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B. Kaczmarek, A. Sionkowska, A.M. Osyczka

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Physicochemical properties of scaffolds based on mixtures of chitosan, collagen and glycosaminoglycans with nano-hydroxyapatite addition

B. Kaczmarek^{1*}, A. Sionkowska¹, A.M. Osyczka²

¹Faculty of Chemistry, Department of Chemistry of Biomaterials and Cosmetics, Nicolaus Copernicus University in Torun, Poland

²Department of Cell Biology and Imaging, Institute of Zoology and Biomedical Research, Faculty of Biology, Jagiellonian University in Kraków, Poland

* beatakaczmarek8@gmail.com

Abstract

Scaffolds based on chitosan (CTS), collagen (Coll), and glycosaminoglycans (GAGs) mixtures with nano-hydroxyapatite (HAp) were obtained with the use of the freeze-drying method. They were characterized by different analyses, e.g. SEM images and mechanical testing. Moreover, swelling behavior and biocompatibility tests were carried out.

The results showed that the scaffolds based on the blends of chitosan, collagen, and glycosaminoglycans with hydroxyapatite are stable in aqueous environment. SEM images allowed the observation of a porous scaffolds structure with the pores size ~250 μm. The main purpose of the research was to detect the influence of hydroxyapatite addition on the glycosaminoglycans-enriched scaffolds properties. The physicochemical properties as swelling and mechanical parameters were tested. The scaffolds structure was observed by SEM. Moreover, the preliminary assessment of scaffolds suitability for cell growth, human osteosarcoma cell line SaOS-2 was used. The obtained results indicate that the addition of hydroxyapatite improves the mechanical parameters and cells biological response of the studied materials.

Key words: chitosan, collagen, glycosaminoglycans, nano-hydroxyapatite, composite materials

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