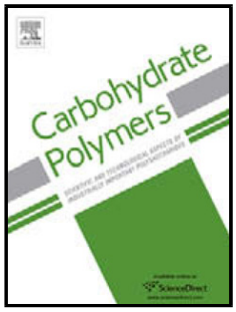

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High-throughput and high-yield fabrication of uniaxially-aligned chitosan-based nanofibers by centrifugal electrospinning

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Highlights ►

► We present a high-yield method for producing aligned chitosan-based nanofibers. ► Our HTP-CES shows superior fiber characteristics over traditional electrospinning. ► Bead-less fibers were produced despite spinneret and compositional variations. ► Our approach allows controlled nanofiber diameters while maintaining alignment. ► A concave correlation between needle diameter and fiber diameter was identified. ► Our method can be scaled up for production of tunable aligned nanofibers. ► ►

ABSTRACT

The inability to produce large quantities of nanofibers has been a primary obstacle in advancement and commercialization of electrospinning technologies, especially when aligned nanofibers are desired. Here, we present a high-throughput centrifugal electrospinning (HTP-CES) system capable of producing a large number of highly-aligned nanofiber samples with high-yield and tunable diameters. The versatility of the design was revealed when bead-less nanofibers were produced from copolymer chitosan/polycaprolactone (C-PCL) solutions despite variations in polymer blend composition or spinneret needle gauge. Compared to conventional electrospinning techniques, fibers spun with the HTP-CES not only exhibited superior alignment,