

# Accepted Manuscript

Isolation of nanocrystalline cellulose from rice straw and preparation of its biocomposites with chitosan: Physicochemical characterization and evaluation of interfacial compatibility

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PII: S0266-3538(17)31759-1

DOI: [10.1016/j.compscitech.2017.10.022](https://doi.org/10.1016/j.compscitech.2017.10.022)

Reference: CSTE 6947

To appear in: *Composites Science and Technology*

Received Date: 19 July 2017

Revised Date: 25 October 2017

Accepted Date: 26 October 2017

Please cite this article as: Xu K, Liu C, Kang K, Zheng Z, Wang S, Tang Z, Yang W, Isolation of nanocrystalline cellulose from rice straw and preparation of its biocomposites with chitosan: Physicochemical characterization and evaluation of interfacial compatibility, *Composites Science and Technology* (2017), doi: [10.1016/j.compscitech.2017.10.022](https://doi.org/10.1016/j.compscitech.2017.10.022).

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1 **Isolation of Nanocrystalline Cellulose from Rice Straw and Preparation of Its Biocomposites**  
2 **with Chitosan: Physicochemical Characterization and Evaluation of Interfacial Compatibility**

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16 **ABSTRACT**

17 In order to develop high value-added rice straw residue biocomposites, nanocrystalline  
18 cellulose (NCC) from rice straw and chitosan (CS) were used as two main raw materials, the  
19 CS/NCC biocomposites were prepared by an acid hydrolysis-ultrasonic treatment and blending  
20 casting. The physicochemical properties and evaluation of interfacial compatibility on CS/NCC  
21 biocomposites were characterized by TEM, UV, FTIR, SEM, XRD, TG, DSC, electron mechanical  
22 instrument, zeta potential analyzer and water absorption testing. The results reveal that a uniform  
23 rod-like or filamentary structure of NCC from rice straw, with the width distribution concentrated  
24 on the range of 10-15 nm and several hundred nanometers in length, can be effectively obtained by  
25 a relatively high ultrasonic power treatment with the same acid hydrolysis conditions. The superior  
26 interfacial compatibility of CS/NCC biocomposites with excellent tensile strength can be achieved

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