

عنوان مقاله:

Various parameters in the preparation of chitosan/polyethylene oxide electrospun nanofibers containing Aloe vera extract for medical applications

محل انتشار:

مجله علوم نانو، دوره 7، شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 8

نویسندگان:

Mohammad Nikbakht - *Department of Medical Nanotechnology, School of Advanced Technology in Medicine, Tehran University of Medical Sciences, Tehran, Iran*

Majid Salehi - *Department of Tissue Engineering, School of Medicine, Shahrood University of Medical Sciences, Shahrood, Iran*

Seyed Mahdi Rezaya - *Department of Medical Nanotechnology, School of Advanced Technology in Medicine, Tehran University of Medical Sciences, Tehran, Iran*

Reza Faridi Majidi - *Department of Medical Nanotechnology, School of Advanced Technology in Medicine, Tehran University of Medical Sciences, Tehran, Iran*

خلاصه مقاله:

Objective(s): The present study aimed to fabricate chitosan/polyethylene oxide (CS/PEO) electrospun nanofibers loaded with Aloe vera extract for biomedical applications. The polymer-to-extract ratio and electrospinning parameters (applied voltage and nozzle-to-collector distance) were evaluated in order to optimize the process of nanofiber fabrication. **Materials and Methods:** The characterizations were performed using scanning electron microscopy (SEM), ImageJ software, attenuated total reflectance Fourier-transform infrared spectroscopy (ATR-FTIR), tensile strength test, and UV-Vis spectroscopy. **Results:** The obtained results indicated that the fabrication of nanofibers from pure Aloe vera extract was unsuccessful, and reducing the extract concentration from 100% to 92% resulted in the formation of the nanofibers. Moreover, further reduction in the extract from 92% to 50% led to the production of fine nanofibers (mean diameters: 204 ± 42 and 398 ± 51 nm, respectively). Therefore, it was concluded that the reduced concentration of the herbal extract increased the diameters of the prepared nanofibers. In addition, the results of the optimization process indicated a direct correlation between the applied voltage and nanofiber diameters, as well as an inverse correlation between the nozzle-to-collector distance and nanofiber diameters. The FTIR spectroscopy also confirmed the presence of CS, PEO, and Aloe vera in the final prepared scaffold. The release measurement revealed a burst effect within the first five hours, followed by a sustain release within 30 hours. Moreover, the biocompatibility assay confirmed the proliferative potential of Aloe vera within seven days. **Conclusion:** According to the results, a nanofibrous scaffold composed of CS and PEO could be fabricated as the carrier of Aloe vera extract, which is a suitable platform for biomedical applications.

کلمات کلیدی:

Aloe vera, Chitosan, Electrospinning, Nanofibers, Polyethylene oxide

