

Biomolecule chitosan, curcumin and ZnO-based antibacterial nanomaterial, via a one-pot process

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Abstract

As a result of the existence of drug-resistant bacteria and the attendant deficiency of innovative antibiotics, the therapeutic and the clinical sectors are, continually, in search of appropriate multifunctional nanomedicines. Herein, curcumin-chitosan-zinc oxide (CCZ) was successfully synthesized by a one-pot method. Transmission electron micrograph reveals that curcumin and chitosan were layered on a hexagonal ZnO and the particles are sized to similar to 48 +/- 2nm. X-ray diffractogram confirmed the formation of CCZ crystal structure. The photoluminescence spectra of CCZ, shows blue and green emissions at 499 nm and 519 nm, respectively, due to the active radicals generated in the nanomaterial, which are responsible for the associated antimicrobial and anticancer activities. The antibacterial activity of the CCZ, performed against methicillin-resistant *Staphylococcus aureus* (MRSA) and *Escherichia coli* (E. coli), showed a greater antibacterial effect than the commercial amoxicillin. The cytotoxic effect of the CCZ nanomaterial was examined in cultured (MCF-7) human breast cancer cells. An IC50 concentration value of 43.53 μ g/mL, was recorded when evaluated after 24 h of CCZ with the MCF-7 cell line. From this study, it is believed that CCZ is a highly promising nanomaterial, which will be suitable for advanced clinical applications.

Palabras clave

Palabras clave de autor: [Chitosan](#); [Curcumin](#); [ZnO and nanomaterial](#)

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