عنوان مقاله:

Effects of combination of magnesium and zinc oxide nanoparticles and heat on Escherichia coli and Staphylococcus aureus bacteria in milk

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خلاصه مقاله:

Objective: The objective of this study was to investigate the antibacterial activities of combination of MgO and ZnO nanoparticles in the presence of heat against Escherichia coli and Staphylococcus aureus. Materials and Methods:Bacteria were grown on either agar or broth media followed by the addition of ZnO and MgO nanoparticles. Then the combined effect of ZnO and MgO nanoparticles was investigated. Furthermore, the media containing nanoparticles were treated with mild heat and their synergistic antibacterial activity was investigated against E. coli and S. aureus in milk. Results: The data showed that the nanoparticles used in this study had no effect on the bacteria in the agar medium. However, the results showed that ZnO and MgO nanoparticles resulted in a significant decrease in the number of E. coli (P<0.000) and S. aureus (Pd 0.05) in the broth medium. The combination of nanoparticles and mild heat exhibited a significant decrease in the number of E. coli and S. aureus indicating the synergistic effects of nanoparticles and heat. Conclusion: Using a combination of mild heat, ZnO and MgO nanoparticles, E. coli and S. aureus can be controlled successfully in the milk. Mild heating plus ZnO and MgO nanoparticles has a synergistic effect which would reduce the need for high temperature and also the concentrations .of ZnO and MgO nanoparticles required for pathogen control in minimally processed milk during maintaining

کلمات کلیدی:

Escherichia coli, Magnesium oxide, Nanoparticles, Staphylococcus aureus, Zinc Oxide