Polish-Israeli Conference on Electrospinning and Tissue Engineering

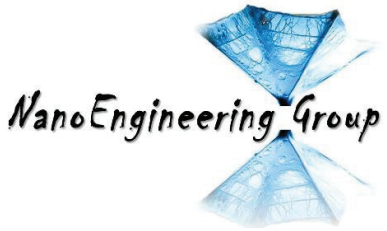
Programme and Abstracts

04 - 05 October 2018

Warsaw, Poland

Organizers

Laboratory of Polymers & Biomaterials at Institute of Fundamental Technological Research Polish Academy of Sciences (IPPT PAN) based on the fundamental knowledge in the area of polymer physics, materials science, chemistry and biotechnology, focuses its recent activity on biomaterials for tissue engineering. Great part of our activity is related to polymeric biodegradable scaffolds, mostly formed by electrospinning as nanofibrous structures, both for tissue regeneration and materials for controlled drug release.



Nano Engineering Group at Technion Israel Institute of Technology is focused on research in the field of molecular engineering of soft matter. The particular activities are related to the electrospinning including optimization of the parameters of the process, deep understanding of the fundamental physical facets of electrospinning as well as designing a composite materials for tissue engineering applications.

Objectives

The goal of PICETE conference is to bring together experts from around the world in order to exchange their knowledge, experience and research innovation in the basics of the electrospinning and the broad area of biomedical materials covering topics related to designing, fabrication, characterisation and tissue engineering applications.

The conference will include the following topics:

- Fundaments of electrospinning
- Optimization of electrospinning
- Properties of electrospun nanofibers
- Functionalization of electrospun nanofibers
- Electrospun nanofibers as scaffolds for tissue engineering/drug delivery systems
- Current trends in designing of polymeric biomaterials for tissue engineering/drug delivery systems

Polycaprolactone/gelatin bicomponent nanofibres: How do we save gelatin?

Judyta Dulnik

Judyta Dulnik[1], Paweł Sajkiewicz[1]
[1] Laboratory of Polymers and Biomaterials, Institute of Fundamental Technological Research of Polish Academy of Sciences,
Pawińskiego 5B, 02-106 Warsaw, Poland

Abstract

Bicomponent polycaprolactone/gelatin electrospun nanofibres have promising properties as scaffold material in both their good mechanical properties as well as bioactivity and hydrophilicity granted by the presence of biopolymer. This material composition can by successfully electrospun from less toxic and cheaper solvents where typically used perfluorinated alcohols are replaced with acetic and formic acid [1,2].

As our previous research have shown [3], regardless of the solvent used, under biodegradation conditions the loss of gelatin is rapid and decreases materials' bioactive potential.

The goal of this work was to establish and optimize a method of crosslinking gelatin, and thus saving it from its depletion from fibres when confronted with biodegradation conditions (37°C, PBS). Based on criteria such as low toxicity and innovative potential four crosslinking agents were chosen. It was systematically investigated how a set off different concentrations and experiment times affected fibres' morphology and gelatin mass left in the material after 24h biodegradation test.

Image

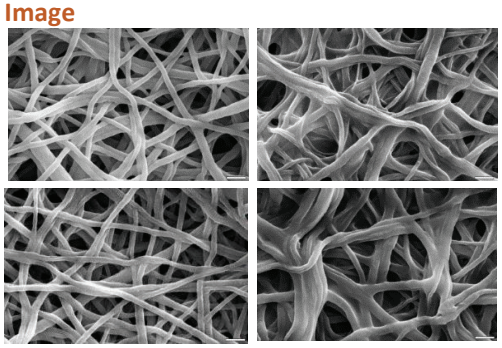


Fig. The influence different crosslinking agents have on the morphology of PCL/gt nanofibres: up left – EDC/NHS; up right – BDDGE; down left – genipin; down right – transglutaminase. Marker 1 µm.

References

1. Denis P, Dulnik J, Sajkiewicz P. Electrospinning and Structure of Bicomponent Polycaprolactone/Gelatin Nanofibers Obtained Using Alternative Solvent System. *International Journal Of Polymeric Materials And Polymeric Biomaterials* 2015, 64(7): 354-364.

2. Dulnik J, Kołbuk-Konieczny D, Denis P, Sajkiewicz P. The effect of a solvent on cellular response to PCL/gelatin and PCL/collagen. *European Polymer Journal*, 2018, 104: 147-156.

3. Dulnik J, Denis P, Sajkiewicz P, Kołbuk D, Choińska E. Biodegradation of bicomponent PCL/gelatin and PCL/collagen nanofibers electrospun from alternative solvent system. *Polymer Degradation And Stability* 2016, 130: 10-21.

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Biography

Specialist in the Laboratory of Polymers and Biomaterials, Institute of Fundamental Technological Research, Polish Academy of Sciences (from 2013)
Master's Degree in Biomedical Engineering with major in biomaterials, Multidisciplinary School of Engineering in Biomedicine, AGH University of Science and Technology, Cracow (2011).
My research interests include are polymeric materials for tissue engineering and regenerative medicine, artificial organs.

Email: judyta.dulnik@gmail.com