Chitosan-Silver Nanocomposites: synthesis, characterization and antibacterial activity against *Staphylococcus aureus*

Anna Regiel[1] ; Agnieszka Kyzioł[1], Grażyna Stochel[1], Manuel Arruebo[2], Jesus Santamaria[2]

[1]*Coordination an Bioinorganic Physicochemistry Group,*
Jagiellonian University, Faculty of Chemistry
[2]*Nanoscience Institute of Aragon, University of Zaragoza*
anna.regiel@uj.edu.pl

Nowadays, there is a great interest in development of bionanomaterials exhibiting antibacterial activity against multi-drug resistant bacterial strains. Appearance of antibiotic resistant ones has moved the researchers attention to searching for new alternative bactericidal agents, which could possibly replace so popular antibiotics. Despite the discovery of a various active agents, very few exhibit desirable properties as biocompatibility, biodegradability and non-toxicity. Among a number of nanotechnological strategies, fabrication of polymer-metal nanoparticles bionanocomposites draws a lot of attention[1, 2].

The present investigation concerns chitosan-silver nanocomposites fabrication, physicochemical characterisation and their antibacterial activity evaluation against two Gram-positive, biofilm forming bacterial strains *Staphylococcus aureus.*

Chitosan, biocompatible and biodegradable polymer was used as a reducing and stabilizing agent in the optimized silver nanoparticles synthesis. Nanoparticles and nanocomposites were characterized by UV-vis, IR, TGA, SEM, TEM, *etc*. techniques. Obtained nanoparticles, trapped in the polymeric network showed high antibacterial activity against biofilm forming *S. aureus* and caused significant morphological changes in the bacterial cell walls (Fig.1).

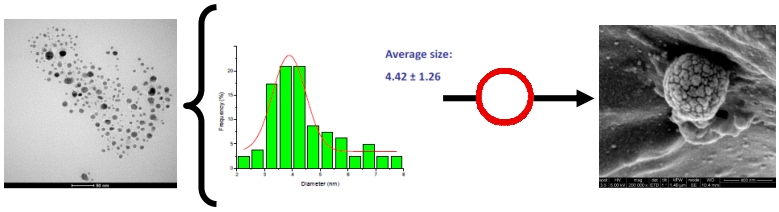

Fig.1. Chitosan based silver nanoparticles (<10 nm), revealing high bactericidal activity against *S. aureus*.

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(2) Thomas, V.; Yallapu, M. M.; Sreedhar, B.; Bajpai, S. K., *Journal of Biomaterials Science, Polymer Edition* **2009,** 20, (14), 2129-2144.