No. 1221

Research for the Elimination Mechanism of Bacteria in Saline Water by Photocatalysis

Nobuaki NEGISHI, Namiha YAMADA, Masahiro SUZUMURA, Kazuhide KOIKE, Shuzo KUTSUNA

Research Institute for Environmental Management Technology, National Institute of Advanced Industrial Science and Technology

Summary

Photocatalytic inactivation in freshwater is widely studied for the purpose of improving the quality of drinking water. In addition, inactivation of seawater has important applications in various marine fields. The objective of our research is to establish means to eliminate bacteria and/or plankton without the addition of bactericide in seawater to prevent marine contamination. In our research work, the effects of UV irradiation on the respiration and survival of *Escherichia coli* in various concentrations of aqueous NaCl were investigated in the presence of a photocatalyst. In this study, we anticipated that the photocatalysis of residual chlorine generated in a solution containing Cl^- would result in bacterial elimination. Our results indicated a gradual reduction in the *E. coli* survival ratio in freshwater; however, no decrease in total abundance was observed during 8 h of photocatalysis with UV irradiation. Conversely, the survival ratio of *E. coli* in the artificial seawater decreased drastically as a consequence of photocatalysis, with a concomitant decrease in total abundance. These results revealed that the chlorinated active species that formed on the photocatalyst surface influenced the observed inactivation.