Manufacture and Application of Solid Bactericide Using AgNPs-Sa Film and NaCl

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When AgNO3 and sodium alginate are mixed, cross-linking occurs by the cation Ag+ and anion Cl-, which can produce an AgNPs-SA gel. Through this research, it was found out that when this film is treated with NA or NB, the film decomposes. Therefore, we investigated the cause of this phenomenon and found a way to utilize it. As a result, the AgNPs film produced by the reaction of 0.1 M AgNO3 and 2% SA solution visibly disappeared and decomposed by NB after 30 minutes. It was thought that the cause was NaCl, a salt contained in beef extract or peptone, the ingredients for NB. The AgNPs-SA gel and film decomposed within 0.01 M to 1 M of NaCl solutions, and it seemed that Ag+, which plays role in cross-linking, reacted with NaCl to form AgCl, which caused the bond to decompose. When the film solution dissolved in 0.01 M to 1 M of NaCl solution for 30 minutes was treated with E. coli and S. aureus, the bacterial inhibition effect was the best in the solution decomposed in 0.01 M, 0.05 M, and 0.1 M of NaCl solutions. As a result, in this research it was found that the AgNPs-SA gel could be a solid antibacterial film that is possible to store in film form and, when used, a part of the film can be put into NaCl solution to make a liquid disinfectant, which can help patients with alcohol allergies and can be applied in places such as livestock farms affected by foot-and-mouth disease.

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