

Preparation and characterization of chitosan-silver nanocomposite with anticandidal activity

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Chitosan-silver nanocomposite (CAgNCs) was green synthesized without the adding any external chemical-reducing agents using low molecular weight chitosan (LMW-C) and silver nitrate. The synthesized nanocomposite was characterized by UV-visible spectroscopy, X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), field emission scanning electron microscopy (FE-SEM), high-resolution transmission electron microscopy (HR-TEM) with selected area electron diffraction (SAED), Inductively coupled plasma-atomic emission spectrometer (ICP-AES), particle size distribution and zeta potential analyzer. The average size of LMW-C and CAgNCs were 1776 ± 23 nm and 240.1 ± 23.6 nm, respectively. The zeta potential of CAgNCs observed as + 41.1 mV. It was indicating positively charged polymeric layer on AgNPs surface. The AgNPs are deposited on chitosan matrix and the average AgNPs particle size lies between 5 nm- 50 nm. The Ag content of the CAgNCs was $0.696 \pm 0.054\%$ (w/w). The CAgNCs also proved to be an excellent antifungal agent against *candida albicans*. The minimum inhibitory concentration (MIC) values of CAgNCs and LMW-C for *C. albicans* were recorded as 50 and 100 $\mu\text{g/mL}$, whereas the minimum fungicidal concentration (MFC) values of CAgNCs and LMW-C for *C. albicans* were recorded as 150 and 400 $\mu\text{g/mL}$ respectively. Propidium iodide (PI) uptake results suggested that CAgNCs has affected to permeability of cell membrane of *C. albicans*. Also, CAgNCs induced the higher level of reactive oxygen species (ROS) when compare to the LMW-C in concentration dependent manner. This report illustrates the eco-friendly approach for the reduction of silver using chitosan as a reducing agent, and its potential antifungal agent against *C. albicans*.

Biography:

A Science Graduate holding a B.Sc special degree in Chemistry (University of Ruhuna, Sri Lanka) and M.Sc in Industrial Chemistry (University of Peradeniya, Sri Lanka). Now, I am working as graduate student following Master- PhD joint program at the College of Veterinary Medicine, Chungnam National University, and Republic of Korea. I have more than 5 years experience in nanotechnology and the author of two book (Sinhala language) and 8 scientific publication. Currently, I am working to develop biodegradable chitosan nano particle and chitosan metal (Silver and Gold) nanocomposite against pathogenic microbial.