Green synthesis and morphology evaluation of silver nanoparticles and preparation of magnetic silver nanoparticles for using in some multicomponent reactions

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present study, silver nanoparticles (AgNPs) and silver/ montmorillonite (Ag/MMT) with a spherical structure were synthesized through a simple, low-cost and eco-friendly pathway using aqueous extract of Lavandula stoechas L. Different extract volumes, silver nitrate (AgNO3) concentrations and reaction time were individually examined and results indicated that they played key roles in the formation of AgNPs. The synthesized AgNPs were characterized via UV-Vis, XRD, FE-SEM, EDX and FT-IR. The silver nanoparticles and silver/ montmorillonite were with an average size of 20.33 nm and 40 nm and spherical shape. Inaddition, AgNPs and Ag/MMT showed antibacterial properties against Escherichia coli and Staphylococcus aureus. Ag/MMT were prepared by water extract of the plant [Satureja hortensis (L)] as the reducing agent and MMT as interlamellar space for controlling the size of silver nanoparticles. The average sizes of nanocomposites were calculated to be 15.79 nm. Chloroacetic acid immobilized on chitosan (CS) coated iron oxide decorated by silver nanoparticles (Fe3O4@CS@Ag@ CH2COOH) was synthesized as a biocompatible magnetic material. The Fe3O4@CS@Ag@CH2COOH nanocomposite was characterized using FT-IR, XRD, SEM, EDS, and TGA instruments. The surface morphology and size of Fe3O4@CS@Ag@ CH2COOH nanocomposite were determined through SEM micrographs analysis. Moreover, magnetic characterization of the prepared nanocomposite was determined by VSM. The produced Fe3O4@CS@Ag and Fe3O4@CS@Ag@CH2COOH nanocomposites were screened for their antibacterial activity against gram-negative Escherichia coli and gram-positive Staphylococcus aureus. The results showed that the Fe3O4@CS@Ag and Fe3O4@CS@Ag@CH2COOH nanocomposites presented good

antibacterial performance toward gram-negative E. coli and gram-positive S. aureus. Furthermore, Fe3O4@CS@Ag@CH2COOH nanoparticles catalyzed one-pot synthesis of hexahydroquinoline-3-carboxamide derivatives by four-component reaction of arylaldehydes, dimedone 1,3- cyclo hexadione, acetoacetanilide and ammonium acetate in ethanol at 70 °C. In the

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