



Synthesis and Characterization of Nanocellulose fibers from Ragi Stalk by Acid Hydrolysis

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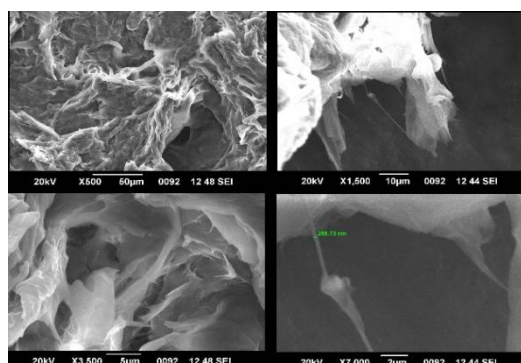
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ABSTRACT

The present research emphasizes lignocellulosic material such as Ragi Stalk or Eleusine Coracana was converted into cellulose by pretreatment with NaOH and NaClO₂ Solution. In addition, the cellulose obtained was transformed into Nanocellulose (NC) using acid hydrolysis, ultrasonication, and centrifugation. XRD (X-ray diffraction), SEM (Scanning Electron Microscopy), FTIR (Fourier transform infrared spectroscopy), and TGA/DTA (Thermogravimetry and Differential Thermal Analysis) are used to characterize the nanocellulose that has been synthesized. According to the FTIR findings, the chemical structure of cellulose synthesized from these agricultural biomasses was not affected by the synthetic approach. According to SEM studies, the synthetic procedure employed affects the morphology/surface topology of synthesized nanocellulose. XRD studies reveal the crystalline and semi-crystalline nature of the synthesized nanocellulose. TEM monographs illustrate the surface structure and size of the synthesized nanocellulose ranging from 9 to 14 nm. The thermal stability of nanocellulose is revealed by TGA/DTA studies and the obtained nanocellulose shows superior thermal stability up to 342.4°C.

Graphical Abstract:



SEM Image of AH-RSNC.

Keywords: Ragi Stalk, Acid hydrolysis, Lignin, Cellulose, Nanocellulose.
