

# **Electrospun chitosan-based nanocomposite mats reinforced with chitin nanocrystals for wound dressing**

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## **Abstract**

The aim of this study was to develop electrospun chitosan/polyethylene oxide-based randomly oriented fiber mats reinforced with chitin nanocrystals (ChNC) for wound dressing. Microscopy studies showed porous mats of smooth and beadless fibers with diameters between 223 and 966 nm. The addition of chitin nanocrystals as well as crosslinking had a positive impact on the mechanical properties of the mats, and the crosslinked nanocomposite mats with a tensile strength of 64.9 MPa and modulus of 10.2 GPa were considered the best candidate for wound dressing application. The high surface area of the mats ( $35 \text{ m}^2 \text{ g}^{-1}$ ) was also considered beneficial for wound healing. The water vapor transmission rate of the prepared mats was between 1290 and 1548  $\text{g m}^{-2} \text{ day}^{-1}$ , and was in the range for injured skin or wounds. The electrospun fiber mats showed compatibility toward adipose derived stem cells, further confirming their potential use as wound dressing materials.