

Author's Accepted Manuscript

Rectangular shaped zinc oxide nanoparticles: Green synthesis by Stevia and its biomedical efficiency

Mehrdad Khatami, Hajar Q. Alijani, Hossein Heli, Iraj Sharifi



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31371-3
DOI: <https://doi.org/10.1016/j.ceramint.2018.05.224>
Reference: CER118399

To appear in: *Ceramics International*

Received date: 19 April 2018
Revised date: 24 May 2018
Accepted date: 26 May 2018

Cite this article as: Mehrdad Khatami, Hajar Q. Alijani, Hossein Heli and Iraj Sharifi, Rectangular shaped zinc oxide nanoparticles: Green synthesis by Stevia and its biomedical efficiency, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.05.224>

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 galley proof before it is published in its final citable 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.

Rectangular shaped zinc oxide nanoparticles: Green synthesis by Stevia and its biomedical efficiency

Mehrdad Khatami ^{1,2*}, Hajar Q. Alijani ^{*1}, Hossein Heli ², Iraj Sharifi ^{3,4}.

¹. NanoBioEletrochemistry Research Center, Bam University of Medical Sciences, Bam, Iran

². Nanomedicine and Nanobiology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

³. Faculty of Medicine. Education. U-Toledo, Ohio, USA

⁴. Leishmaniasis Research Center, Kerman University of Medical Sciences, Kerman, Iran

mehrdad7khatami@gmail.com (M. Khatami)

q.aliyani@yahoo.com

*Corresponding author. Tel/Fax: +98 34 42 19 07 4

Abstract

Synthesis and properties of a new zinc oxide nanostructure, and its antimicrobial applications are presented. The synthesis method was fast, clean and green using a natural sweetener (Stevia) extract. The synthesized nanoparticles had a rectangular shape with a size range of 10 to 90 nm. The antimicrobial activity of the biosynthesized nanoparticles in parasitic strain of *Leishmaniasis major* and bacterial strains of *Staphylococcus aureus* and *Escherichia coli* was studied. It was found that low concentrations of the nanoparticles are required for complete prevention of growth of these organisms *in vitro*.

Keywords: Green synthesis; Antimicrobial; Antileishmanial; ZnO; Rectangular structure.

1. Introduction

Over the past decade, properties of a variety of nanostructures such as nanoparticles, nanocapsules, nanotubes and nanoflowers have attracted attention in researchers due to their uses in a wide range of areas, particularly in applied medicine [1]. In this regard, a wide range of antimicrobial agents have been identified and produced which have had significant contributions to the prevention and treatment of infectious diseases in human and animal. Many of these materials play an essential role to improve humans and animals health. On the contrary, incorrect use of certain antimicrobial agents and common antibiotics such as methicillin, ampicillin and Glucantime has led to the growth and spread of drug-resistant microbial strains [2]. Treating diseases and infections that cause resistant strains has become a serious and complex problem in clinical practice. This dilemma has made the necessity of discovering and developing new approaches to deal with pathogenic microorganisms.

Zinc oxide is a unique and semiconductor material with a wide band gap of ~3.37 eV and high binding energy of 60 meV that shows multiple semiconductor properties and piezoelectric effect [4]. Nanosheets, nanowires and nanocrystals of zinc oxide have been produced employing a variety of synthesis techniques. One of the important properties of zinc oxide nanostructures is their antimicrobial effect that leads to their widespread use in

Download English Version:

<https://daneshyari.com/en/article/7886456>

Download Persian Version:

<https://daneshyari.com/article/7886456>

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