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# Fabrication of Electrospun Microbial Siderophore-Based Nanofibers: A Wound Dressing Material to Inhibit the Wound Biofilm Formation

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**Abstract :** Nanofibers will leave no field untouched by its scientific innovations; the medical field is no exception. Electrospinning has proven to be an excellent method for the synthesis of nanofibers which, have attracted the interest for many biomedical applications. The formation of biofilms in wounds often leads to chronic infections that are difficult to treat with antibiotics. In order to minimize the biofilms and enhance the wound healing, preparation of potential nanofibers was focused. In this study, siderophore incorporated nanofibers were electrospun using biocompatible polymers onto the collagen scaffold and were fabricated into a biomaterial suitable for the inhibition of biofilm formation. The purified microbial siderophore was blended with Poly-L-lactide (PLLA) and poly (ethylene oxide) PEO in a suitable solvent. Fabrication of siderophore blended nanofibers onto the collagen surface was done using standard protocols. The fabricated scaffold was subjected to physical-chemical characterization. The results indicated that the fabrication processing parameters of nanofiberous scaffold was found to possess the characteristics expected of the potential scaffold with nanoscale morphology and microscale arrangement. The influence of Poly-L-lactide (PLLA) and poly (ethylene oxide) PEO solution concentration, applied voltage, tip-to-collector distance, feeding rate, and collector speed were studied. The optimal parameters such as the ratio of Poly-L-lactide (PLLA) and poly (ethylene oxide) PEO concentration, applied voltage, tip-to-collector distance, feeding rate, collector speed were finalized based on the trial and error experiments. The fibers were found to have a uniform diameter with an aligned morphology. The overall study suggests that the prepared siderophore entrapped nanofibers could be used as a potent tool for wound dressing material for inhibition of biofilm formation.

**Keywords :** biofilms, electrospinning, nano-fibers, siderophore, tissue engineering scaffold
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