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**Isolation and characterization of cellulose nanocrystals from cotton balls
by using sulfuric acid hydrolysis**

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Cellulose nanocrystal (CNC) is a nanoscale material isolated by removing the amorphous regions in cellulose fibres by employing the acid hydrolysis method. In this study, CNCs from the cotton balls were isolated by acid hydrolysis using sulfuric acid. The cotton balls are made from 100% premium pre-treated and high-quality cotton fibres. The sulfuric acid hydrolysis process was performed with 64% (w/w) sulfuric acid and combined using a liquor ratio of 1:20 with cotton fibres while being subjected to strong magnetic stirring, which was carried out at 50°C for 60 minutes. The CNCs have been characterized by Transmission Electron Microscopy (TEM) analysis, Fourier Transform Infrared (FTIR) spectroscopy analysis and X-ray Diffraction (XRD) analysis. The isolated CNCs have needle-shaped particles with a 6.35 nm average diameter and a length of 108.8 nm on average. The FTIR spectrum showed the functional groups of the isolated CNCs from cotton balls. The crystalline configuration of the cellulose nanocrystal can be seen in the ensuing XRD diffraction pattern.

Keywords: Acid hydrolysis, Cellulose nanocrystals, Cotton balls, Cotton fibres, Sulfuric acid

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