



## Evaluation of Microbicidal Activity of Oxygen-Containing Plasmas using Biological Monitors with Different Lumen Calibers

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**SUMMARY.** New technologies and sterilization agents for heat-sensitive materials are under intense investigation. Plasma sterilization, an atoxic low-temperature substitute for conventional sterilization, uses various gases that are activated by an electrical discharge, generating reactive species that promote lethality in microorganisms. Here, assays were performed using pure O<sub>2</sub> and O<sub>2</sub> + H<sub>2</sub>O<sub>2</sub> mixture gas plasmas against a standard load of *Bacillus atrophaeus* spores inoculated on glass carriers inside PVC catheters. The sterilization efficiency was studied as a function of plasma system (reactive ion etching or inductively coupled plasma), biological monitor lumen diameter, gas, radio frequency power, and sub-lethal exposition time. After sterilization, the biological monitors were disassembled and the surviving bacteria were grown in trypticase soy broth using the most probable number technique. Plasma antimicrobial activity depended on the catheter's internal diameter and radio frequency powers. The O<sub>2</sub> + H<sub>2</sub>O<sub>2</sub> mixture exhibited higher microbial efficacy than pure O<sub>2</sub> in both plasma systems.

**KEY WORDS:** Biological monitor, Inductively coupled plasma, Medical devices, Microbial efficacy, Plasma sterilization, Reactive ion etching.

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