

Thinking outside the spectrum: Efficacy of a UV-A lighting system for passive disinfection of healthcare associated pathogens

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Introduction

- Mobile UV-C light room decontamination devices are increasingly used as an adjunct to standard cleaning in patient rooms
- However, UV-C cannot be used when patients or personnel are present
- UV-A (315-400 nm) has been proposed as a safe method to provide continuous disinfection of surfaces that can occur while patients and staff are present

Methods

- In the laboratory, we evaluated the efficacy of UV-A for reduction of methicillin-resistant *Staphylococcus aureus* (MRSA), *Escherichia coli*, *Clostridium difficile* spores, *Candida auris*, and bacteriophages phi X147 and MS2 on steel disk carriers
- Recovery of organisms from carriers exposed to UV-A was compared to controls held under ambient light for the same duration of exposure

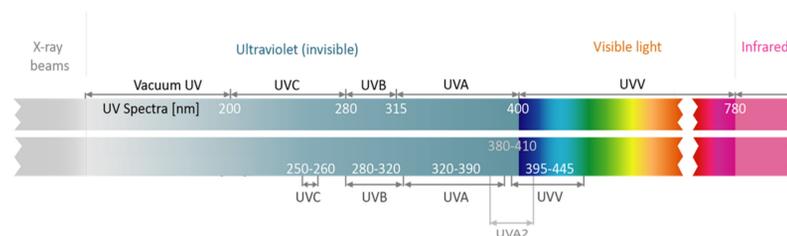


Figure 1. Reduction of organisms exposed to 3 W/m² of UV-A

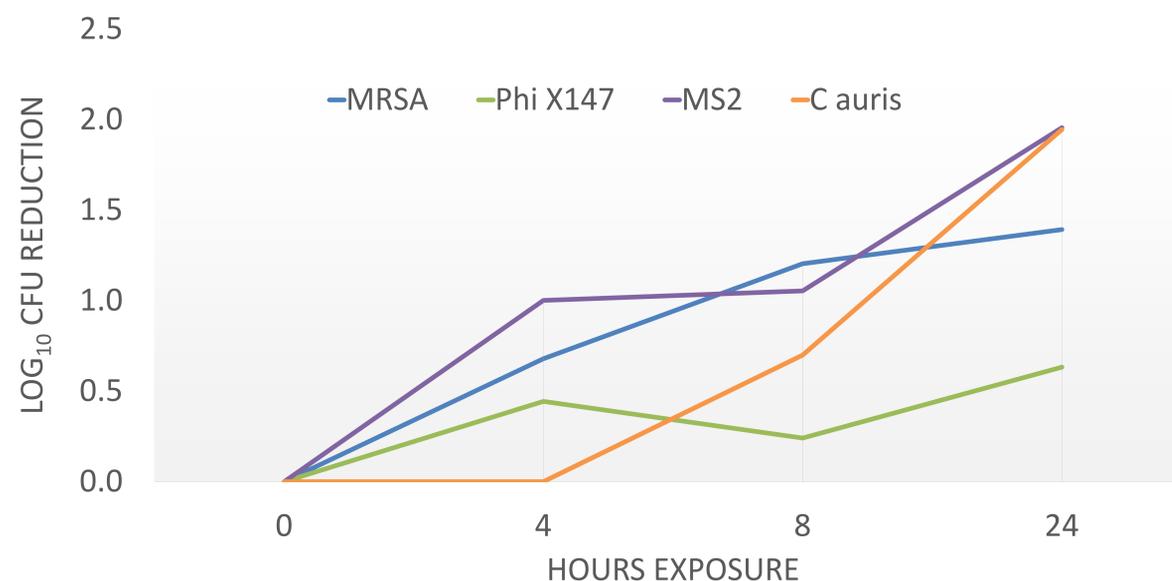
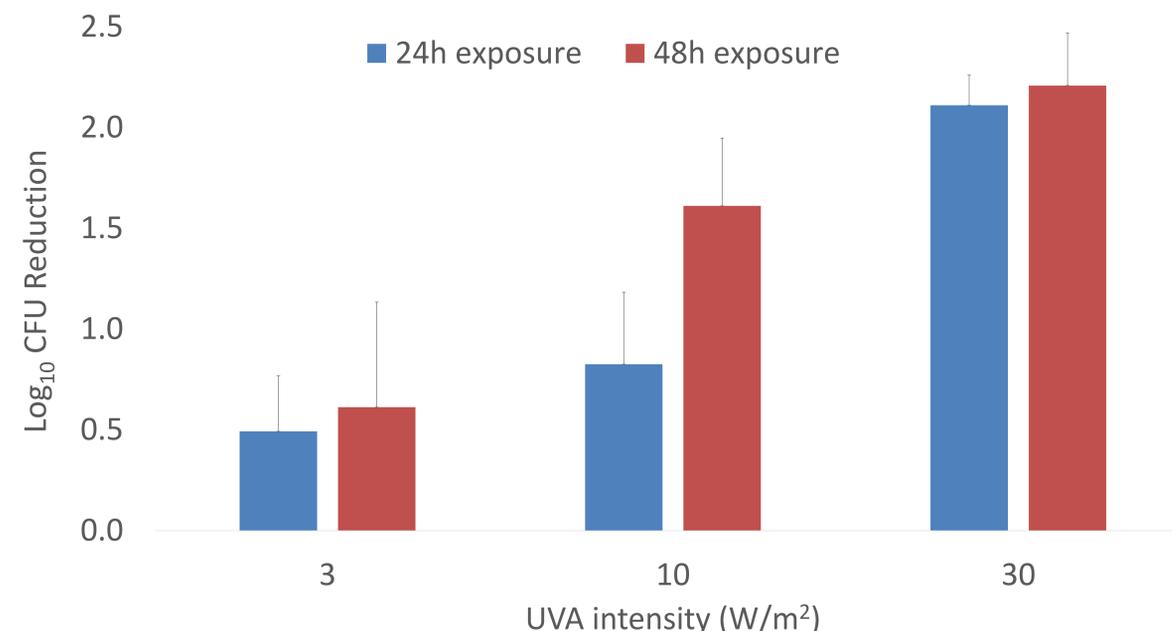


Figure 2. Reduction of *C. difficile* spores exposed to variable intensities of UV-A



Results

- At the intensity proposed for use in patient rooms (3 W/m²), we found that MRSA and *E. coli* were reduced by $\geq 1.2 \log_{10}$ CFU after 8 hours of exposure (figure 1)
- Bacteriophage MS2 and Phi X147 were reduced by 1.1 \log_{10} PFU and .3 \log_{10} PFU respectively after 8 hours of exposure (figure 1)
- At 3 W/m², *C. difficile* and *Candida auris* were reduced by $< 0.5 \log_{10}$ CFU at 8 hours
- At 24 and 48 hours of exposure at 30 W/m², *C. difficile* spores were reduced by 2.1 \log_{10} CFU and 2.2 \log_{10} CFU respectively (figure 2)

Conclusions and Acknowledgements

- We found that UV-A light was effective in reducing MRSA, *E. coli*, and bacteriophage MS2 at an intensity level proposed for use in patient rooms
- At higher intensities (10, 30 W/m²), UV-A was also effective against *C. difficile* spores
- UV-A may be useful as a supplement to standard cleaning by providing continuous low level disinfection of surfaces
- GE Current a Daintree Company provided the testing apparatus but had no role in the study design or outcome