

# Graduate Student Research Seminar

Fall 2024

## Obtaining Cellulose Nanocrystals via Acid Hydrolysis of Bacterial Cellulose

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**Monday, October 7<sup>th</sup>**

**3:00 pm (EST) – 132 Fluor Daniel Building**



### Abstract

Cellulose nanocrystals (CNCs), derived from bacterial nanocellulose (BC) through acid hydrolysis, exhibit remarkable properties that make them suitable for a range of advanced applications. This study presents the extraction and characterization of cellulose nanocrystals (CNCs) from bacterial cellulose (BC) using acid hydrolysis. The structural attributes of CNCs, such as aspect ratio and crystallinity, were evaluated through various characterization techniques, which are crucial for determining their performance in advanced applications. Scanning Electron Microscopy (SEM) was employed to analyze the nanocrystals, providing precise measurements of particle size and fibril structure. Further structural insights were gained by measuring the crystallinity and aspect ratio of CNCs. Energy Dispersive X-ray Spectroscopy (EDS), X-ray Diffraction were utilized to determine the elemental and phase composition of the CNCs. For this presentation, we focus on developed protocol to obtain CNC and emphasize on the influence of processing parameter (hydrolysis duration) on CNC size distribution and colloidal stability.

This work establishes a framework for converting CNCs into carbon materials through carbonization, with the structural characteristics of CNCs playing a pivotal role in their final properties.



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