

# Antimicrobial and antibiofilm capacity of chitosan nanoparticles against wild type strain of pseudomonas sp. Isolated from milk of cows diagnosed with bovine mastitis

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## Abstract

Bovine mastitis (BM) is the most prevalent bacterial infection in the livestock sector, affecting the dairy industry greatly. The prevention and treatment of this disease is mainly made via antibiotics, but the increasing antimicrobial resistance of pathogens has affected the efficiency of conventional drugs. *Pseudomonas* sp. is one of the pathogens involved in this infection. The therapeutic rate of cure for this environmental mastitis-causing pathogen is practically zero, regardless of treatment. Biofilm formation has been one of the main virulence mechanisms of *Pseudomonas* hence presenting resistance to antibiotic therapy. We have manufactured chitosan nanoparticles (NQo) with tripolyphosphate (TPP) using ionotropic gelation. These NQo were confronted against a *Pseudomonas* sp. strain isolated from milk samples of cows diagnosed with BM, to evaluate their antimicrobial and antibiofilm capacity. The NQo showed great antibacterial effect in the minimum inhibitory concentrations (MIC), minimum bactericidal concentration (MBC) and disk diffusion assays. Using sub lethal concentrations, NQo were tested for inhibition of biofilm formation. The results show that the nanoparticles exhibited biofilm inhibition and were capable of eradicate pre-existing mature biofilm. These findings indicate that the NQo could act as a potential alternative to antibiotic treatment of BM.

## Author keywords

Antibiofilm  
Bovine mastitis  
Chitosan  
Nanoparticles  
*Pseudomonas*