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Effect of Hydrogen Peroxide Concentration Produced by Cold Atmospheric Plasma on Inactivation of Escherichia Coli in Water

Authors : Zohreh Rashmei

Abstract : Introduction: Plasma inactivation is one of the emerging technologies in biomedical field and has been applied to the inactivation of microorganisms in water. The inactivation effect has been attributed to the presence of active plasma species, i.e. OH, O, O3, H2O2, UV and electric fields, generated by the discharge of plasma. Material and Method: To evaluate germicidal effects of plasma, the electric spark discharge device was used. After the effect of the plasma samples were collected for culture medium agar plate count. In addition to biological experiments, the concentration of hydrogen peroxide was also measured. Results: The results showed that Plasma is able to inactivate a high concentration of E. coli. After a short period of plasma radiation on the surface of water, the amount log8 reduced the microbial load. Starting plasma radiation on the surface of the water, the measurements show of production and increasing the amount of hydrogen peroxide in water. So that at the end of the experiment, the concentration of hydrogen peroxide to about 100 mg / l increased. Conclusion: Increasing the concentration of hydrogen peroxide is directly related to the reduction of microbial load. The results of E. coli culture in media containing certain concentrations of H2O2 showed that E. coli can not to grow in a medium containing more than 2/5 mg/l of H2O2. Surely we can say that the main cause of killing bacteria is a molecule of H2O2.

Keywords : plasma, hydrogen peroxide, disinfection, E. coli
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