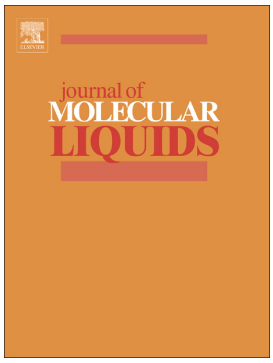

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Fabrication of magnetite nanoparticles modified with copper based metal organic framework for drug delivery system of letrozole

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ABSTRACT

In the present work, magnetite nanoparticles were synthesized and modified using metal organic framework (MOF) as the drug carrier for drug delivery of letrozole and the affecting parameters such as pH and contact time, were optimized. The maximum capacity of Fe_3O_4 @SiO_2-MOF for letrozole was determined. These new nanoparticles modified by carrier agent were characterized in details using Fourier transform infrared spectroscopy, vibration sample magnetometer, thermogravimetric analysis, field emission scanning electron microscopy, and X-ray diffraction patterns recorded with Siemens D5000 diffractometer k_α radiation over the range of $5°<2\theta<80°$. Particles' size of composite was in the range of 20 to 50 nm. These MOF based magnetite nanoparticles could adsorb up to 8.4 mg of letrozole per gram of nano-sorbent at optimum pH of 5. The equilibrium adsorption data of letrozole by grafted magnetite nano-sorbent were analyzed using Langmuir, Freundlich, and Temkin. Nearly, 44% of letrozole was released in simulated gastric fluid, pH 1.2, in 0.5 h and 80% in simulated intestinal fluid, pH 7.4, in 15 h. The synthesized particles with both magnetite characteristics and high porosity are excellent candidates for targeted drug delivery system.

Keywords

Surface modification, Drug delivery, Magnetic nano-particles, Metal organic framework, Isotherm study, Letrozole.

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