

## Electrolyzed water as a disinfectant against foodborne pathogens in vegetables and kitchen apparatus

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### Information

In recent, there are many report about nonthermal disinfection using electrolyzed water. Also, foodborne illnesses associated with pathogenic bacteria such as *Listeria monocytogenes* and *Escherichia coli* O157:H7 have raised concerns about the adequacy of disinfectants (Kim et al., 2000). Foodborne pathogens in vegetables and kitchen apparatus are not easy to disinfect but also hard to use chemical compounds for disinfection. The objective of this research is to determine the disinfection effect of electrolyzed water against foodborne pathogens in vegetable and kitchen apparatus.

### Materials and Methods

Pathogenic bacteria : *Listeria monocytogenes* ATCC 19113, *Escherichia coli* O157:H7 ATCC 43889, *Bacillus cereus* KCTC 1012, *Vibrio vulnificus* KCTC 2962, *Staphylococcus aureus* ATCC 25923, *Streptococcus mutans* KCTC 3298

Materials : Carrot(*Daucus carota* var. *sativa*), cucumber(*Cucumis sativa*), lettuce(*Lactuca scariola*) and germ of radish(*Raphanus sativus*). A kitchen apparatus are kitchen board and kitchen knife. They were purchased at Gangneung E-MART.

Electrolyzer : Produced by E-su tech. Co. (Korea)

Treatments with electrolyzed water on pathogenic bacteria : Each bacterium was precultured in brain heart infusion broth (Difco., USA) at 37°C for 24 h. A 10 ml of preculture was centrifuged at 1250×g for 30 min. The cell pellet was suspended in 10 ml of PBS (phosphate buffered saline). Five hundred µl of bacteria cell suspension was treated with electrolyzed water for 30 and 60 sec. After treatment, the viable cell number was measured by AOAC method (1995).

Treatments with electrolyzed water on vegetable : A 5 g of each vegetable was treated with tap water (negative control), 35 ppm of sodium hypochlorite (positive control) and electrolyzed water (35 ppm available chlorine), respectively. After

treating for 10, 30, 60 and 90 sec, viable cell number was measured by AOAC method (1995).

Kitchen apparatus : The kitchen board and the kitchen knife were soaked in mixed pathogenic bacterial culture ( $10^6 \sim 10^7$  CFU/ml). After treating for 1 min, the kitchen board and the kitchen knife were soaked to electrolyzed water. After treating for 30 and 60 sec, they were wiped with sterilized towel and then viable cell number on surface of them was measured by Swab Kit (ELMEX., Japan).

## Result

Treatments with electrolyzed water on pathogens bacteria : After treating 30, *B. cereus*, *E. coli* O157:H7, *V. vulnificus* and *L. monocytogenes* were not detected. The 4 log CFU/ml of *S. aureus* and *S. mutans* were reduced after treating for 30 sec.

Treatments with electrolyzed water on vegetable and Kitchen apparatus : The 2 log CFU/g of viable cell number of carrot, cucumber and germ of radish were reduced after treating for 60 sec, respectively. The 3 log CFU/g of viable cell number of in lettuce was reduced after treating for 60 sec. The 1~3 log CFU/cm<sup>2</sup> of surface on the kitchen board and the kitchen knife were reduced after treating with electrolyzed water for 60 sec.

## 참고문헌

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