two vancomycin-resistant microorganisms, VRSA and VREF, in planktonic and sessile settings. The results obtained showed that chitosan was highly effective in inhibiting VRSA and VREF planktonic growth and reduced VREF viable counts by 6 log CFU in 30 min. Additionally, chitosan was active upon several phases of VRSA and VREF sessile growth inhibiting adhesion, biofilm formation and dual-species biofilms at concentrations as low as 0.0125 mg/mL. In lieu of these results chitosan shows great potential as a possible alternative for the control of vancomycin-resistant microorganisms in recalcitrant wound infections.

Keywords: vancomycin resistance; VRSA; VREF; chitosan; antibacterial; antibiofilm

1. Introduction

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