

Accepted Manuscript

Development of a novel chitosan based biocompatible and self-healing hydrogel for controlled release of hydrophilic drug

Swati Sharma, Ashok Kumar, Deepak, Rajesh Kumar, Nishant Kumar Rana, Biplob Koch



PII: S0141-8130(18)31527-7
DOI: doi:[10.1016/j.ijbiomac.2018.05.020](https://doi.org/10.1016/j.ijbiomac.2018.05.020)
Reference: BIOMAC 9621

To appear in:

Received date: 2 April 2018
Revised date: 25 April 2018
Accepted date: 3 May 2018

Please cite this article as: Swati Sharma, Ashok Kumar, Deepak, Rajesh Kumar, Nishant Kumar Rana, Biplob Koch , Development of a novel chitosan based biocompatible and self-healing hydrogel for controlled release of hydrophilic drug. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Biomac(2017), doi:[10.1016/j.ijbiomac.2018.05.020](https://doi.org/10.1016/j.ijbiomac.2018.05.020)

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.

Development of a novel chitosan based biocompatible and self-healing hydrogel for controlled release of hydrophilic drug

Swati Sharma^a, Ashok Kumar^a, Deepak^a, Rajesh Kumar,^{a,*} Nishant Kumar Rana^b, Biplob Koch^b

^a *Organic Polymer Laboratory, Centre of Advanced Studies in Chemistry, Institute of Science, Banaras Hindu University, Varanasi-221005, (UP), India, e-mail : orajesh@bhu.ac.in*

^b *Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi-221005, (UP), India,*

ABSTRACT

Smart polymeric hydrogels of chitosan and acryloyl-phenylalanine having potential of fast intrinsic shape memory properties (self-healing), non-toxic, biocompatible with moderate mechanical strength have been developed. The hydrogel has been formed by linking its network with flexible pendant side chains of chitosan and acryloyl-phenylalanine (exhibiting optimal balance of hydrophilic and hydrophobic moieties). The non-toxic and biocompatible behavior of the synthesized chitosan based hydrogel reveals its potential use towards the biomedical field. The side chain of hydrogel consists of amine and carboxylic acid groups and these moieties allow non-covalent interactions (H-bonding) across its interface. Thus, synthesized hydrogel shows very good self-healing property. Further, it has shown remarkable swelling (at different pH viz.- 2, 7, 9), cell viability (HEK-293 cells up to 200 $\mu\text{g}/\text{mL}$), cell proliferation, and controlled drug release and thus found multi-responsive.

Keywords: Chitosan; self-healing; cell-viability; proliferation; drug-delivery.

Introduction

Chitosan (CS) is a biopolymer having possibilities for chemical and mechanical modifications to generate novel properties, functions and applications especially in biomedical area [1]. It possesses a linear straight-chain, composed of randomly distributed β -

* To whom correspondence should be addressed

Download English Version:

<https://daneshyari.com/en/article/8326984>

Download Persian Version:

<https://daneshyari.com/article/8326984>

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