Abstract

Magnetic iron oxide nanoparticles have been proposed as one of the most popular and efficient drug carrying magnetic materials used in human treatment and diagnosis due to their non-toxicity, high stability and high magnetic responses. Magnetic iron oxide nanoparticles (MNP) were obtained by chemical co-precipitation of iron salts in the presence of ammonia. The prepared magnetic particles were modified with gallic acid to reduce aggregation of particles, maintain magnetic stability, and slowdown degrading process under physiological conditions. Magnetic iron oxide nanoparticles coated with gallic acid (MNPG) were obtained with small particle size ranging from 10 nm to 80 nm and retained magnetization properties. The magnetic nanoparticles were characterized by scanning electron microscope (SEM) coupled with an energy dispersive X-ray detector (EDX), Fourier transform infrared (FTIR), and powder X-ray diffraction (XRD). Surface functionalization of magnetic nanoparticles was evaluated *via* adsorption of protein bovine serum albumin (BSA) on nanoparticles. The highest adsorption of BSA was obtained from MNP as BSA adsorbed up to 70% within 30 min of incubation, while the adsorption of BSA by MNPG within 30 min of incubation was observed at 50% approximately and MNPG showed the lower BSA adsorption rate within 4 h of incubation. After 4 h of incubation, the result indicated similar adsorption profile of BSA by MNP and MNPG.