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ANTIMICROBIAL EFFICACY OF MULTIPURPOSE DISINFECTING SOLUTIONS AGAINST EMERGING PATHOGENS

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INTRODUCTION

Contact lens cases are often contaminated with gram negative bacteria during use, [1,2] which can lead to corneal infiltration or infection. [3] Recent studies report contamination with previously unreported gram-negative bacteria such as *Achromobacter xylosoxidans* and *Elizabethkingia meningoseptica*. [4] Microbial contamination of CL cases may result in biofilm formation, [5] which can serve as a source of bacteria that may then infect the eye.

AIM

To evaluate the efficacy of two multipurpose disinfectant solutions (MPDS) against emerging pathogens in planktonic form and following biofilm formation in contact lens cases

METHODS

- Anti-microbial efficacy of Cleadew (Ophtecs, Japan) and Biotrue (Bausch & Lomb, USA) against test strains (Table 1) in planktonic form determined according to ISO 14729:2001.
- Bacterial biofilm grown in Cleadew lens cases over 24 hours, disinfected for minimum recommended disinfection time (4 hours) and lens cases either:
 - Rinsed and recapped wet for 18 hours
 - Rinsed and air dried for 18 hours (Manufacturer's recommendation)
 - Rinse, tissue wiped and air dried for 18 hours.
- Bacteria recovered from treated lens cases by standard culture and numbers (colony forming units – CFU) compared to untreated lens cases (lens cases cultured after 24 hours biofilm growth).

RESULTS

Table 1: List of bacterial strains used in study

Bacteria	Strain	Type	Isolation
<i>Achromobacter xylosoxidans</i> *	001	Emerging strain	Adverse Response
<i>Elizabethkingia meningoseptica</i> *	001	Emerging strain	Adverse Response
<i>Pseudomonas aeruginosa</i>	6294	Clinical strain	Microbial Keratitis
<i>Pseudomonas aeruginosa</i> *	071	Clinical strain	Microbial Keratitis
<i>Serratia marcescens</i> *	ATCC 13880	Standard strain	Pond water

* Strains used for biofilm study

Figure 1: Comparison of antimicrobial efficacy of Cleadew and Biotrue MPDS against planktonic bacteria

