

Ozone and UVC radiation as disinfection strategies of textile substrates

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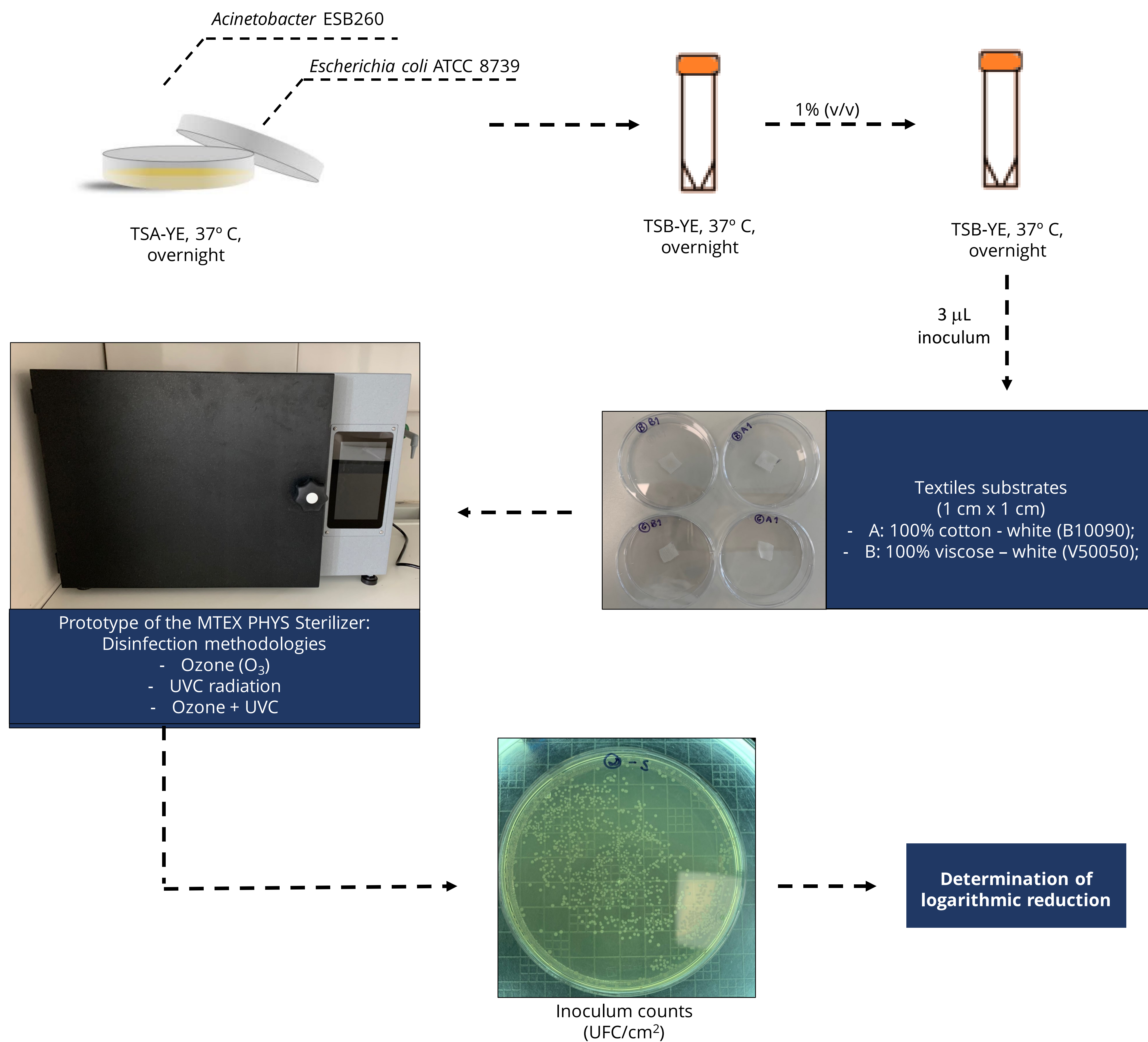


Introduction and Objectives

The emergence of COVID-19 triggered changes in routines and other concerns, such as the disinfection of textile clothing, to avoid the transmission of the disease. The application of ozone and UV radiation to textiles are interesting disinfection strategies that do not use harmful chemicals. Ozone has been used for several years as a disinfectant [1], and UVC radiation has been shown to destroy viruses and bacteria [2]. These technologies can be applied in hospitals, clinics, clothing stores, hotels, among others.

The objective of this study was to investigate the impact of ozone (at different concentrations) and UVC radiation treatments and their combination (at different treatment times) in the elimination of pathogenic microorganisms (*Acinetobacter* ESB260 and *Escherichia coli* ATCC 8739) applied to different textile substrates.

