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## Preparation of antimicrobial gold-cobalt ferrite nanocomposites

In the present work nanocomposites based on antimicrobial –functionalized gold nanoparticles and magnetic –ferrite nanoparticles that are used as a carrier of gold nanoparticles were prepared. Magnetic component, the cobalt ferrite nanoparticles (CFO NPs) were synthesized via one-step solvothermal method with oleic acid as a surface capping agent. The resulting CFO NPs are hydrophobic and cannot be used for preparation of nanocomposite with bio-oriented application. In order to prepare hydrophilic nanoparticles ligand exchange was performed and different concentration of hydrocaffeic (HCA) acid was used. In the next step the CFO nanocomposites with functionalized gold were prepared by sonochemical synthesis method. As prepared samples were characterized by X-ray powder diffraction (XRD), transmission electron microscopy (TEM), thermogravimetric analysis (TGA), Fourier transform infrared spectroscopy (FT-IR) and vibrating sample magnetometry (VSM). The XRD patterns of samples show that all the diffraction maxima correspond to the cubic spinel structure. TEM analysis revealed the presence of sphere-like CFO NPs with similar diameter for all the samples ( $\langle D_{TEM} \rangle \sim 5\text{nm}$ ). The TEM analysis also revealed that the size of gold nanoparticles is influenced by HCA concentration. The FT-IR analysis confirms the presence of ligand on the surface of the nanoparticles, while magnetic measurements confirms the superparamagnetic behavior of CFO NPs. The antibacterial tests were also performed and the results shows that composites prepared with the lowest concentration of HCA were active against *E.coli*, *S. epidermidis* and *P. aeruginosa*.

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