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## Antibacterial properties of chitosan silver nano composites (CAGNCs) against *Vibrio salmonicida*

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The aim of this study is to characterize and investigate the antibacterial properties of chitosan-silver (Ag) nano composite (CAGNCs). The synthesized CAGNCs was characterized by field emission scanning electronic microscope (FESEM) and Fourier transform infrared (FTIR) spectrometer techniques. Results show that CAGNCs could inhibit the growth of *V. salmonicida*. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined as 50µg/mL and 100µg/mL respectively. The field emission scanning electronic microscope (FE-SEM) revealed that the exposure of *V. salmonicida* to CAGNCs led the disruption of cell membranes and the leakage of cytoplasmic materials. The existence of elementary Ag in the membranes of treated bacteria, detected by FE-SEM equipped with an energy dispersive X-ray spectrum (EDS). The effect of CAGNCs on bacterial protein synthesis was determined by SDS PAGE and results showed inhibition of protein level in concentration and time dependent manner. Treatment of CAGNCs induced the level of reactive oxygen species (ROS) in concentration and time dependent manner suggesting that it may generate oxidative stress leading to bacterial cell death. Propidium iodide (PI) uptake results suggest change in the permeability of the inner cell membrane of *V. salmonicida* with CAGNCs. Overall results from this study suggest that CAGNCs is potential antibacterial agent to control fish pathogenic bacteria.

**Key words:** Chitosan silver nanocomposite, antibacterial agents, *Vibrio salmonicida*, ROS, membrane permeability

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