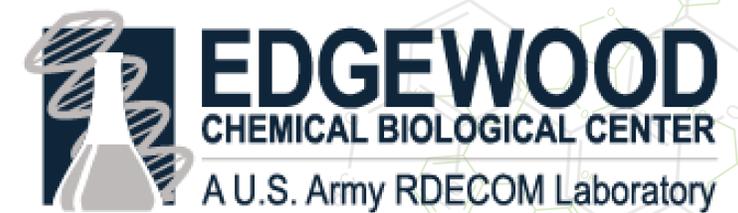


Evaluation of Liquid-, Foam-, and Gel-Based Decontaminants

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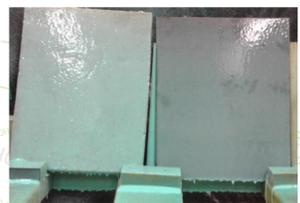


Abstract

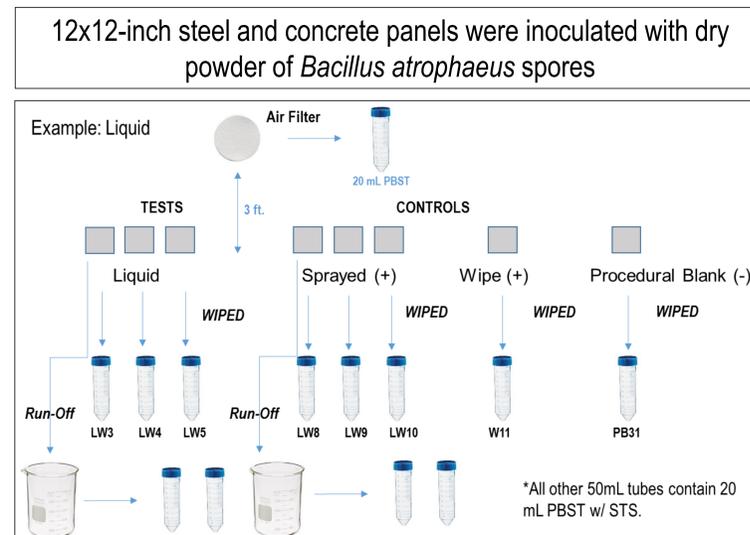
For fixed site surface decontamination, two distinct options among liquid disinfectants include pH-adjusted bleach (pAB) and per-acetic/peroxide formulation Spor-Klenz (Steris Corp., Mentor, OH). Efficacy of these two sterilants in lab-scale studies is well-documented. In a recent study completed by a multi-agency group led by the U.S. EPA, pAB was found to be effective, however, some collateral damage was evident (EPA/600/S-15/001). Disinfectants have been applied as liquids, foams, or gels. It is often hypothesized that foam- or gel-based decontaminants will be more effective because of prolonged wetted contact times. Scientific data supporting this assumption is lacking. Ambient conditions were varied to include: 50 °F/70% RH and 90 °F/25% RH, with fan ON or OFF to simulate wind. With just one application of disinfectant, runoff was collected to assess mechanical dislodgment vs. sporicidal efficacy, and panels were wipe-sampled following the 30 minute contact time to estimate the amount of viable spores remaining. As for control panels, water was sprayed. Additional panels were simply wiped down to determine the inoculation density in each test run. Unfortunately, the gel application was discontinued mid-way through the work because of issues related to its application after re-formulation. A modified gel (lacking 10% aqueous component, for reconstitution with decontaminant volume) could not be procured from the vendor. Results show that vertically-oriented surfaces are difficult to decontaminate with just one application of a sporicide, regardless of formulation (liquid or foam). Direct observation tests showed that foam application maintained surface wetness longer than liquid. However, no significant difference in efficacy in terms of log reduction with the use of foam was observed relative to liquid application.

