

## Accepted Manuscript

pH-responsive chitosan/alginate polyelectrolyte complex membranes reinforced by tripolyphosphate

Magdalena Gierszewska, Jadwiga Ostrowska-Czubenko, Ewelina Chrzanowska

PII: S0014-3057(17)32043-8

DOI: <https://doi.org/10.1016/j.eurpolymj.2018.02.031>

Reference: EPJ 8305

To appear in: *European Polymer Journal*

Received Date: 15 November 2017

Revised Date: 6 February 2018

Accepted Date: 22 February 2018

Please cite this article as: Gierszewska, M., Ostrowska-Czubenko, J., Chrzanowska, E., pH-responsive chitosan/alginate polyelectrolyte complex membranes reinforced by tripolyphosphate, *European Polymer Journal* (2018), doi: <https://doi.org/10.1016/j.eurpolymj.2018.02.031>

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.



## **pH-responsive chitosan/alginate polyelectrolyte complex membranes reinforced by tripolyphosphate**

Magdalena Gierszewska\*, Jadwiga Ostrowska-Czubenko, Ewelina Chrzanowska

Faculty of Chemistry, Nicolaus Copernicus University in Toruń, Gagarina St. 7, 87-100

Toruń, Poland

Phone: +48 56 611 45 24

\*Corresponding author

E-mail addresses: e-mail: [mgd@chem.uni.torun.pl](mailto:mgd@chem.uni.torun.pl) (Magdalena Gierszewska),

[jocz@chem.uni.torun.pl](mailto:jocz@chem.uni.torun.pl) (Jadwiga Ostrowska-Czubenko), [ewelinachrzanowska@gmail.com](mailto:ewelinachrzanowska@gmail.com)

(Ewelina Chrzanowska)

### **Abstract**

pH-sensitive chitosan/alginate/tripolyphosphate (Ch/Alg/TPP) hydrogel membranes based on chitosan/alginate (Ch/Alg) polyelectrolyte complex and crosslinking agent tripolyphosphate (TPP) were synthesized. An effect of TPP-crosslinking on the molecular structure, crystallinity, morphology, swelling and model drug release behavior of the Ch/Alg membrane was analysed. The dynamic swelling behavior of the Ch/Alg and Ch/Alg/TPP membranes were studied in solutions of different pH (1.0-9.0). At pH 7.4 or higher Ch/Alg and Ch/Alg/TPP hydrogels showed an untypical swelling behavior, i.e. “overshooting effect”. The results showed, that addition of TPP reinforced chitosan/alginate network. The swelling/deswelling behavior of the membranes was investigated at pH=1.5 (or 3.5) and 9 to confirm the response rate and reversibility of the swelling process. Ch/Alg/TPP membranes exhibited sharp swelling/deswelling behavior and high stability in acidic and basic solutions what makes them suitable candidate for drug delivery systems. Drug release of ascorbic acid from Ch/Alg/TPP membrane was measured in buffer solutions of pH=3.5 and 7.4.

### *Highlights:*

- Tripolyphosphate (TPP) was applied to reinforce Ch/Alg membranes.
- TPP-crosslinking affected the structure and properties of Ch/Alg membranes.
- Dynamic swelling curves of Ch/Alg/TPP membranes exhibited an overshooting effect at  $\text{pH} \geq 7.4$ .
- Ch/Alg/TPP membranes had good swelling/deswelling ability and pH-sensitivity.
- Ch/Alg/TPP membranes seem to be suitable candidate for drug delivery systems.

Download English Version:

<https://daneshyari.com/en/article/7803889>

Download Persian Version:

<https://daneshyari.com/article/7803889>

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