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Antibacterial properties of functionalized nanoparticles (AgNPs-AB and AuNPs-AB) against antibiotic resistant bacteria with public health concerning

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The aim of this study is to synthesize and investigate the antibacterial properties of functionalized AgNPs-TET and AuNPsr TET complexes, evaluating their antimicrobial effect on antibiotic resistant bacteria with public health concerning. Strains tested were E. coli ST648 and S. aureus ST398, both resistant to tetracycline and the control strains E. coli K12 and S. aureus ATCC 25923, susceptible to tetracycline. MIC and MBC tests were performed on LB medium. Control cultures without nanoparticles and/or tetracycline were included in all experiments. Our results are supported by innumerous previous studies reporting that AgNPs are exquisite bactericides and, as AuNPs, they both are suitable antibiotic carriers. Nevertheless, direct comparisons between our results from other studies are difficult because the physicochemical properties of nanoparticles used differ, since the functionalization of nanoparticles in this study was made in aqueous phase instead of silica matrix and the protocols to assess antimicrobial activity diverge among studies. We compared the potential of AuNPs and AgNPs used as tetracycline delivery systems and showed evidences that both agents succeed on inhibiting bacterial growth. Also, AgNPs functionalized with tetracycline had an inhibitory and bactericidal ability even against Gram-negative and Gram-positive tetracycline-resistant bacteria. The functionalization of nanoparticles with antibiotics could be a potent prospective therapeutic method to overcome infections caused by antibiotic-resistant bacteria. Future studies should focus on functionalization of nanoparticles with other antibiotics, testing their antimicrobial efficiency against a broader spectrum of pathogens, prevention on biofilm formation on in vivo and in inert substrates.

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Biological activities of lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base

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The field of coordination chemistry has registered a phenomenal growth during last few decades. It is well known that precious metals have been used for medicinal purposes for at least 3500 years. At that time, precious metals were believed to benefit health because of their rarity, but research has now well established the link between medicinal properties of inorganic drugs and specific biological properties. The current study was designed to explain the synthesis and characterization of the lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base and to evaluate the antibacterial and the antioxidant activities of the Schiff base and its lanthanide ion complexes. Antimicrobial activity of the lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base was estimated by minimum inhibitory concentration (MIC, μ g/mL) using a micro-broth dilution method for different clinical isolates such as *Eschereshia coli and Enterococcus faecalis*. Our present study has shown that moderate antimicrobial activity exists against both ligand and its complexes. There was no significant difference between Gram-positive and Gram-negative bacteria towards the tested ligand and its complexes. The results obtained herein indicate that the ligand and its complexes have a considerable antibacterial activity.

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