**ELECTROSPUN NANOFIBERS FROM DURIAN RIND-DERIVED NANOCELLULOSE: INFLUENCE OF TWEEN 20 AND TWEEN 80 ON MORPHOLOGY AND STRUCTURE FOR LIVESTOCK SEMEN PRESERVATION**

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Abstract

This study explores the utilization of nanocellulose derived from durian rind as a reinforcing agent in electrospun nanofibers intended for potential use in livestock semen preservation. Nanocellulose was extracted through alkaline treatment followed by acid hydrolysis and incorporated into polyvinyl alcohol (PVA) solutions. Two surfactants, Tween 20 and Tween 80, were investigated to assess their influence on nanocellulose dispersion and fiber morphology during electrospinning. The electrospun nanofibers were characterized using Field Emission Scanning Electron Microscopy (FESEM), Fourier-Transform Infrared Spectroscopy (FTIR), and X-ray Diffraction (XRD). FESEM analysis showed that fibers produced with Tween 80 had more uniform diameters and smoother morphologies compared to those with Tween 20, indicating better nanocellulose dispersion and solution stability. FTIR spectra confirmed the presence of characteristic cellulose and PVA functional groups, with evidence of hydrogen bonding interactions between the matrix and nanocellulose. XRD analysis revealed that nanofibers containing Tween 80 exhibited higher crystallinity, suggesting enhanced molecular alignment and structural integrity. The improved morphology and crystallinity of fibers with Tween 80 imply better physical stability and potential barrier properties, which are desirable for preservation applications. This research demonstrates the feasibility of converting agricultural waste into high-value nanomaterials and highlights the importance of surfactant selection in tailoring electrospun fiber properties. The resulting nanocellulose-based electrospun membranes show promise as a novel, biocompatible material for livestock semen preservation, offering a sustainable alternative to conventional synthetic supports.

Keywords: nanocellulose, durian rind, semen preservation, surfactant