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Molecularly imprinted polymer as drug delivery carrier in alginate dressing

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Abstract

Vancomycin was used as a template to obtain a molecularly imprinted polymer. The polymer imprinted with the antibiotic was encapsulated in alginate matrix to obtain a potential antibacterial wound dressing. The amount of vancomycin released in the first 24 hours after application of the double barrier system decreased with respect to that released from the polymer without the alginate from 87% to 47%. The antibiotic release process followed diffusion and swelling controlled mechanism (non-Fickian transport). The highest correlation coefficients were obtained for Higuchi kinetic model typical of polymer matrices or some transdermal systems. The system studied with vancomycin demonstrated antibacterial activity towards the bacteria strains selected. The diameters of inhibition zone were greater than for the reference samples. The system without the antibiotic had no effect on the growth of bacteria. The material studied has the properties of a dressing for a potential use in a long term wound healing.

Keywords: polymers; biomaterials; drug delivery carriers; wound dressing

1. Introduction

Modern dressings are often used as drug delivery carriers. They should ensure proper environment near the wound to facilitate the process of healing. Alginate is common drug carrier in modern dressings. The alginate-based dressings can be used for healing of different wounds [1]. An

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