



Going Green and Staying Clean:

Using Accelerated Hydrogen Peroxide as a Disinfectant in Rodent Facilities

Kathleen M. McDonald, BS, CMAR, RLATG; Matthew Mihalik, ALAT; Lindsay Bihler, MBA, RLATG

Division of Laboratory Animal Resources, University of Pittsburgh, Pittsburgh PA



Objective

To determine if Accelerated Hydrogen Peroxide (AHP) is a viable alternative disinfectant to chlorine dioxide (ClO₂) in rodent facilities

Safe

- AHP has the safest OSHA hazardous materials in-use rating and the EPA's safest toxicity rating.
- AHP has been safely used by animal shelters for several years.

Effective

- AHP is bactericidal, fungicidal, and virucidal, and is effective against both enveloped and non-enveloped viruses.
- AHP contains a surfactant that helps penetrate soil load.

Environmentally Responsible

- Hydrogen peroxide breaks down to water and oxygen, and the inert ingredients of AHP are generally regarded as safe.
- AHP contains no perfumes or dyes.
- AHP is produced in a LEED certified production facility.

Cage Changes: AHP vs. ClO₂

We changed mouse cages in six rooms using ClO₂ (1:18:1) and six rooms using AHP (1:16). We measured microbial contamination (see Figure 1) on the cage, cage track, and animal transfer station, pre and post cage change.

Results

- AHP reduced microbial contamination significantly more than ClO₂ on the rodent cage surface ($t(49)=2.40<.05$).
- We observed no significant difference between AHP and ClO₂ when all test surfaces are combined ($t(134)=0.534$).

Figure 1. We assessed microbial contamination by using bioluminescence monitors. Using a swab sample of a test area, the monitors assess adenosine triphosphate (ATP) levels, indicating the amount of residual cellular energy.



