

SYNTHESIS OF CELLULOSE BASED SOLUTION TO FABRICATE NANOFIBERS BY ELECTROSPINNING TECHNIQUE

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This study reports on the synthesis of cellulose-based solution suitable for electrospinning. Cellulose is a biodegradable and renewable resource with excellent mechanical properties, making it an attractive material for nanofiber production. In this study, cellulose was extracted from cotton wool using a simple, cost-effective method. The extraction process involved the alkaline peroxide pretreatment of cotton wool with a mixture of sodium hydroxide and hydrogen peroxide at a specific temperature and time. The extracted cellulose was then characterized using Fourier transform infrared spectroscopy (FTIR) to confirm the removal of lignin and hemicellulose. The FTIR analysis indicated the presence of cellulose and removal of functional groups of lignin and hemicellulose. The extracted cellulose was then chemically modified using acetic anhydride and acetic acid under different reaction conditions by going through the processes of activation, acetylation, and hydrolysis respectively. The resultant cellulose acetate sample was centrifuged to sediment at a defined rpm value and time, and then the resultant cellulose acetate was dissolved in a Acetone/DMF solvent mixture at a proper ratio to prepare a precursor solution suitable for electrospinning, offering opportunities for the fabrication of nanofibers.

Keywords: Cellulose, Cellulose acetate, Hydrolysis, Electrospinning, Nanofibers