Chlorine Dioxide or Accelerated Hydrogen Peroxide: Can we switch? Do we want to? Did it work?

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Abstract: Maintaining a high level of sanitation is essential for animal research facilities. Researcher and technician compliance, including appropriate application, is a common problem. Historically, our standard protocol included using a Chlorine Dioxide disinfectant (Clidox-S) followed by a wipe down with a less corrosive cleaner (Quatricide PV). The Clidox-S required a five-minute contact time, was corrosive to our stainless steel equipement and required a follow-up cleaner. We identified an Accelerated Hydrogen Peroxide based disinfectant (Rescue Ready to Use – RTU) that is both a disinfectant and a cleaner. It requires a one-minute contact time, claims to be non-corrosive to stainless steel equipment and comes in a convenient pre-soaked wipe format. Before deciding which product would best suit our needs we conducted side by side testing, for effectiveness. Using agar plates, we compared the level of contamination present on surfaces before and after use, following the manufacturers' recommended procedures. After three sets of testing, we determined that both chemicals were equally effective. We then considered many other factors: expense (wipes in particular), shorter contact time (improved compliance), less corrosion of our stainless equipment (long-term cost savings), safety of the product (no aerosol), longer shelf life (up to 2 years), the need for only one chemical (no cleaner required), ease of use (wipes) and user preference. Our final determination was that while the Rescue Ready to Use was more expensive, especially the wipes; it was an effective agent and offered many advantages that justified the increase in cost. We continue to see positive effects based on quarterly health monitoring, yearly agar testing and equipment longevity. In combination with a comprehensive training program our change to Rescue Ready to Use has ensured a high level of sanitation and cleanliness in our facility.

Materials:

Rescue Ready to Use (RTU) wipes, Rescue Ready to Use (RTU) spray, Research Supply Company; Clidox-S and Quatricide PV, mixed according to Pharmacal instructions; sterile cotton tipped applicators; sterile saline; Rodac plates, Pharmacal

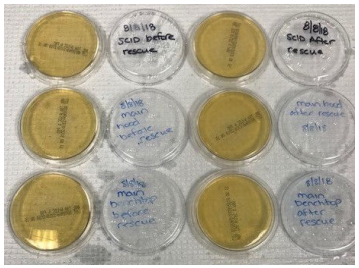
Methods:

Initial comparison; We set up three sets of side by side testing, using Rodac plates. Each set had plates for before and after cleaning, using either Clidox-S followed by Quatricide PV or Rescue Ready to Use wipes. The first set was run by pressing the Rodac plates directly onto the surface to be tested. The second and third sets were run using sterile swabs, moistened with 0.10mL of sterile saline. An area 8" x 8" was swabbed, and the swab was then used to streak the plates. Test surfaces included; the hoods in each room, tables in the procedure room and the floor. The Rodac plates were incubated at 37C for 72 hours, in house. Observations were recorded at 24, 48 and 72 hours. The first set of tests were recorded as positive or negative for growth. In the second and third sets of testing the growth was counted as a percentage of plate covered, or by colony count if less than 25% of the plate was covered.

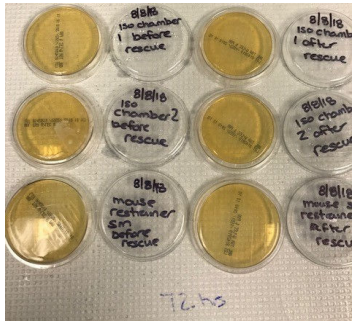
Follow-up comparison; We repeated the procedures used in sets two and three from the initial testing. We tested the hoods, table-tops, isoflurane chambers and restrainers. In order to have a more comprehensive view of the cleanliness of our facility, we also perform quarterly health monitoring on a sample of our animals, per room. The testing is done at Charles River Labs. Discussions with current and new researchers were held regarding the convenience and use of the Rescue RTU wipes. These discussions, combined with the health monitoring results and our in house Rodac plate testing were used to evaluate the success of the Rescue Ready to Use product.

