

Accepted Manuscript

Title: Effect of chitin nanofibrils on electrospinning of chitosan-based composite nanofibers

Authors: Irina P. Dobrovolskaya, Vladimir E. Yudin, Pavel V. Popryadukhin, Elena M. Ivan'kova, Anton S. Shabunin, Igor A. Kasatkin, Pierfrancesco Morgantie



PII: S0144-8617(18)30339-4
DOI: <https://doi.org/10.1016/j.carbpol.2018.03.074>
Reference: CARP 13424

To appear in:

Received date: 25-9-2017
Revised date: 18-3-2018
Accepted date: 22-3-2018

Please cite this article as: Dobrovolskaya, Irina P., Yudin, Vladimir E., Popryadukhin, Pavel V., Ivan'kova, Elena M., Shabunin, Anton S., Kasatkin, Igor A., & Morgantie, Pierfrancesco., Effect of chitin nanofibrils on electrospinning of chitosan-based composite nanofibers. *Carbohydrate Polymers* <https://doi.org/10.1016/j.carbpol.2018.03.074>

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.

Effect of chitin nanofibrils on electrospinning of chitosan-based composite nanofibers

Irina P. Dobrovolskaya^{a,b*}, Vladimir E. Yudin^{a,b}, Pavel V. Popryadukhin^{a,b}, Elena M. Ivan'kova^{a,b}, Anton S. Shabunin^b, Igor A. Kasatkin^c, Pierfrancesco Morgantie^d

^a Institute of Macromolecular Compounds, Russian Academy of Sciences, 31 Bolshoy pr. VO, 199004 Saint-Petersburg Russia.

^b Peter the Great St. Petersburg Polytechnic University, Polytechnicheskaya ul. 29, 195251 Saint-Petersburg Russia.

^c Saint-Petersburg State University, 7-9, Universitetskaya nab., 199034 Saint-Petersburg Russia

^d Applied Cosmetic Dermatology, II University of Naples, Italy

* Corresponding author. Tel: +7 (812) 323-5065

E-mail address: zair2@mail.ru (I. Dobrovolskaya)

Highlights

- The study of electrical conductivity, surface tension, as well as the dependence of viscosity on the shear rate of solutions of chitosan of different concentrations and mixtures containing chitin nanofibrils and polyethylene oxide was carried out.
- It is shown, that electrical conductivity of chitosan solutions and the mixtures containing chitin nanofibrils is 3-4 orders of magnitude higher than the corresponding parameters for the polymers with high rate of electrospinning. Surface tension of chitosan solutions decreases after introducing chitin nanofibrils in relatively low amounts (about 1 wt.%).
- Introducing 20 wt.% of chitin nanofibrils into chitosan solution leads to increase in viscosity of the mixture, and its dependence on shear rate becomes more pronounced.
- It is assumed that this phenomenon is caused by the formation of cluster structures involving filler particles, and orientation of chitin nanofibrils under the action of shear stresses that appear in electromagnetic field.
- X-ray diffraction analysis revealed the orientation of chitin nanofibrils with respect to the axes of composite nanofibers. It was demonstrated that the presence of chitin

Download English Version:

<https://daneshyari.com/en/article/7782353>

Download Persian Version:

<https://daneshyari.com/article/7782353>

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