Objectives

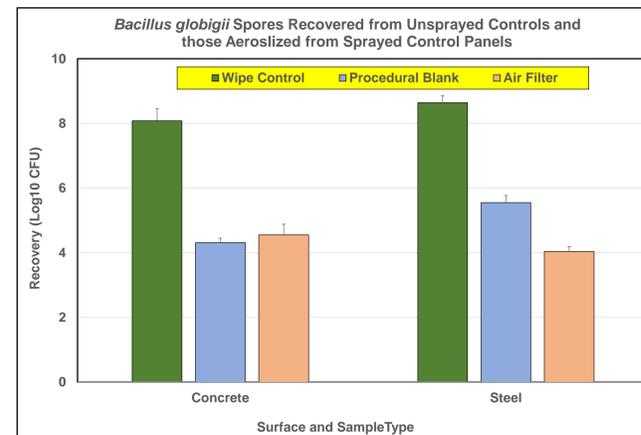
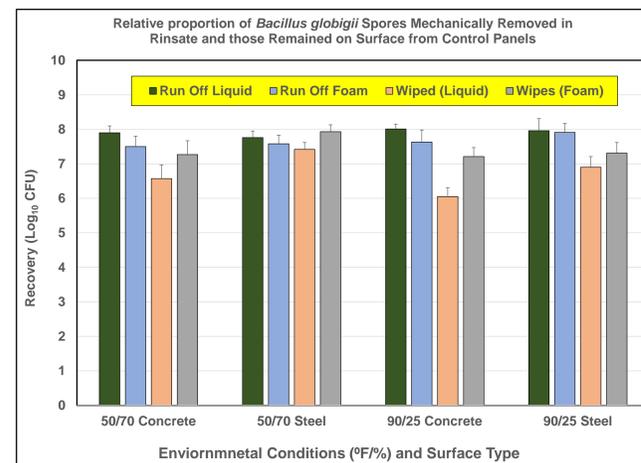
The objective of current effort was to compare three delivery methods, i.e. liquids, foam and gel, of two decontaminants, Spor-Klenz and pAB (representing two distinct chemistries) on vertical surfaces. With just one application of disinfectant, runoff was collected to assess mechanical dislodgment vs. sporicidal efficacy, and panels were wipe-sampled following the 30 minute contact time to estimate the amount of viable spores remaining. As for control panels, water was applied for each method of application.



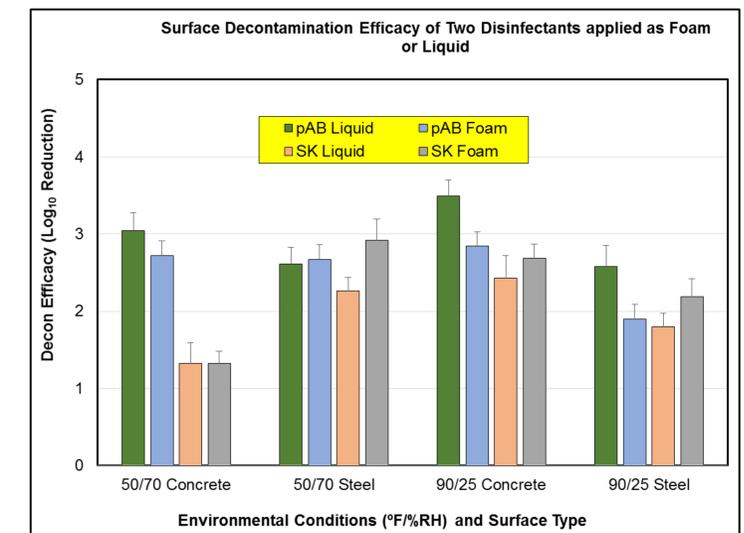
Methodology



Spore Partitioning and Recovery



Decontamination Efficacy



Discussion & Conclusions

- ✓ Spore deposition was uniform (7.2-7.8-logs) over the 1 ft² surface
- ✓ A large fraction of viable spores from control panels were mechanically removed and recovered in rinseate (over 7-logs) when sprayed with water
 - Spore removal by liquid application was on average one-log greater than with foam, proportionate to runoff volume
 - This was more pronounced for concrete than for steel
- ✓ Spores recovered in air samples demonstrate re-aerosolization
- ✓ A significant fraction of spores (~4-6 logs) survived the decontaminant treatments on surface
- ✓ Poor efficacy of peroxide-based Spor-Klenz on concrete is corroborated by this study
- ✓ There was no significant efficacy difference between liquid and foam application for both sporicides

Disclaimer : The United States Environmental Protection Agency (EPA), through its Office of Research and Development's National Homeland Security Research Center, funded and managed this collaborative investigation with ECBC through Interagency Agreement DW02192450401. This poster was peer and administratively reviewed and has been approved for presentation as an Environmental Protection Agency document. It does not necessarily reflect the views of the Environmental Protection Agency. No official endorsement should be inferred. This poster includes photographs of commercially-available products. The photographs are included for purposes of illustration only and are not intended to imply that EPA approves or endorses the product or its manufacturer. EPA does not endorse the purchase or sale of any commercial products or services.