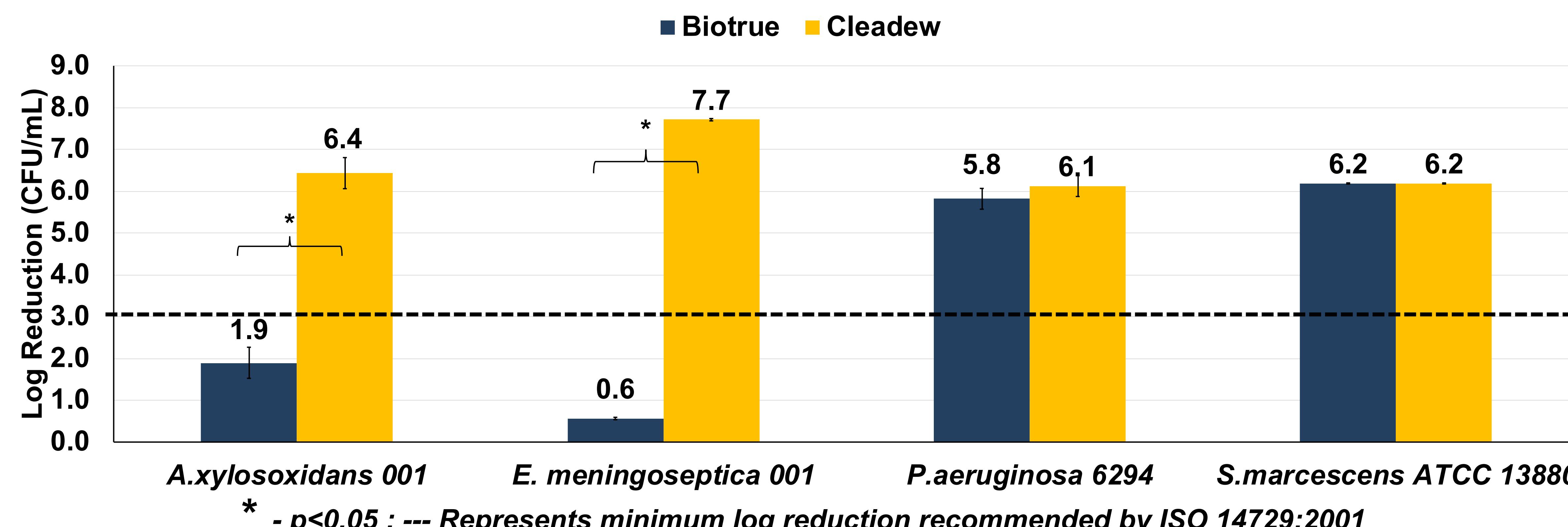
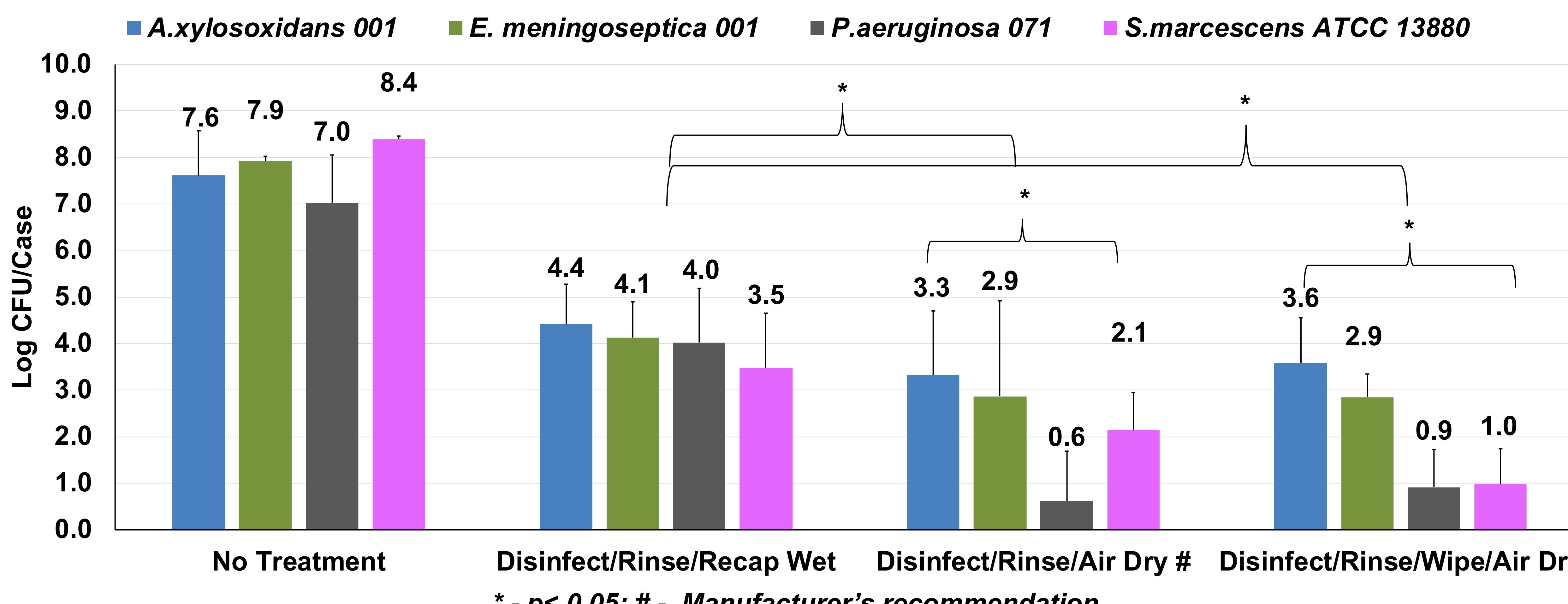


Figure 2: Comparison of bacterial biofilm removal from Cleadew contact lens storage cases



RESULTS

- Cleadew MPDS was very effective against the planktonic form of all test strains (Figure 1).
- Biotrue MPDS had minimal antimicrobial activity against planktonic *A. xylosoxidans* and *E. meningosepticum* and was not used in biofilm studies.
- All storage case hygiene procedures using Cleadew MPDS reduced biofilm of all test strains by more than 3.0 log CFU (Figure 2; p<0.001).
- Air drying the storage cases without (-1.7 log CFU/case; p<0.01) or with the wiping step (-1.8 log CFU/case; p<0.01) removed more bacterial biofilm than recapping the storage cases wet (Figure 2).

CONCLUSION

This study has shown that emerging ocular pathogens are susceptible to Cleadew MPDS in planktonic and biofilm form. Tissue wiping the lens cases did not offer a significant benefit over manufacturer's recommendation of air drying alone in removing bacterial biofilm.

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