May 30th-31st 2023
Bydgoszcz, Poland
E-NNOVATE
International Innovation Show

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Category
Biotechnology

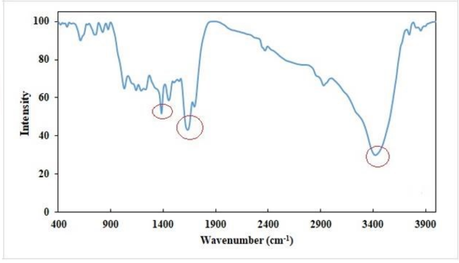
Synthesis of Chitosan/Silver Oxide Nanocomposite by Eco-friendly Method to Investigate Antibacterial Properties

Abstract

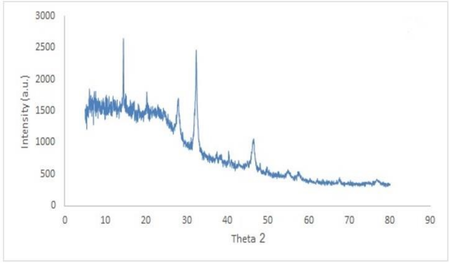
The aim of the present study was to synthesize chitosan/silver oxide nanocomposite using a green method to investigate its antibacterial properties. For this purpose, silver oxide nanoparticle was first synthesized and then chitosan was applied on the silver oxide nanoparticle network using celery extract with different concentrations. The mentioned nanocomposite was studied by EDX, FTIR, XRD, and SEM analyses.

The results of the study showed that the nanocomposite was synthesized on a nanoscale and also the desired functional groups and crystal structure were obtained on it. To investigate the antibacterial properties of the synthetic nanocomposite, two Gram-positive and negative bacteria, Staphylus aureus and Pseudomonas, were used, and the results showed that the synthesized nanocomposite has a suitable performance to reduce bacteria in the desired agar. Also, the results of this section showed that the synthetic nanocomposite has a very good performance for antibacterial properties, and the effect of the concentration of celery extract on the efficiency of the antibacterial property was also effective, and with the increase in the concentration of the celery extract, the efficiency of the antibacterial function increased.

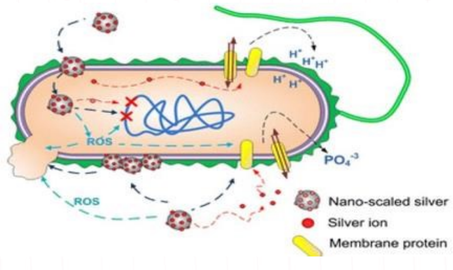
The final synthesized nanocomposite



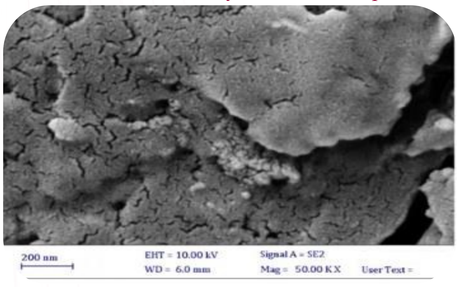
FTIR spectrum diagram of the synthesized sample



Results of XRD analysis of nanocomposite



The mechanism of effect of silver nanoparticles on bacterial cells



SEM image of the synthesized nanocomposite

Innovative Features

- Preparation of pure aqueous solution from celery extract
- Using the green synthesis method
- Eco-Friendly

Currently Marketed

- Agriculture
- Food industry
- Health centers

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