

## Accepted Manuscript

Effects of wheat gluten protein on the properties of starch based sustainable wood polymer nanocomposites

Prasanta Baishya, Deepankar Nath, Pakiza Begum, Ramesh C. Deka, Tarun K. Maji

PII: S0014-3057(17)31006-6

DOI: <https://doi.org/10.1016/j.eurpolymj.2017.09.041>

Reference: EPJ 8092

To appear in: *European Polymer Journal*

Received Date: 5 June 2017

Revised Date: 22 September 2017

Accepted Date: 27 September 2017

Please cite this article as: Baishya, P., Nath, D., Begum, P., Deka, R.C., Maji, T.K., Effects of wheat gluten protein on the properties of starch based sustainable wood polymer nanocomposites, *European Polymer Journal* (2017), doi: <https://doi.org/10.1016/j.eurpolymj.2017.09.041>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## Effects of wheat gluten protein on the properties of starch based sustainable wood polymer nanocomposites

Prasanta Baishya,<sup>a</sup> Deepankar Nath,<sup>a</sup> Pakiza Begum,<sup>a</sup> Ramesh C. Deka,<sup>a</sup> and Tarun K. Maji\*

Department of Chemical Sciences, Tezpur University, Tezpur, 784028, India

Corresponding Author: E-mail: tkm@tezu.ernet.in; Tel.: +91 3712 267007; ext. 5053; Fax: +91 3712 267005

### ABSTRACT

Wood polymer nanocomposites (WPNC) having attractive mechanical and water resistance properties were prepared through a completely green route using a mixture of wheat gluten protein and starch. Starch was blended with wheat gluten protein at different ratios (70/30 and 50/50) and then grafted with methylmethacrylate (MMA). The effect of wheat gluten protein on various properties of the wood composites was investigated. Citric acid was employed to cross-link the wood flour with methylmethacrylate grafted starch-gluten (MMA-g-SG). The most advantageous part of the reaction was the use of water as the reaction media in the entire process to prepare the green composites. To improve the further properties of the composites, different percentage of N-cetyl-N, N, N-trimethyl ammonium bromide (CTAB) modified TiO<sub>2</sub> nanoparticles were incorporated in the composite system and their effects were studied. The interaction among MMA-g-SG, cross-linker, soft wood flour and nanofiller were investigated by FTIR study. The probable interactions among MMA-g-SG, soft wood, modified TiO<sub>2</sub> and citric acid in the formation of wood starch gluten nanocomposites (WSGNC) were established. The density functional theory (DFT) calculations were also used to study the interactions of the nanocomposite. The morphology of the wood starch gluten nanocomposites (WSGNC) was examined by SEM and TEM study. Composite prepared from 50/50 ratio of starch and gluten

Download English Version:

<https://daneshyari.com/en/article/7803872>

Download Persian Version:

<https://daneshyari.com/article/7803872>

[Daneshyari.com](https://daneshyari.com)