GREEN SYNTHESIS OF MAGNETIC SILVER-BASED NANOCOMPOSITES APPLICABLE AS EFFICIENT ANTIBACTERIAL AND ANTIFUNGAL AGENTS

MARKOVÁ Zdenka, FILIP Jan, ŠAFÁŘOVÁ Klára

Palacky University Olomouc, Olomouc, Czech Republic, EU

Abstract

In recent years, a great attention is given to investigation of newly prepared compounds with antimicrobial effects because of an enormously increasing bacterial resistance against excessively and repeatedly used classical antibiotics. In the present study, we report on new synthetic procedures exploiting “green” chemistry and resulting in preparation of magnetically-driven nanocomposites which reveal both, antibacterial and antifungal activities. The nanocomposites consist of silver nanoparticles providing antimicrobial effects (NPs), biogenic magnetite NPs isolated from magnetotactic bacteria providing magnetic properties and environmentally friendly polymers which act in the procedure as (i) biocompatible matrix surrounding magnetite NPs, (ii) reducing agent for the silver ions, and (iii) linker between magnetic and silver NPs. Herein we report an optimization of reaction conditions for preparation of nanocomposites and their characterization in phase composition by X-ray powder diffraction (XRD) and transmission electron microscopy (TEM). We also demonstrate here very high bactericidal and antifungal activities of such nanocomposites against a variety of microorganisms including disease causing pathogens which make them comparable to the best of previously prepared microbial agents and predetermine them for targeted biomedical or disinfection applications.

Keywords: nanocomposite, green synthesis, magnetic, silver, antimicrobial

Author did not supply full text of the paper/poster