

Abstract Submitted
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Innovative Plasma Disinfection Technique with the Reduced-pH Method and the Plasma-Treated Water (PTW) -Safety and Powerful Disinfection with Cryopreserved PTW-¹ KATSUHISA KITANO, Eng., Osaka Univ., SATOSHI IKAWA, YOICHI NAKASHIMA, TRI Osaka, ATSUSHI TANI, Sci., Osaka Univ., TAKASHI YOKOYAMA, Eng., Osaka Univ., TOMOKO OHSHIMA, Dental Medicine, Tsurumi Univ. — Among the applications of the plasma disinfection to human body, plasma sterilization in liquid is crucial. We found that the plasma-treated water (PTW) has strong bactericidal activity under low pH condition and the half-lives of its activity depend on temperature. Lower temperature brings longer half-life and the bactericidal activity of PTW can be kept by cryopreservation. These physicochemical properties were in accordance with Arrhenius equation both in liquid and solid states. From the experimental results of ESR (Electron Spin Resonance) measurement of $O_2^- \bullet$ in liquid against PTW with spin trapping method, half-lives of PTW were also in accordance with Arrhenius equation. It suggests that high concentration PTW as integrated value can be achieved by cooling of plasma apparatus. Pure PTW has disinfection power of 22 log reduction (*B. subtilis*). This corresponds to 65% H₂O₂, 14% hypochlorous acid and 0.33% peracetic acid, which are deadly poison for human. On the other hand, PTW is deactivated soon at body temperature. This indicates that toxicity to human body seems to be low. PTW, which is a sort of indirect plasma exposure, with pH and temperature controls could be applied for safety and powerful disinfection.

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