

Accepted Manuscript

The effects of metal elements on ramie fiber oxidation degumming and the potential of using spherical bacterial cellulose for metal removal

Chaoran Meng, Na Zhong, Jinguang Hu, Chongwen Yu, Jack N. Saddler



PII: S0959-6526(18)32786-0

DOI: [10.1016/j.jclepro.2018.09.072](https://doi.org/10.1016/j.jclepro.2018.09.072)

Reference: JCLP 14207

To appear in: *Journal of Cleaner Production*

Received Date: 24 May 2018

Revised Date: 6 September 2018

Accepted Date: 8 September 2018

Please cite this article as: Meng C, Zhong N, Hu J, Yu C, Saddler JN, The effects of metal elements on ramie fiber oxidation degumming and the potential of using spherical bacterial cellulose for metal removal, *Journal of Cleaner Production* (2018), doi: <https://doi.org/10.1016/j.jclepro.2018.09.072>.

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.

1 **The effects of metal elements on ramie fiber oxidation degumming and the potential of**
2 **using spherical bacterial cellulose for metal removal**

3
4 Chaoran Meng^{a,b,c}, Na Zhong^a, Jinguang Hu^{d*}, Chongwen Yu^{b,c}, and Jack N. Saddler^a

5 ^a Forest Products Biotechnology and Bioenergy Group, Department of Wood Science, Faculty
6 of Forestry, The University of British Columbia, 2424 Main Mall, Vancouver BC, Canada.

7 ^b College of Textiles, Donghua University, Shanghai, 201620, P.R. China

8 ^c Key Laboratory of Textile Science & Technology, Ministry of Education, Shanghai, 201620,
9 P.R. China

10 ^d Department of Chemical and Petroleum Engineering, University of Calgary, 2500 University
11 Dr. NW, Calgary, AB T2N 1N4, Canada

12
13
14 * Corresponding author:

15 Jinguang Hu

16 jinguang.hu@ucalgary.ca

17
18 **Abstract:** Current production of ramie fiber (the “queen” of nature fiber) requires the
19 oxidation degumming process which suffers from the presence of metal elements due to the
20 well-known Fenton reaction. In this study, the metal species/contents in current major
21 degumming systems along Yangtze valley and their effects on the final ramie fiber properties
22 (e.g. degree of polymerization (DP), tenacity, elongation) were assessed. The potential of
23 employing our recently developed spherical bacterial cellulose (SBC) as recyclable metal
24 adsorbent was also evaluated. Results showed that excessive amounts of metal elements (e.g.
25 Ca, Mg, Fe, Mn, Cu, Pb) existed in the degumming systems which were detrimental to the
26 final fiber properties. The application of 2,2,6,6-tetramethylpy-peridine-1-oxy radical
27 (TEMPO)-oxidized spherical bacterial cellulose efficiently removed these metal elements
28 and improved the degree of polymerization and tenacity of ramie fiber products. Our results
29 could also open the door for the potential application of spherical bacterial cellulose as
30 super absorbance in different types of waste water treatment.

Download English Version:

<https://daneshyari.com/en/article/11019766>

Download Persian Version:

<https://daneshyari.com/article/11019766>

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