Going Green and Staying Clean: Using Accelerated Hydrogen Peroxide as a Disinfectant in Rodent Facilities

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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.

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).
- AHP significantly reduced CFUs on all test surfaces (t(26)=3.69<0.001). See Figure 2.
- We fogged a rodent facility room with AHP (1:16) for 20 minutes using a Cyclone® UV 2730 Fogger. No pre-cleaning was performed. Using RODAC® plates, we measured bacterial colony forming units (CFUs) on the ceiling, wall, and floor, before and after fogging. The test was performed nine times.

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.

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.

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

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 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.

Figure 2
Post-fogging, a range of zero to four CFU’s remained on surfaces, indicating successful decontamination.

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.

Figure 4
We measured microbial contamination on the ceiling, wall, and floor, before and after fogging.