

## Accepted Manuscript

Title: Layer-by-Layer Films of Polysaccharides Modified with Polyethylene Glycol and Dextran

Authors: Tatsiana G. Shutava, Kanstantsin S. Livanovich, Anastasiya A. Sharamet



PII: S0927-7765(18)30705-7  
DOI: <https://doi.org/10.1016/j.colsurfb.2018.10.009>  
Reference: COLSUB 9693

To appear in: *Colloids and Surfaces B: Biointerfaces*

Received date: 31-5-2018  
Revised date: 7-9-2018  
Accepted date: 4-10-2018

Please cite this article as: Shutava TG, Livanovich KS, Sharamet AA, Layer-by-Layer Films of Polysaccharides Modified with Polyethylene Glycol and Dextran, *Colloids and Surfaces B: Biointerfaces* (2018), <https://doi.org/10.1016/j.colsurfb.2018.10.009>

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.

## Layer-by-Layer Films of Polysaccharides Modified with Polyethylene Glycol and Dextran

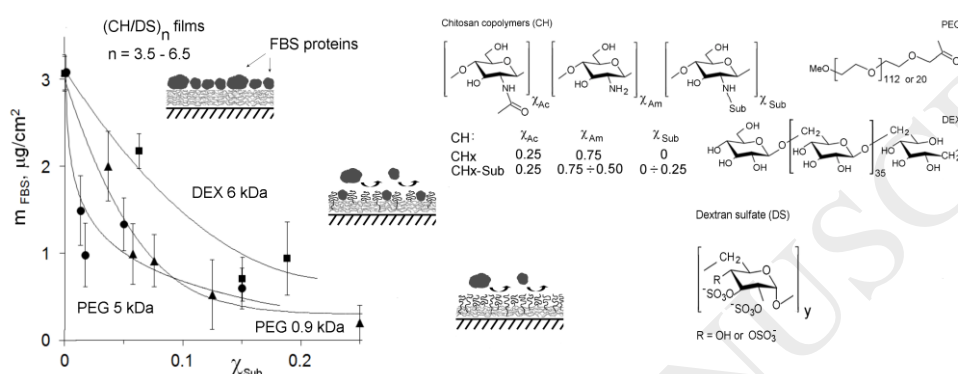
Tatsiana G. Shutava\*, Kanstantsin S. Livanovich and Anastasiya A. Sharamet

*Institute of Chemistry of New Materials, National Academy of Sciences of Belarus,*

*Minsk, Belarus*

\*Corresponding author: Tatsiana Shutava, PhD, Leading Researcher, Institute of Chemistry of New Materials, National Academy of Sciences of Belarus, F.Skaryny St. 36, Minsk, 220141 Belarus, Fax: (375)17-237-68-28; tshutova@yahoo.com, shutova@ichnm.basnet.by

### Graphical abstract



### Highlights

- PEG or dextran-grafted chitosans replace parent polymer in layer-by-layer films
- Copolymer-based films show high resistance to protein adsorption
- Antifouling properties of copolymer films are controlled by side chains overlapping
- PEG and dextran side chains are equally effective in preventing protein adsorption

**Abstract:** Layer-by-layer (LbL) films with enhanced resistance to protein adsorption were obtained on the basis of N-grafted copolymers of chitosan with polyethylene glycol (PEG) or dextran (DEX). The copolymers with the backbone molecular weight of 18 and 450 kDa, side chains of PEG of 5.0 and 0.9 kDa, DEX of 6.0 kDa and the degree of amine groups substitution  $\chi_{\text{Sub}}$  as high as  $\sim 0.25$  were alternated with dextran sulfate (DS) to assemble up to 10 bilayer films. The film material contains  $85 \pm 5\%$  of water with virtually no effect of the copolymer structure. By utilizing the graft copolymers and applying suitable number of copolymer/DS bilayers to the surface, the mass of adsorbed fetal bovine serum proteins was decreased by 70-85 % as compared to that on unmodified chitosan/DS film. In terms of overlapping side chains on the LbL surface the copolymers of PEG and DEX are equally effective in tailoring protein-resistant materials.

Download English Version:

<https://daneshyari.com/en/article/11263382>

Download Persian Version:

<https://daneshyari.com/article/11263382>

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