Hydrogen peroxide and sodium hypochlorite disinfectants are more effective against *Staphylococcus aureus* and *Pseudomonas aeruginosa* biofilms than quaternary ammonium compounds

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ABSTRACT

Eight disinfectants, including accelerated hydrogen peroxide®, regular hydrogen peroxide and quaternary ammonium compound (QUAT)-based products were tested against *Staphylococcus aureus* (*S. aureus*) and *Pseudomonas aeruginosa* (*P. aeruginosa*) biofilms. The sodium hypochlorite and hydrogen peroxide-based products effectively decontaminated biofilms, whereas QUAT-based products did not.

BACKGROUND

Bacterial biofilms account for 65 and 80% of microbial and chronic infections, respectively. *Staphylococcus aureus* and *Pseudomonas aeruginosa*, the leading agents responsible for hospital-acquired infections, are capable of forming biofilms, augmenting their ability to survive on surfaces for prolonged periods of time, as well as boosting their resistance to disinfectants. To date, there has not been a great deal of research examining the activity of disinfectants against biofilms. This study evaluated the efficacy of eight disinfectants against *S. aureus* and *P. aeruginosa* biofilms.

STUDY

Disinfectants tested included ready-to-use AHP® products and diluted AHP® concentrate, along with other hydrogen peroxide products, sodium hypochlorite (bleach), and quaternary ammonium compound (QUAT)-based products. Biofilms were developed on borosilicate glass coupons, and coupons were treated with the disinfectants (3-5 replicates per disinfectant).

RESULTS

Products containing hydrogen peroxide and sodium hypochlorite achieved significantly better results compared to QUAT-based products. No significant differences were measured between sodium hypochlorite and hydrogen peroxide-based products.

STUDY CONCLUSION

The hydrogen peroxide and sodium hypochlorite products tested successfully decontaminated biofilm, destroying both the biofilm matrix and the bacterial cells within. The QUAT-based products were significantly less effective against these biofilms.

IMPLICATIONS FOR AHP®

These findings are significant, since biofilms are a major concern within numerous healthcare settings. Although the findings clearly indicate that hydrogen peroxide-based products are superior to QUATs, AHP® did not perform significantly better than bleach-based products. This could provide us with an opportunity to position AHP® as a solution to deliver the same efficacy as bleach, but without many of the negative aspects such as poor cleaning ability and occupational hazards.

REFERENCE

Lineback CB, Nkemngong Cam Wu ST, Li X, Teska PJ, Oliver HF. (2018). Hydrogen peroxide and sodium hypochlorite disinfectants are more effective against Staphylococcus aureus and Pseudomonas aeruginosa biofilms than quaternary ammonium compounds. Antimicrob Resist Infect Control. 7:154.