Abstract

Both the neat and the gentamicin sulfate (GS)-loaded silk fibroin (SF)/gelatin (Gel) blend scaffolds were fabricated by freeze drying method. The SF/Gel scaffolds were prepared by various blending ratio of SF and Gel solutions (i.e., 0/100, 30/70, 50/50, 70/30 and 100/0). 0.005 $mg \cdot mL^{-1}$ of GS powder was then added to prepare the GS-loaded SF/Gel blend scaffolds. These scaffolds were characterized for their morphology, pore size, mechanical property, water swelling and weight loss. The release characteristics of GS from the GS-loaded SF/Gel blend scaffolds were carried out in phosphate buffer solution. The antibacterial activity and the indirect cytotoxicity of these scaffolds were also investigated. From the results, the interconnected porous structure of these scaffolds was obtained. The pore size of the neat and the GS-loaded SF/Gel blend scaffolds ranged between 60 and 138 μm. Increasing SF content and addition of GS in scaffolds caused the compressive modulus of the scaffolds to decrease. Moreover, the water swelling and weight loss behaviors of these scaffolds increased with increasing submersion time. The cumulative amount of GS released from the GS-loaded SF/Gel blend scaffolds decreased with an increase of SF content in scaffolds. All scaffolds showed high activity against the growth of *S. aureus*, *S. epidermidis*, *M. luteus*, *B. cereus*, and *P. aeruginosa*. Lastly, all the GS-loaded SF/Gel blend scaffolds were proven non-toxic to NHDF cells except for the GS-loaded SF/Gel blend scaffolds at blending ratio of 100/0.

Key words: Silk Fibroin, Gelatin, Scaffolds, Gentamicin Sulfate, Wound Dressings