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

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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

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