

Accepted Manuscript

Title: Hyaluronan Hydrogels Modified by Glycinated Kraft Lignin: Morphology, Swelling, Viscoelastic Properties and Biocompatibility

Authors: Lenka Musilová, Aleš Mráček, Adriana Kovalcik, Petr Smolka, Antonín Minařík, Petr Humpolíček, Robert Vícha, Petr Ponížil



PII: S0144-8617(17)31191-8
DOI: <https://doi.org/10.1016/j.carbpol.2017.10.048>
Reference: CARP 12897

To appear in:

Received date: 11-8-2017
Revised date: 6-9-2017
Accepted date: 11-10-2017

Please cite this article as: Musilová, Lenka., Mráček, Aleš., Kovalcik, Adriana., Smolka, Petr., Minařík, Antonín., Humpolíček, Petr., Vícha, Robert., & Ponížil, Petr., Hyaluronan Hydrogels Modified by Glycinated Kraft Lignin: Morphology, Swelling, Viscoelastic Properties and Biocompatibility. *Carbohydrate Polymers* <https://doi.org/10.1016/j.carbpol.2017.10.048>

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.

Hyaluronan Hydrogels Modified by Glycinated Kraft Lignin: Morphology, Swelling, Viscoelastic Properties and Biocompatibility

Lenka Musilová^{a,d}, Aleš Mráček^{a,d,*}, Adriana Kovalcik^{b,c}, Petr Smolka^{a,d}, Antonín Minařík^{a,d}, Petr Humpolíček^a, Robert Vícha^e, Petr Ponižil^{a,d}

^aCentre of Polymer Systems, Tomas Bata University in Zlín, třída Tomáše Bati 5678, 760 01 Zlín, Czech Republic

^bInstitute for Chemistry and Technology of Materials, Graz University of Technology, Stremayrgasse 9, 8010 Graz, Austria

^cDepartment of Food Chemistry and Biotechnology, Faculty of Chemistry, Brno University of Technology, Purkynova 118, 612 00 Brno, Czech Republic

^dDepartment of Physics and Materials Engineering, Faculty of Technology, Tomas Bata University in Zlín, nám. T.G. Masaryka 275, 760 01 Zlín, Czech Republic

^eDepartment of Chemistry, Faculty of Technology, Tomas Bata University in Zlín, nám. T.G. Masaryka 275, 760 01 Zlín, Czech Republic

Highlights

Hydrogels based on hyaluronan-lignin

Creep/creep compliance and recovery, swelling

ABSTRACT

Effects of the addition of water soluble glycinated Kraft lignin (WS/KL) on the mechanical stability and biocompatibility of hyaluronan (NaHy) hydrogels were evaluated in this work. Water soluble lignin was obtained by the modification of Kraft lignin via a Mannich reaction. It was found that WS/KL is highly compatible with hyaluronan due to its improved water solubility, which favours its use in designing new advanced composite hydrogels. The effects of the concentration of WS/KL on morphological, swelling and creep/recovery behaviours of hyaluronan hydrogels were investigated. It was detected that the creep resistance and creep recovery of NaHy hydrogels was improved by the incorporation of up to 3 % (w/w) of WS/KL. In contrast, the swelling capacity of hydrogels was decreased. The cytotoxicity tests proved that glycinated KL lignin limits the viability of cells only slightly, and the final hyaluronan/lignin hydrogels were non-toxic materials.

Keywords: Hyaluronan, Lignin, Hydrogel, Swelling Behaviour, Mechanical Properties, Biocompatibility of hydrogels

*Corresponding authors: mracek@ft.utb.cz (A. Mráček), adriana.kovalcik@gmail.com (A.Kovalcik)

Download English Version:

<https://daneshyari.com/en/article/7784546>

Download Persian Version:

<https://daneshyari.com/article/7784546>

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