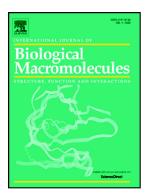
Accepted Manuscript

Effect of vinyl montmorillonite on the physical, responsive and antimicrobial properties of the optimized polyacrylic acid/ chitosan superabsorbent via Box-Behnken model



Mohamed S. Abdel Aziz, Hend E. Salama

PII:	S0141-8130(18)31123-1
DOI:	doi:10.1016/j.ijbiomac.2018.05.081
Reference:	BIOMAC 9682
To appear in:	
Received date:	10 March 2018
Revised date:	3 May 2018
Accepted date:	14 May 2018

Please cite this article as: Mohamed S. Abdel Aziz, Hend E. Salama, Effect of vinyl montmorillonite on the physical, responsive and antimicrobial properties of the optimized polyacrylic acid/chitosan superabsorbent via Box-Behnken model. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Biomac(2017), doi:10.1016/j.ijbiomac.2018.05.081

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.

ACCEPTED MANUSCRIPT

Effect of vinyl montmorillonite on the physical, responsive and antimicrobial properties of the optimized polyacrylic acid/chitosan superabsorbent via Box-Behnken model

Mohamed S. Abdel Aziz*, Hend E. Salama

Chemistry Department, Faculty of Science, Cairo University, Giza, Egypt, 12613.

Abstract

This work aims to study the effect of a vinyl-modified montmorillonite (VMT) on the physical and antimicrobial properties of chitosan-graft-polyacrylic acid superabsorbent (Ch-g-PA). Ch-g-PA was first optimized using Box-Behnken Design to obtain the maximum equilibrium swelling, and the model was efficient to express the experimental swelling data $(R^2=0.999)$. VMT was further added to the optimized Ch-g-PA in different contents 0, 4, 7 and 10 wt%. FTIR confirmed the successful synthesis of the copolymers and their nanocomposites. Morphology and the average pores size were studied using SEM. Wide angle X-ray diffraction showed the formation of exfoliated nanocomposites after VMT addition. Thermal stability studied by TGA was greatly enhanced in the presence of VMT. The Swelling kinetics by Voigtbased viscoelastic model showed that the equilibrium swelling was increased by increasing the VMT up to 7 wt% then decreased after further incorporation. The superabsorbents exhibited salt and pH-responsive properties and showed a pH-reversibility at two buffer solutions (pH 2 and 9). Moreover, the prepared superabsorbents exhibited a strong bacterial and fungal killing ability which becomes more pronounced upon increasing the VMT content. The obtained results encourage the usage of the prepared copolymer nanocomposites in many fields as antimicrobial superabsorbents of improved physical properties.

Keywords: Superabsorbents; Box-Behnken; Responsive properties

* Corresponding author Emails: msamir@sci.cu.edu.eg mo3amed_samir@yahoo.com Download English Version:

https://daneshyari.com/en/article/8327278

Download Persian Version:

https://daneshyari.com/article/8327278

Daneshyari.com