Biosynthesized silver nanoparticles for inhibition of antibacterial resistance and biofilm formation of methicillin-resistant coagulase negative Staphylococci

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The ability of a natural stabilizing and reducing agent on the synthesis of silver nanoparticles (Ag NPs)was explored using a rapid and single-pot biological reduction method using Nocardiopsis sp. GRG1 (KT235640)biomass. The UV?visible spectral analysis of Ag NPs was found to show a maximum absorption peak located at a wavelength position of ?422 nm for initial conformation. The major peaks in the XRD pattern were found to be in excellent agreement with the standard values of metallic Ag NPs. No other peaks of impurity phases were observed. The morphology of Ag NPs was confirmed through TEM observation, demonstrating that the particle size distribution of Ag NPs entrenched in spherical particles is in a range between 20 and 50 nm. AFM analysis further supported the nanosized morphology of the synthesized Ag NPs and allowed quantifying the Ag NPs surface roughness. The synthesized Ag NPs showed significant antibacterial and antibiofilm activity against biofilm positive methicillin-resistant coagulase negative Staphylococci (MR-CoNS), which were isolated from urinary tract infection as determined by spectroscopic methods in the concentration range of 5?60 µg/ml. The inhibition of biofilm formation with coloring stain was morphologically imaged by confocal laser scanning microscopy (CLSM). Morphological alteration of treated bacteria was observed by SEM analysis. The results clearly indicate that these biologically synthesized Ag NPs could provide a safer alternative to conventional antibiofilm agents against uropathogen of MR-CoNS.