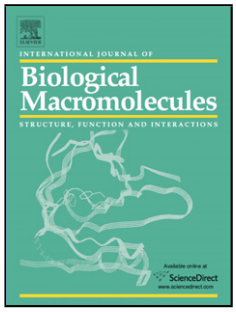

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Author: Mehdi Yadollahi Iman Gholamali Hassan Namazi Mohammad Aghazadeh

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Synthesis and characterization of antibacterial carboxymethylcellulose/ CuO bio-nanocomposite hydrogels

Mehdi Yadollahi[1], Iman Gholamali[1], Hassan Namazi [1, 2, *] Mohammad Aghazadeh [3]

[1] *Research Laboratory of Dendrimers and Nanopolymers, Faculty of Chemistry, University of Tabriz, P.O. Box 51666, Tabriz, Iran*

[2] *Research Center for Pharmaceutical Nanonotechnology, Tabriz University of Medical Science, Tabriz, Iran*

[3] *Departments of Microbiology, Faculty of Medicine, Tabriz University of Medical Science, Tabriz, Iran*

**Corresponding author. E-mail: namazi@tabrizu.ac.ir*

Abstract

In this study, carboxymethyl cellulose/ CuO nanocomposite hydrogels have been synthesized through the in situ formation of CuO nanoparticles within swollen carboxymethyl cellulose hydrogels. The aim of study was to investigate whether these hydrogels have the potential to be used in antibacterial applications. The formation of CuO nanoparticles in the hydrogels was confirmed using X-ray diffraction, scanning electron microscopy studies. In addition, swelling behavior of nanocomposite hydrogels was investigated in various pH values and salt solutions. Furthermore, the CuO nanocomposite hydrogels were tested for antibacterial activities. The antibacterial activity of the nanocomposite hydrogels was studied by inhibition zone method against E. coli and S. aureus. The nanocomposite hydrogels demonstrated excellent antibacterial effects. Therefore, the developed carboxymethyl cellulose/ CuO nanocomposite hydrogels can be used effectively for biomedical application.

Keywords: hydrogel, Copper oxide nanoparticle, antibacterial, carboxymethylcellulose