

[J Microbiol Methods](#). 2002 May;49(3):285-93.

## **Bactericidal activity of electrolyzed acid water from solution containing sodium chloride at low concentration, in comparison with that at high concentration.**

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### **Abstract**

Electrolyzed strong acid water (ESW) containing free chlorine at various concentrations is becoming to be available in clinical settings as a disinfectant. ESW is prepared by electrolysis of a NaCl solution, and has a corrosive activity against medical instruments. Although lower concentrations of NaCl and free chlorine are desired to eliminate corrosion, the germicidal effect of ESW with low NaCl and free-chlorine concentrations (ESW-L) has not been fully clarified. In this study, we demonstrated that ESW-L possesses bactericidal activity against Mycobacteria and spores of *Bacillus subtilis*. The effect was slightly weaker than that of ESW containing higher NaCl and free-chlorine concentrations (ESW-H), but acceptable as a disinfectant. To clarify the mechanism of the bactericidal activity, we investigated ESW-L-treated *Pseudomonas aeruginosa* by transmission electron microscopy, a bacterial enzyme assay and restriction fragment length polymorphism pattern (RFLP) assay. Since the bacterium, whose growth was completely inhibited by ESW-L, revealed the inactivation of cytoplasmic enzyme, blebs and breaks in its outer membrane and remained complete RFLP of DNA, damage of the outer membrane and inactivation of cytoplasmic enzyme are the important determinants of the bactericidal activity.

PMID:

[11869793](#)

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