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Preparation and physical properties of nano-cerium ion dopped carboxymethyl cellulose/alginate composite films

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Carboxymethyl cellulose and alginate are non-toxic, biocompatible, and biodegradable biopolymers and are easily obtained from natural sources. In our previous study, we reported that alginate films crosslinked with cerium ions gained antimicrobial properties [1]. In addition to the antibacterial properties of cerium ions, it was reported that cerium doped composites enhanced the osteoblastic cell response [2] and cerium (III) ions increased fibroblast proliferation [3]. Cerium (III) nitrate has been successfully used in clinics for burn treatment [4]. The addition of nanoparticles to polysaccharide films increase their mechanical strength and add them different qualities. In the present study, novel cerium nanoparticles doped and cerium ion crosslinked carboxymethyl cellulose/alginate composite films were prepared as potential wound dressing materials and their physical properties were revealed by Fourier Transformed Infrared Spectroscopy (FTIR), tensile testing, swelling and light transparency experiments, and thermogravimetric analysis (TGA).

Recent Publications

1. Kaygusuz H, Torlak E, Evingür GA, von Klitzing R, Erim FB (2017) Antimicrobial cerium ion-chitosan crosslinked alginate biopolymer films: A novel and potential wound dressing. International Journal of Biological Macromolecules 105:1161-1165.
2. Morais DS, Fernandes S, Gomes PS, Sampaio P, Ferraz MP et. al (2015) Novel cerium doped glass-reinforced hydroxyapatite with antibacterial and osteoconductive properties for bone tissue regeneration. Biomedical Materials 10:055008.
3. Schmidlin PR, Tchouboukov A, Wegehaupt FJ, Weber FE (2012) Effect of cerium chloride application on fibroblast and osteoblast proliferation and differentiation. Archives of Oral Biology 57:892-897.
4. Garner JP, Heppell PS (2009) Cerium nitrate in the management of burns. Burns 31: 539-547.

Biography

Nilay Kahya is a Ph.D. candidate working under the guidance of Prof. F. Bedia Erim Berker. She completed her MSc degree in Chemistry at ITU Graduate School of Science Engineering and Technology in 2016. Research fields of her are mainly related to the applications of biopolymers in drug delivery systems and adsorption fields. She has three publications in Science Citation Index Expanded journals..

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