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A Study for Efficiency of Electrolytic Disinfection on Algae and Microorganisms for Ballast Water

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Living organisms can maintain their structure and function include energy production with proper management of electrochemical balances among cellular organelles. The aquatic organisms which are common in ballast water were electrolysed with the ELECTRO-CLEAN^{TM} System (ECS) which was granted the basic approval of ballast water management systems that make use of active substances from Marine Environment Protection Committee of IMO at March 2006, at various conditions to elucidate biological effectiveness for disinfection. Electrical potential between anode and cathode can make an electrical disruption both outside and inside circumstances of the cell. In addition to direct disinfection effect on cell, the cell can be disinfected indirectly by various radicals include free chlorine ions which are generated during electrolysis of water.

Legionella pneuphila, is used to determine the relative efficacy of disinfection using the electrolysis. More than 90% of *L. pneuphila* was reduced within 20 min after electrolysis with 3V/2A under the condition of 2L/min. More than 90% of blue-green and green algae was removed within 10 min after electrolysis with 6V/15A under the condition of 2L/min. The electrolysed water(pH 7.0-8.0) was effective to reduce both green

algae and blue-green algae with or without electrolytes. More than 90% of *E. coli* was eliminated by electrolysis application within 20 min compare to those of *E. coli* without electrolysis.