Methods



Results

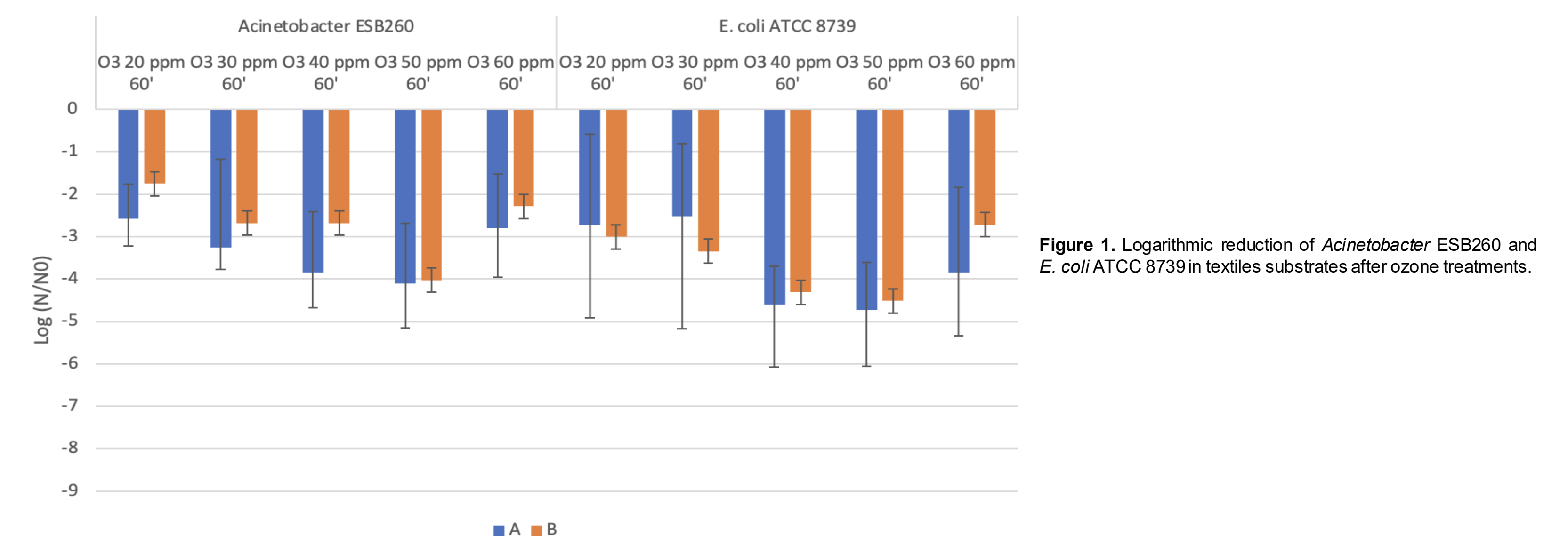


Figure 1. Logarithmic reduction of *Acinetobacter* ESB260 and *E. coli* ATCC 8739 in textiles substrates after ozone treatments.

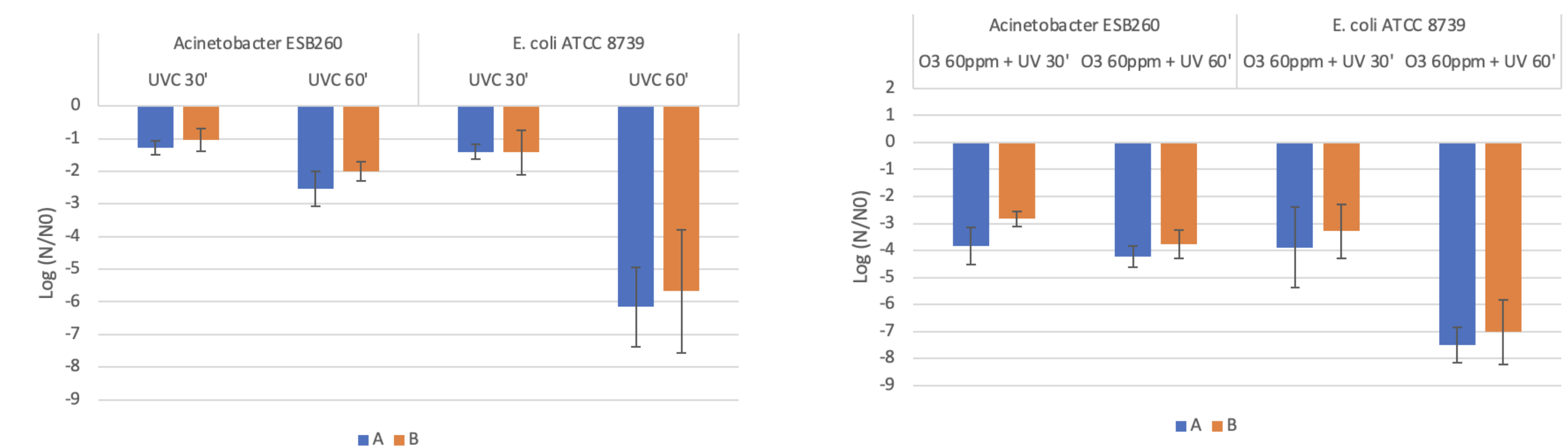


Figure 2. Logarithmic reduction of *Acinetobacter* ESB260 and *E. coli* ATCC 8739 in textiles substrates after UVC treatments.

Figure 3. Logarithmic reduction of *Acinetobacter* ESB260 and *E. coli* ATCC 8739 in textiles substrates after ozone and UVC treatments.

Conclusion and Relevance

The results demonstrated that ozone is more effective than UVC radiation. The highest bacterial inactivation with UVC radiation was that lasting 60 minutes. The best results with ozone treatments were obtained at concentrations of 50 and 60 ppm for 60 minutes, and log reductions of up to 5 log cycles were obtained. The combined treatment triggered a synergy of the treatments, in which values of logarithmic reduction were identical to those of the ozone treatment, but in a shorter time. The effectiveness of the treatments depends on the type of fabric and the bacterial species/strain.

References

- 1] Grignani E. et al. Safe and Effective Use of Ozone as Air and Surface Disinfectant in the Conjunction of Covid-19. *Gases* 2020, 1: 19-32.
- 2] Mackenzie D. Ultraviolet Light Fights New Virus. *Engineering* 2020, 6: 851-853.

Acknowledgements

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