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Vancomycin loaded super paramagnetic $MnFe_2O_4$ nanoparticles coated with PEGylated chitosan to enhance antibacterial activity

Akbar Esmaeili and Sepideh Ghobadian pour
Islamic Azad University, Iran

Background & Aim: Increasing prevalence of antibiotic-resistant and failed-treatment make more investigations to deal with these problems. Hence new therapeutic approaches for effective treatment are necessary. Ferrite superparamagnetic nanoparticles have potential antibacterial activity.

Methodology: In this study we prepared $MnFe_2O_4$ superparamagnetic nanoparticles as core by precipitation method and used chitosan crosslinked by glutaraldehyde as shell, then modified with PEG to increase stability of particles against RES.

Results: Chitosan coating not only improves the properties of ferrite nanoparticles but also has antibacterial activity. FT-IR confirmed this surface modification; XRD and SEM were developed to demonstrate particle size and characteristics of crystal structure of these nanoparticles. Final particle size was reported approximately 25 nm. Magnetic properties of nanoparticles were evaluated by VSM. Actual drug loading and releasing were examined by (UV-Vis) spectroscopy method.

Conclusions: We employed liquid broth dilution method to assessment antibacterial activity of nanoparticles against microorganisms. Significant antibacterial effect against gram negative bacteria was developed.

akbaresmaeili@yahoo.com