

عنوان مقاله:

Evaluation of the Inhibitory Effects of Magnesium Oxide and Copper Oxide nanoparticles on Biofilm Formation of Some Foodborne Bacterial Pathogens

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خلاصه مقاله:

One of the most important factors in food industry is the formation of microbial biofilm which can be the potential source of food products contamination with food spoilage and foodborne pathogenic bacteria. Nanotechnology is considered as a promising solution to produce and develop such novel antimicrobial substances. The potential effects of nanostructured metal oxides on the reduction of such contaminants are well established. The goal of this study was to see how well magnesium oxide (MgO) and copper oxide (CuO) nanoparticles (NPs) inhibited growth and biofilm formation of two common foodborne bacterial pathogens. This study was completed in the year ۲۰۲۰. Resazurin reduction and micro-dilution procedures were used to assess the minimum inhibitory concentration (MIC) of magnesium oxide and copper oxide nanoparticles for *Escherichia coli* O157: H7 (ATCC ۳۵۲۱۸), *Listeria monocytogenes* (ATCC ۱۹۱۱۸), *Staphylococcus aureus* (ATCC ۶۵۳۸) and *Pseudomonas aeruginosa* (ATCC ۱۴۰۲۸). Magnesium oxide nanoparticles had MICs of ۲, ۲, ۲ and ۴ mg/ml, while copper oxide nanoparticles had MICs of ۱, ۰.۱۶, ۰.۵ and ۰.۲۵ mg/ml against *E. coli*, *L. monocytogenes*, *Staph. aureus* and *P. aeruginosa* respectively. At the MIC, the magnesium oxide nanoparticles inhibited biofilm formation of *E. coli*, *L. monocytogenes*, *Staph. aureus* and *P. aeruginosa* by ۸۹.۹, ۹۶.۶, ۹۸.۳ and ۹۸.۳ percent and the copper oxide nanoparticles inhibited biofilm formation ۸۸, ۹۷.۷, ۹۳.۶ and ۹۸.۷ percent, respectively. Both compounds had inhibitory effects on *E. coli*, *L. monocytogenes*, *Staph. aureus* and *P. aeruginosa* according to our findings. Even at sub-MICs, NPs were found to be able to prevent biofilm development. MgO and CuO nanoparticles can be utilized as a cleaning agent for surfaces to avoid the formation of foodborne bacterial biofilms, which is important for public health.

کلمات کلیدی:

biofilm, magnesium oxide nanoparticle, copper oxide nanoparticle, *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*

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