# Extension of the inhibitory effect of chloramphenicol on bacteria by incorporating it into $Fe_3O_4$ magnetic nanoparticles

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Abstract: Magnetite $Fe_3C_4$ nanoparticles were prepared by using a co-precipitation method, then functionalized by double layers of surfactants (core/oleic acid (OA) /sodium dodecyl sulfate (SDS)). For application as a drug carrier, the double-layer-coated magnetic nanoparticles were fully loaded with the antibiotic chloramphenicol (Cm) to investigate the effect of the drug release process on the bacteria Escherichia coli (E. coli). The water-soluble Cm and Cm-coated magnetic nanoparticles (Cm-NPs) (equivalent to 50 ?l of 5-200 ?g/ml Cm) were poured into small holes on agar plates spread with E. coli, after which the plates were incubated overnight. The diameters of the nonbacteria circles were shown to gain their maximal values after 14 h, then to gradually decrease in almost all samples. Nevertheless, the circles created by Cm-NPs were about 1.5 times larger than those for the control Cm. The speed of bacterial lawn re-grown in the case of the Cm-NPs was obviously slower than that of the controlled Cm. We conclude that the magnetic nanoparticles gradually release the antibiotic, thereby maintaining the stability and the effect of the antibiotic longer than that of the conventional water-soluble antibiotic.

Author Keywords: Antibiotic; Bacteria; Cm-coated magnetic nanoparticles; Inhibitory effect; Non-bacteria circle

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