



Evaluation of the Efficacy of Disinfectant Footmats for the Reduction of Bacterial Contamination on Footwear in a Large Animal Veterinary Hospital

(Hornig et al, Journal of Veterinary Internal Medicine, 2016.)

Abstract

Many North American laboratories and life science facilities utilize footbaths and footmats at entrances and key control points throughout the facility in an endeavor to decrease trafficking of pathogenic microorganism throughout the facility via contaminated footwear.

Studies have shown that disinfectant footmats and footbaths may be helpful, but are not absolute methods, for eliminating contamination on footwear in laboratory or life science facilities. While disinfectant footmats may be considered reliable in decreasing footwear contamination, the magnitude of these decreases is limited. Disinfectant efficacy would likely be improved by the removal of organic debris before disinfection or increasing contact time, however, the study was designed to emulate common practice in facilities where footmats are utilized to decrease trafficking of microorganisms on footwear as personnel move throughout the facility.

Study

The purpose of this study was to assess the efficacy of footmats containing different popular disinfectants by standardized methods to evaluate the reduction of bacterial contamination on footwear in a natural setting. The disinfectant solutions included a 1.0% VIRKON solution (6.5 ounces of powder to 20 L of water), a 4.25% AHP® solution (40 ounces of concentrate to 20 L of water), a 1.56% QUAT solution (10 ounces of concentrate to 20 L of water), and a 0.39% PHENOLIC solution (2.5 ounces concentrate to 20 L of water). Four new disinfectant footmats were used for the project.

New rubber overboots were purchased, and 4 standardized sampling zones were drawn on the sole using a template. Contaminated bedding and animal waste provided the source of microbial contamination. Study personnel wore the boots, followed a process to contaminate them, and then stepped on the randomly assigned, solution-saturated footmat for 3 seconds, before the boot was removed and allowed to rest for the 10 minute contact time, sole-side up. Samples were collected from the boot sole with a sterile swab moistened with neutralizing broth, then processed and diluted with buffered peptone water. Samples of each dilution were then plated on tryptic soy agar plates with 5% sheep blood to quantify total aerobic bacteria, and on MacConkey agar to quantify enteric bacteria (Gram-negative bacteria).

Results

Reductions in colony-forming units (CFUs) on treated boots ranged from no detectable reduction to 0.45 log₁₀ and varied by disinfectant.

Percentage reduction in total bacterial counts generally were larger for AHP® and QUAT disinfectants (range 37-45%) and smallest for the PHENOLIC (no detectable reduction).

Conclusions

The results suggest that disinfectant footmats could be used to decrease CFUs for total bacteria and Gram-negative bacteria on the soles of overboots under conditions that simulate use in a large animal veterinary hospital. In general, the greater reductions were seen with peroxygen disinfectants (AHP® and VIRKON), but neither of these treatments decreased contamination to levels that would be considered “sanitization” or “disinfection”.

Implications for AHP®

Footmats and footbaths can serve as visual indicators to personnel that they are entering or leaving areas of greater risk within a facility, and also can serve as a deterrent to unnecessary foot traffic, thereby decreasing the potential for spread of contamination. The use of AHP® with footmats and footbaths is an effective way to decrease bacterial contamination of footwear.

AHP® disinfectants provide the perfect balance between safety and efficacy

- AHP® provides a HMIS rating of "0", meaning it has been proven to be non-toxic, non-irritating to eyes and skin and non-skin sensitizing and does not require the use of personal protective equipment to handle

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® disinfectants are compatible

- AHP® formulations are designed to be compatible with a wide range of materials, protecting investments by reducing corrosion and wear

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

PTSMP0190.0(02/2017)