

Abstract Submitted
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Plasma-functionalized solution: A potent antimicrobial agent for biomedical applications from antibacterial therapeutics to biomaterial surface engineering¹ JOO YOUNG PARK, SANGHOO PARK, WONHO CHOE, KAIST, HAE IN YONG, CHEORUN JO, Seoul National University, KIJUNG KIM, KAIST — Deadly diseases caused by pathogenic bacteria have increasingly victimized humans; thus, the importance of disinfection has increased in medicine as well as in food and agricultural industries. Plasma contains multiple bactericidal agents, including reactive species, charged particles, and photons, and their synergistic effects. In particular, the chemicals formed in aqueous solution during plasma exposure have the potential for high antibacterial activity against various bacterial infections. Here, we report the antibiotic potency of plasma-treated water (PTW). To illustrate the applicability of PTW for disinfecting biological substances, *Escherichia coli*, *Salmonella typhimurium*, and *Listeria monocytogenes* biofilms were used. We sought to identify the chemical species in the PTW and investigate their separate effects on biofilm removal. Dielectric barrier discharge, which is operated in ambient air, was used to prepare the PTW and to treat the biofilm directly. The major species of PTW that led to the biofilm reduction were OH, H₂O₂, HNO₂, and O₃. H₂O₂ was the most influential species, while O₃ and HNO₂ also contributed.

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