

Accepted Manuscript

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PII: S0141-8130(16)32723-4
DOI: <http://dx.doi.org/doi:10.1016/j.ijbiomac.2017.03.006>
Reference: BIOMAC 7169

To appear in: *International Journal of Biological Macromolecules*

Received date: 30-11-2016
Revised date: 8-2-2017
Accepted date: 2-3-2017

Please cite this article as: Arjunan Nithya, Singaravelu Chandra Mohan, Kulanthaivel Jeganathan, Kandasamy Jothivenkatachalam, A potential photocatalytic, antimicrobial and anticancer activity of chitosan-copper nanocomposite, *International Journal of Biological Macromolecules* <http://dx.doi.org/10.1016/j.ijbiomac.2017.03.006>

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A potential photocatalytic, antimicrobial and anticancer activity of chitosan-copper nanocomposite

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HIGHLIGHTS

- Chitosan-copper (CS-Cu) nanocomposite was elucidated by several characterization techniques.
- Efficiency of CS-Cu composite was exploited in organic dye pollutant removal.
- CS-Cu nanocomposite, an advanced material acts as a photocatalyst, drug resistant antimicrobials and anticancer agents.

ABSTRACT

In this study, chitosan-copper (CS-Cu) nanocomposite was synthesized without the aid of any external chemical reducing agents. The optical, structural, spectral, thermal and morphological analyses were carried out by several techniques. The prepared nanocomposite acts as a photocatalyst for the removal of Rhodamine B (RhB) and Congo red (CR) dyes under visible light irradiation. The pseudo first order kinetics was derived according to Langmuir–Hinshelwood (L–H) model. The nanocomposite also proved to be an excellent antimicrobial agent against Gram-positive and Gram-negative bacteria; and also show activity against fungus. The advanced material was used for the major research areas which include photocatalytic materials for waste water treatment; biological applications in the development of drug resistant antimicrobials and anticancer agents.

Keywords: Chitosan

Photocatalyst

Antimicrobial agent

Anticancer agent

1. Introduction

Nanotechnology is a rapidly growing field in science and technology for the purpose to built-up of new materials with nanometric size. Metal nanoparticles are attracted due to their application in various fields ranging from environmental to medicinal applications, which includes waste water

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