Ag/Cu bimetallic nanoalloys: from morphological characterization to antimicrobial action

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Microorganisms have been a growing concern due to the rapid expansion of multi-resistant antibiotic strains. Therefore, discover of new drugs is urgent. Among several alternatives, silver nanoparticles (AgNP) stand out, but their high cost and human toxicity has limited its use [1]. An alternative are copper nanoparticles (CuNP), a metal with lower cost and a broad spectrum of action, but easily oxidized in an aqueous medium [2]. In this scenario, we propose here the synergic use of Ag and Cu through the production of Ag/CuNP nanoalloys aiming a high multifocal antimicrobial activity, lower cost, higher biocompatibility and kinetic stability. Ag/CuNP nanoalloys of different Ag/Cu proportions were synthesized by a simultaneous chemical reduction process in aqueous solution [2]. The synthetisized nanolloys presented a strong visible light absorption due plasmon resonance of both nanometasls [1]. DLS measurements confirmed the nanosize of the synthesized particles and a low polydispersion. TEM images demonstrated a spherical shape and confirmed the size of the particles. SAED, EDS and XRD measurements also confirmed the chemical and crystalline nature of Ag/CuNPs. Antimicrobial activity of nanoalloys in *E. coli*, *S. aureus*and *P. aeruginosa*clearly demonstrated that the creation of nannolloys synergistically increased antimicrobial action of Ag/Cu alloys with high content of Cu in their composition. These promising results augurs well for further developments of Ag/CuNPs nanoalloys aiming inactivation of multi-resistant bacteria.

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References:

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