

Stainless Steel Surfaces Disinfection with Atomized Hydrogen Peroxide

Samuel Bravo González
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Objectives

To study the effectiveness of atomized hydrogen peroxide on stainless steel surfaces in a laminar flow cabinet prototype against reference microorganisms to evaluate sterility in the pharmaceutical industry, as well as health care and food industry high interest microorganisms.

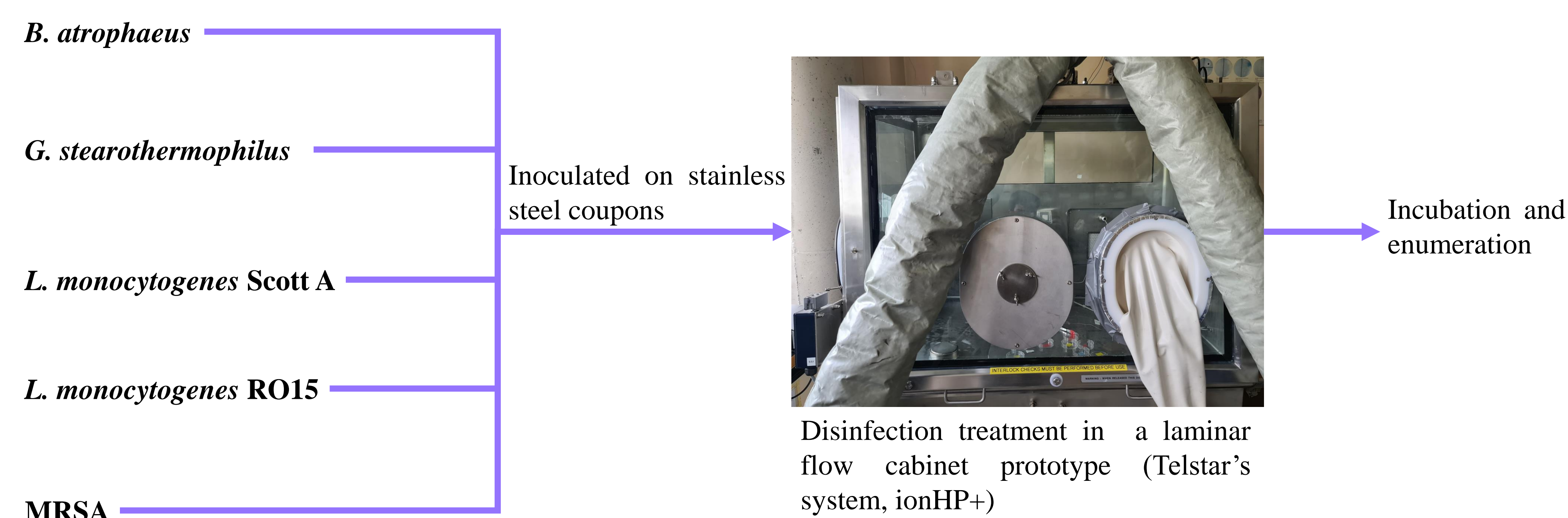
Introduction

In order to improve traditional cleaning and disinfection in food processing areas food manufacturers need to consider new complementary techniques. One of the techniques that may help to reduce environmental contamination is whole room disinfection. Atomized hydrogen peroxide characteristics as whole room disinfectant are shown below:

- Advantages:**
- Ability to reach areas such as cracks in gaskets, walls and ceilings.
 - Broad spectrum antimicrobial activity.
 - Low toxicity and environmentally friendly as it breaks down into water and oxygen.
- Disadvantages:**
- Expensive equipment.
 - Need to remove personnel from the room.

The studied microorganisms were *Bacillus atrophaeus*, *Geobacillus stearothermophilus*, *Listeria monocytogenes* Scott A, *Listeria monocytogenes* RO15 and methicillin-resistant *Staphylococcus aureus* (MRSA).

