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Drug Release Profile in Core-Shell Nanofibrous Structures: A Study on Peppas Equation and Artificial Neural Network Modeling

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Abstract

Release profile of drug constituent encapsulated in electrospun core-shell nanofibrous mats was modeled by Peppas equation and artificial neural network. Core-shell fibers were fabricated by co-axial electrospinning process using tetracycline hydrochloride (TCH) as the core and poly(L-lactide-co-glycolide) (PLGA) or polycaprolactone (PCL) as the shell materials. The density and hydrophilicity of the shell polymers, feed rates and concentrations of core and shell phases, the contribution of TCH in core material and electrical field were the parameters fed to the perceptron network to predict Peppas constants in order to derive release pattern. This study demonstrated the viability of the prediction tool in determining drug release profile of electrospun core-shell nanofibrous scaffolds.

Keywords: Core-shell Nanofibers, Release Profile, Peppas Equation, Artificial Neural Network.

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