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# Evaluation of κ -Carrageenan Hydrogel Efficiency in Wound-Healing

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**Abstract :** The abuse of antibiotics, such as tetracycline (TC), is a great global threat to people and the use of topical antibiotics is a promising tact that can help to solve this problem. Antibiotic therapy is often appropriate and necessary for acute wound infections, while topical tetracycline can be highly efficient in improving the wound healing process in diabetics. Due to the advantages of drug-loaded hydrogels as wound dressing, such as ease of handling, high moisture resistance, excellent biocompatibility, and the ability to activate immune cells to speed wound healing, it was found as an ideal wound treatment. In this work, the tetracycline-loaded hydrogels combining agar (AG) and κ-carrageenan (k-CAR) as polymer materials were prepared, in which span60 surfactant was introduced inside as a drug carrier. The Field Emission Scanning Electron Microscopes (FESEM) and Fourier-transform infrared spectroscopy (FTIR) techniques were employed to provide detailed information on the morphology, composition, and structure of fabricated drug-loaded hydrogels and their mechanical properties, and hydrogel permeability to water vapor was investigated as well. Two types of gram-negative and gram-positive bacteria were used to explore the antibacterial properties of prepared tetracycline-contained hydrogels. Their swelling and drug release behavior was studied using the changing factors such as the ratio of polysaccharides (MAG/MCAR), the span60 surfactant concentration, potassium chloride (KCl) concentration and different release media (deionized water (DW), phosphate-buffered saline (PBS), and simulated wound fluid (SWF)) at different times. Finally, the kinetic behavior of hydrogel swelling was studied. Also, the experimental data of TC release to DW, PBS, and SWF using various mathematical models such as Higuchi, Korsmeyer-Peppas, zero-order, and first-order in the linear and nonlinear modes were evaluated.

**Keywords :** drug release, hydrogel, tetracycline, wound healing
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