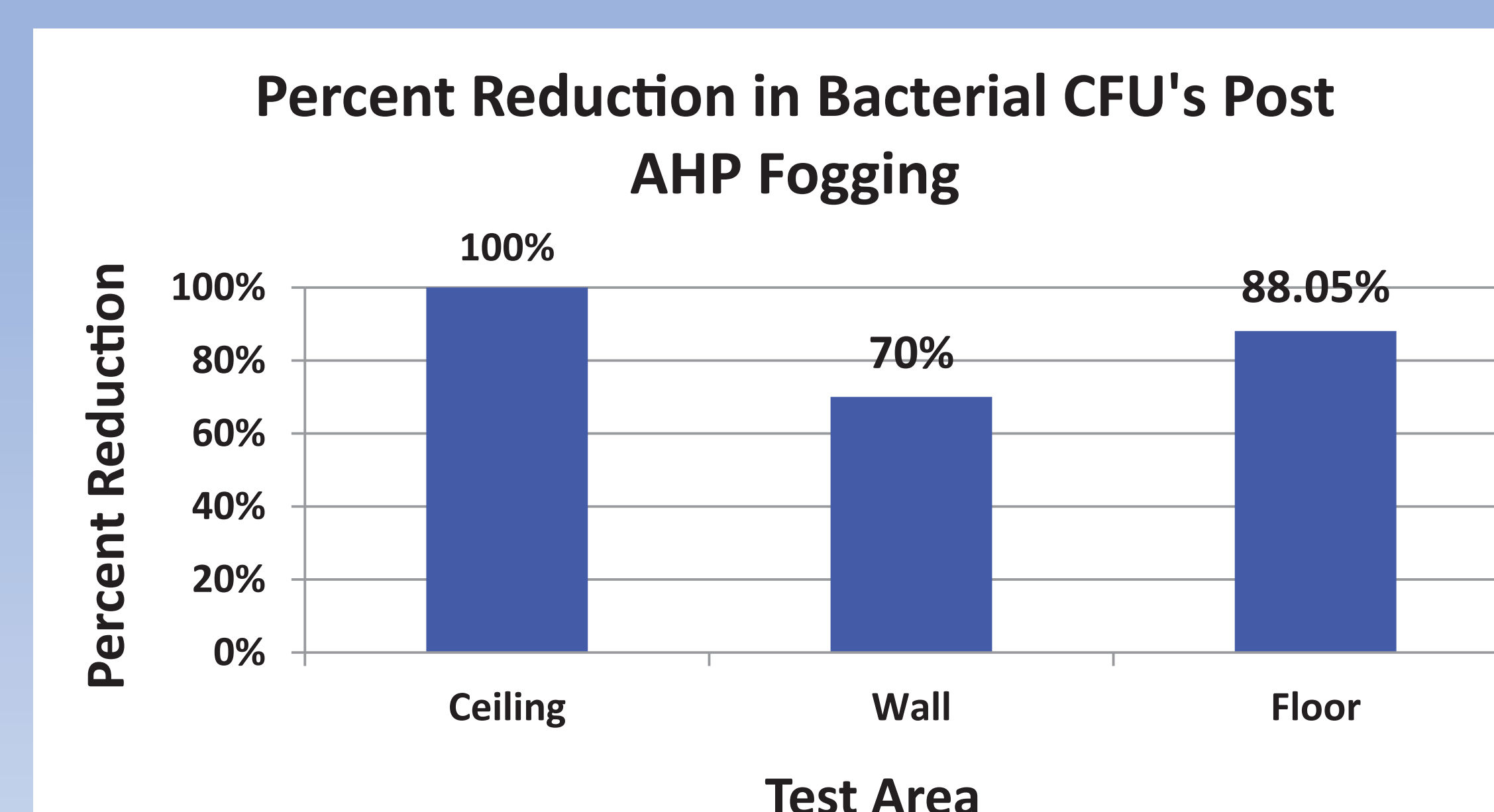
AHP Fogging Decontamination

We fogged a rodent facility room with AHP (1:16) for 20 minutes using a Cyclone® ULV 2730 Fogger. No pre-cleaning was performed. Using RODAC® plates, we measured bacterial colony forming units (CFU's) on the ceiling, wall, and floor, before and after fogging. The test was performed nine times.

Results

- AHP significantly reduced CFUs on all test surfaces ($t(26)=3.69<0.001$). See Figure 2.

Figure 2.



Post-fogging, a range of zero to four CFU's remained on surfaces, indicating successful decontamination.