Methods



Results

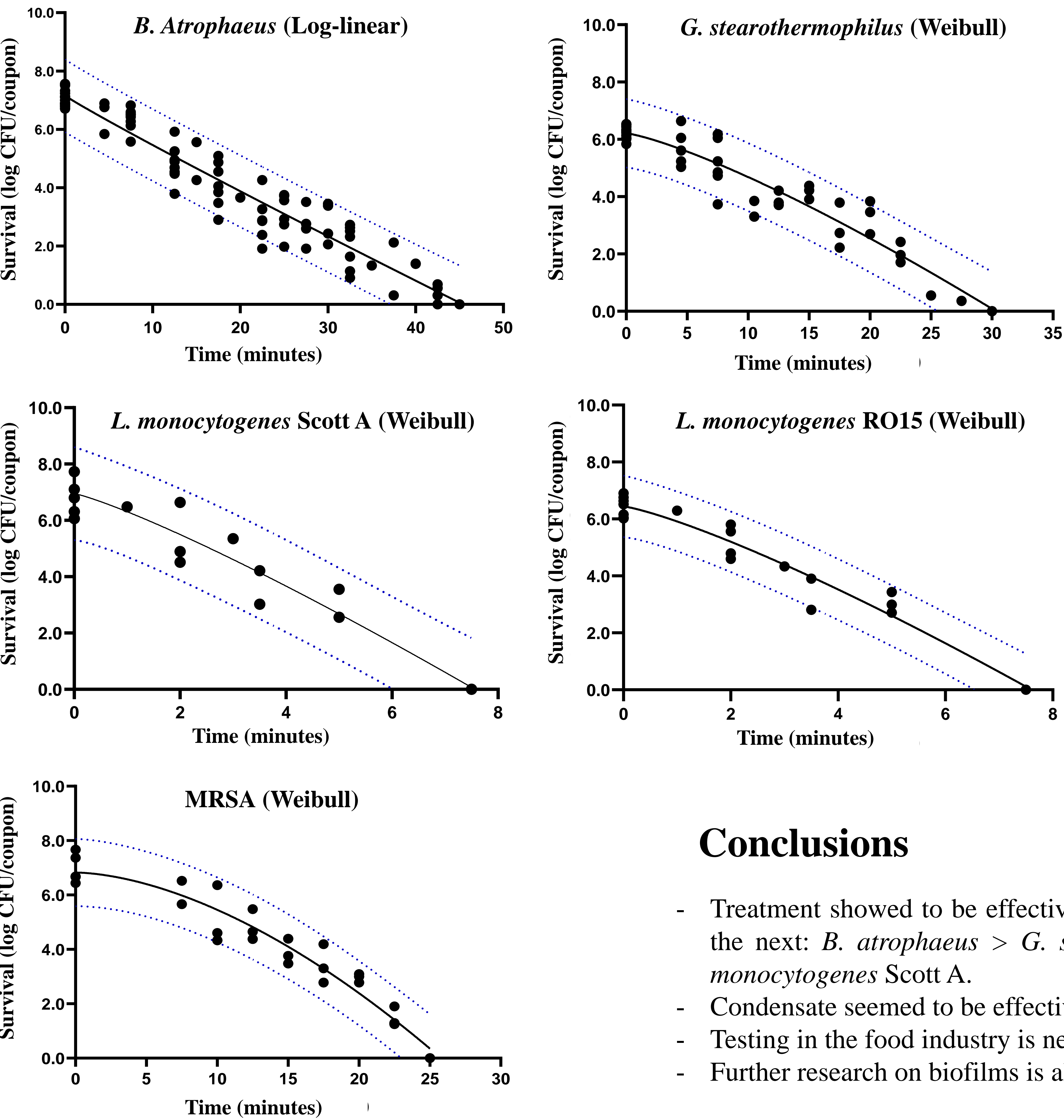


Figure 1. Inactivation models identified for the disinfection process.

Table 1. Inactivation parameters obtained for the disinfection process.

	Initial count (log CFU/coupon + SE)	4D reduction (min)
<i>B. atrophaeus</i>	7,09 ± 0,11	25,65
<i>G. stearothermophilus</i>	6,21 ± 0,14	21,60
<i>L. monocytogenes</i> Scott A	6,95 ± 0,28	4,8
<i>L. monocytogenes</i> RO15	6,42 ± 0,19	5,04
MRSA	6,89 ± 0,22	18,97

Conclusions

- Treatment showed to be effective against the studied microorganisms. The resistance order was the next: *B. atrophaeus* > *G. stearothermophilus* > MRSA > *L. monocytogenes* RO15 ≥ *L. monocytogenes* Scott A.
- Condensate seemed to be effective along with the gaseous phase.
- Testing in the food industry is necessary to verify the process before implementation.
- Further research on biofilms is also necessary to achieve applicable results.

References

- Geeraerd, A.H., Valdramidis, V.P., Van Impe, J.F., 2005. GInaFiT, a freeware tool to assess non-log-linear microbial survivor curves. Int. J. Food Microbiol. 102. <https://doi.org/10.1016/j.ijfoodmicro.2004.11.038>
- Møretrø, T., Fanebust, H., Fagerlund, A., Langsrud, S., 2019. Whole room disinfection with hydrogen peroxide mist to control *Listeria monocytogenes* in food industry related environments. Int. J. Food Microbiol. 292, 118-125. <https://doi.org/10.1016/j.ijfoodmicro.2018.12.015>