

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

Choi, Rachel (School: Gangnam International School)

When AgNO_3 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 AgNO_3 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.

Awards Won: