

Accepted Manuscript

Title: Enzymatic pulp upgrade for producing high-value cellulose out of a Kraft paper pulp

Authors: Christian Hutterer, Gerhard Kliba, Manuel Punz, Karin Fackler, Antje Potthast



PII: S0141-0229(17)30066-2
DOI: <http://dx.doi.org/doi:10.1016/j.enzmictec.2017.03.014>
Reference: EMT 9064

To appear in: *Enzyme and Microbial Technology*

Received date: 13-3-2017
Accepted date: 31-3-2017

Please cite this article as: Hutterer Christian, Kliba Gerhard, Punz Manuel, Fackler Karin, Potthast Antje. Enzymatic pulp upgrade for producing high-value cellulose out of a Kraft paper pulp. *Enzyme and Microbial Technology* <http://dx.doi.org/10.1016/j.enzmictec.2017.03.014>

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.

Enzymatic pulp upgrade for producing high-value cellulose out of a Kraft paper pulp

Christian Hutterer¹, Gerhard Kliba², Manuel Punz², Karin Fackler², Antje Potthast^{3*}

¹Kompetenzzentrum Holz GmbH, Altenberger Str. 69, A-4040 Linz, Austria

²Lenzing AG, Werkstraße 1, A-4860 Lenzing, Austria

³Universität für Bodenkultur Wien, Department für Chemie, A-1190 Wien, Austria

* antje.potthast@boku.ac.at

Highlights

- Combined paper pulp upgrade by alkali and enzyme usage
- Impact of pulp fiber morphology on enzyme activity
- Simultaneous usage of cellulase and xylanase preparations

Abstract

The high-yield separation of polymeric parts from wood-derived lignocellulosic material is indispensable in biorefinery concepts. For the separation of cellulose and xylan from hardwood paper pulps to obtain pulps of high cellulose contents, simple alkaline extractions were found to be the most suitable technology, although having certain limitations. These are embodied by residual alkali resistant xylan incorporated in the pulp matrix. Further purification in order to produce pure cellulose with a low uniformity could be achieved selectively degrading residual xylan and depolymerizing the cellulose macromolecules by xylanase and cellulase. The latter help to adjust cellulose chain lengths for certain dissolving pulp grades while reducing the demand for ozone in subsequent TCF bleaching. Experiments applying different commercially available enzyme preparations revealed the dependency of xylanase performance on the residual xylan content in pulps being stimulated by additional cellulase usage. The action of the latter strongly depends on the cellulose allomorphy confirming the impact of the pulp morphology. Hence, the combined application of both types of enzymes offers a high potential for upgrading pulps in order to produce a pure and high-value cellulose product.

Download English Version:

<https://daneshyari.com/en/article/4752761>

Download Persian Version:

<https://daneshyari.com/article/4752761>

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