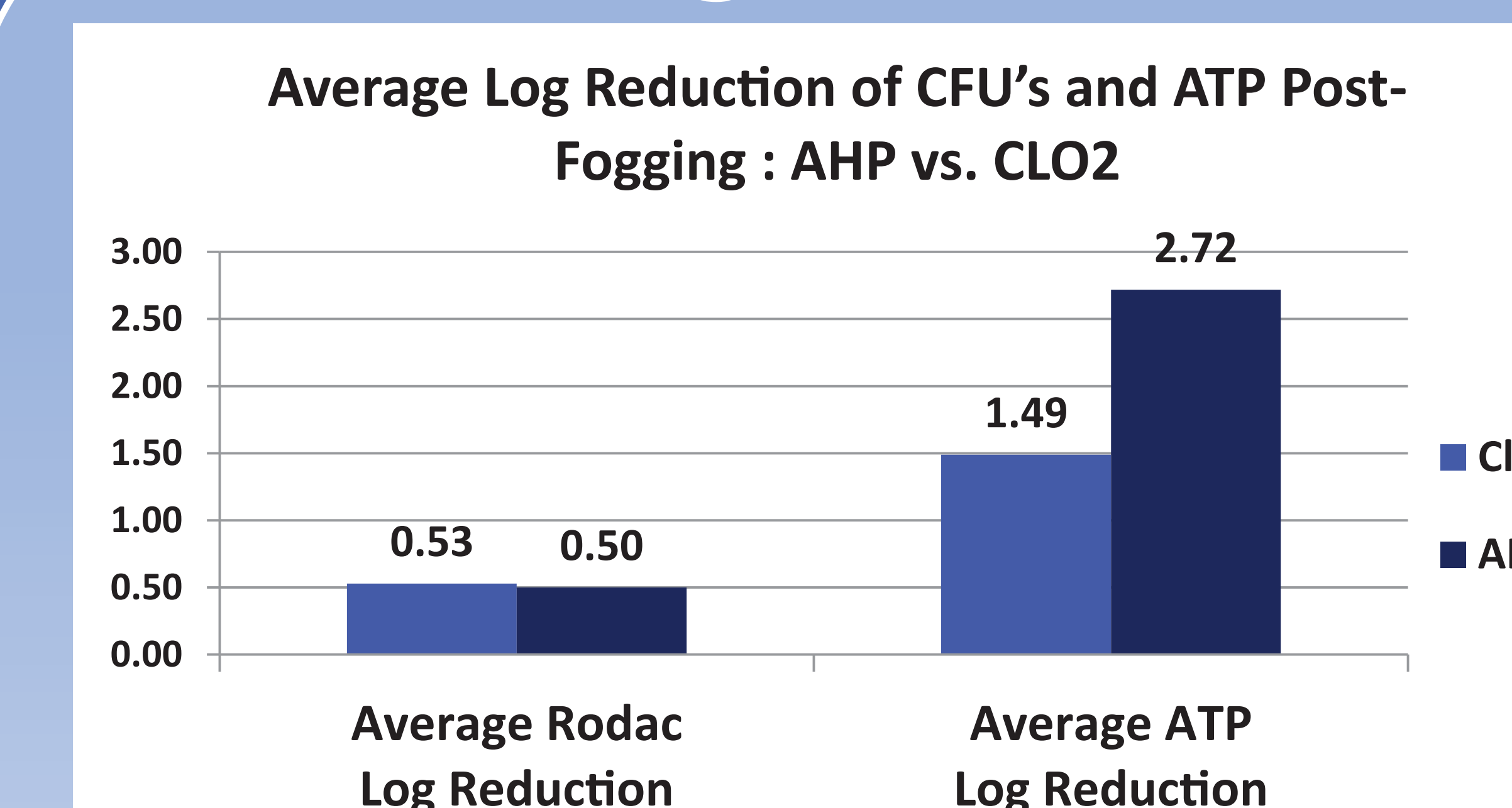
AHP vs. ClO₂ Fogging Decontamination

We fogged an 87 ft.² room using AHP (1:16), and fogged a 74 ft.² using ClO₂ (1:5:1). Using ATP and RODAC®, we assessed microbial contamination before and after fogging.

Results

- AHP and ClO₂ demonstrated comparable CFU log reduction.
- AHP had a greater ATP log reduction. See Figure 3.

Figure 3.



While the CFU log reduction was comparable between AHP and ClO₂, we observed differences in ATP results. For Example, two ClO₂ test areas had CFU growth (2 and 44 CFU's), but the corresponding ATP test indicated zero bacteria present. Our results suggest that product chemistries may alter ATP results.

Conclusions

- AHP is as effective a disinfectant as ClO₂ when used during rodent cage changes.
- Although fogging is an off label use of AHP, our data suggests it can effectively be used for fogging decontamination (see Figure 2).
- Caution must be used when comparing ATP results between different products (see Figure 3).

Discussion

- AHP is cost effective. Because it has a 90 day shelf life versus ClO₂'s 14 day shelf life, we observed less product waste and a monthly savings of 45.09%.
- AHP is non-corrosive to stainless steel and may improve equipment longevity.
- Initial data suggests that AHP does not negatively impact breeding efficacy.
- Because AHP contains a surfactant, it may successfully remove pinworms eggs from surfaces.