References:

Pharmacal: Microbial Monitoring (Rodac Plate use)
Pharmacal: Technical Information for Clidox-S
Pharmacal: Technical Information for Quatricide PV
Research Supply Company: Rescue RTU wipes information sheet
Research Supply Company: Germicidal Efficacy Data Summary
Previous poster by Autumn MacFarlane, presented at QUAD Symposium 2017:
Clidox vs Rescue: Can we switch? Do we want to?



SCID and MAIN room. Before and after cleaning at 72hrs. Follow-up testing.



Isoflurane and mouse restrainer before and after cleaning at 72 hrs. Follow-up testing.

Discussion:

In our initial testing we compared Chlorine Dioxide (Clidox-S) followed by a cleaner (Quatricide PV) and Accelerated Hydrogen Peroxide (Rescue Ready to Use) wipes to determine if both were equally effective and if so, which product would work best in our facility. We ran three sets of testing using direct exposure and streaking of Rodac plates to confirm the results. In all testing we used the floor as a positive control and an unexposed plate as a negative control. During our initial experiment we were pleased to be able to verify that all areas were cleaned properly based on the "0" colony growth in our room hoods, in the "before cleaning" plates. We took into account many factors when making our decision. These factors included: cost, time, compliance-due to a 1 minute contact time, longer shelf life-up to 2 years, lack of mixing required, storage space, corrosion of stainless equipment-or not, user preference and the ability to use one product for all surfaces, including floor, walls and as a spray for items entering our vivarium. Our follow up testing identified areas that required a more thorough cleaning after use. The plates showed growth before cleaning in the chambers and restrainers. This allowed us to visually show all users the need for complete cleaning before and after use of all equipment. This discussion increased compliance and improved our training program. We reviewed our quarterly health monitoring results, from Charles River Labs. Despite having been concerned about animals from a vendor who had alerted us to a positive result in their testing, our testing continues to be negative. We discussed the satisfaction levels with our senior users and new ideas from our recent hires. All of this information was looked at to verify and improve our sanitization and cleaning program.

Conclusion:

We are satisfied that the switch made over a year ago was the correct one for our company and will continue to use the Rescue Ready to Use products. We view the increase in cost as money well spent in the ongoing effort to maintain our high standards. The success is based on: our continued clean Health Monitoring results, compliance, time savings and ease of use.

Future considerations:

Due to the expense of the Ready to Use format, we may consider switching to the concentrated product. This would increase some staff duties, however the cost savings may become a larger priority. The addition of new employees would balance the work increase, which would help to balance the duties in our facility. At this time, however we will continue with the Ready to Use concentration.

	24 hours	48 hours	72 hours	follow-up
SCID, MAIN and BREEDER rooms before Clidox	0	0	0	N/A
SCID, MAIN and BREEDER rooms after Clidox	0	0	0	N/A
SCID, MAIN and BREEDER rooms before Rescue	0	0	0	0
SCID, MAIN and BREEDER rooms after Rescue	0	0	0	0
PROCEDURE before Clidox	0	0	50%	N/A
PROCEDURE after Clidox	0	0	5 colonies	N/A
PROCEDURE before Rescue	0	0	2 colonies	25%-50%
PROCEDURE after Rescue	0	0	4 colonies	0
FLOOR before Clidox	25%	50%	75%	N/A
FLOOR after Clidox	0	0	1 colony	N/A
FLOOR before Rescue (also positive control)	25%	50%	75%	75%+
FLOOR after Rescue	0	0	0	0
NEG control	0	0	0	0

Combination of charts from the animal housing rooms, isoflurane chambers and restrainers for initial three sets of testing and follow up testing with Rescue only. In plates with less than 25% coverage, colonies were counted. In plates with greater than 25% coverage we estimated percent of plate covered.

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