



## Lab disinfectant harms mouse fertility (2008 Macmillan Publishers Limited)

### Abstract

The harmful effects of quaternary ammonium based disinfectants (Quats) found in lab mice, indicates the importance of choosing a disinfectant that balances efficacy with safety, without compromising either. It is also important to consider the environmental sustainability in a disinfectant, as chemical compounds can build up over time that have the ability to contribute to unforeseen health and environmental issues.

### Background

In 2005, Patricia Hunt moved her research animals from Case Western Reserve Medical School in Ohio- where they used a chlorine-dioxide based sanitizer- to Washington State University where a quaternary ammonium based disinfectant was being used. Since the move, prominent breeding issues, including low fertility rates, late-stage fetus death, developmental stage discrepancies, birth defects, and lactation irregularities, became a concern.

### Results

After a year of extensive research going through all the variables of what could possibly be contaminating the mice and adversely impacting fertility, Hunt discovered that the problem was not with the mice but with the cages. When the mice cages went through the cleaning cycle in the cage washers, they came out covered in Quats. Recognizing the correlation, Hunt, immediately switched back to the chlorine-dioxide based sanitizer, yet it took months for the quaternary ammonium levels to drop in the cages. These compounds build up in the environment over time and make it immensely difficult to eliminate. Although Hunt and her team have been unable to run a controlled experiment, they did perform a side-by-side experiment by exposing the ten cages to the quaternary ammonium based disinfectant and leaving 10 cages clean. However, it was found that after several months, the clean cages were reintroduced to the contaminant through the cage washer, thus revealing the immense build up of the quat-based compounds and its ability to contaminate and spread to other surfaces.

### Conclusions

Although, Hunt switched back to a chlorine-dioxide-based sanitizer and saw an improvement in mice colony fertility performance, it was noted that productivity was nothing like it had been, suggesting chronic damage. Although this problem was found in lab mice, there is concern for human health as well. This group of compounds acts on the cell membrane, and does a fantastic job of killing everything,

however humans are composed of membranes too. The adverse effects on mice fertility, may imply a deleterious effect on the ovary, uterus and in lactation for those who are repeatedly exposed to quaternary ammonium based disinfectants.

### Implications for Accelerated Hydrogen Peroxide Technology

#### AHP Disinfectants provide the perfect balance between safety and efficacy

- Under GHS classification, based on the toxicity data for AHP, the products have been found to be Non-Hazardous with respect to Chronic Exposure for Irritancy, Respiratory Tract Sensitization, Carcinogenicity, Teratogenicity, Mutagenicity and Reproductive Effects.
- AHP has been used successfully in Lab Animal Research facilities with no impact on fertility rates

#### AHP Disinfectants are One-Step Disinfectant Cleaners

- AHP has proven cleaning efficiency resulting in lower costs and faster results as well as added confidence that disinfection can occur
- Because AHP contains surfactants, it helps to remove pinworm eggs from surfaces
- AHP is effective at cleaning and removing quaternary ammonium residue and buildup

#### AHP Disinfectants have realistic contact times

- Short contact times ensure surfaces remain wet for the required contact time, providing comfort and confidence that disinfection has occurred
- AHP's shelf life both as a ready to use and concentrate once diluted ensures less product is used making it more economical

#### AHP Disinfectants are environmentally sustainable

- AHP's active ingredient, hydrogen peroxide, breaks down into water and oxygen leaving no active residues
- AHP is formulated to ensure that it will not negatively impact indoor air quality

#### AHP Disinfectants are compatible

- AHP formulations are compatible with most surfaces, thus preserving your investments

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# DISINFECTION DIGEST

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Reference:

<http://www.nature.com/news/2008/080618/pdf/453964a.pdf>

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