عنوان مقاله:

Antimicrobial and cytotoxicity effect of Synthesized Ag-doped ZnO nanoparticles against Listeria monocytogenes isolated from traditional Cheese

محل انتشار:

مجله بین المللی میکروبیولوژی مولکولی و بالینی, دوره 13, شماره 2 (سال: 1402)

تعداد صفحات اصل مقاله: 17

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خلاصه مقاله:

Listeriosis (caused by Listeria monocytogenes) is one of the most serious and severe foodborne diseases. The purpose of present study is to investigate the antibacterial, antiinvasion and anti-adhesion effect of synthesized Ag-doped ZnO (ZnO:Ag NPs) nanoparticles against L.monocytogenes isolates. ZnO and ZnO:Ag NPs were synthesized using a chemical method and were characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), Energy Dispersive X-ray (EDX) and Fourier-transform infrared (FTIR) spectroscopy. Antibacterial assay of nanoparticles towards L. monocytogenes was performed using culture turbidity measurement. The MTT assay was performed for assessing cytotoxicity activity in Caco-۲ cells exposed to L.monocytogenes treated with ۳.۱۲۵, ۶.۲۵, ۱۲.۵, ۲۵, ۵۰ and ۱۰۰ µg /ml concentrations of both ZnO and ZnO:Ag NPs. The adhesion and invasion assays were performed by infecting semiconfluent Caco-۲ cell monolayers grown in ۲۴-well plates. To further confirm, the messenger RNA (mRNA) levels of invasion and adhesion-associated genes (inlA, hlyA and prfA) of L. monocytogenes were examined using Real-time PCR. Our results show ZnO:Ag NPs have great antibacterial activities against L.monocytogenes isolates. Paper results also indicated exposure of L.monocytogenes isolates treated with all concentration of ZnO:Ag NPs could obviously reduce the viability of Caco-۲ cells. The results of Realtime PCR revealed that the mRNA levels of inlA, hlyA and prfA were dramatically downregulated after the exposure of L.monocytogenes treated with ZnO:Ag NPs compared to ۱۶S rRNA as housekeeping gene. It can therefore be considered that ZnO:Ag NPs should be utilized in medicinal and pharmaceutical applications as credible antibacterial, anti-.invasion and anti-adhesion agents

کلمات کلیدی:

ZnO, ZnO:Ag NPs, Antibacterial activity, Listeria monocytogenes, MTT Assay, Real-time PCR