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NUMBER 32 - NOVEMBER 2010

Opti-Cide³ Cleaning Study

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Purpose – The ability of chemical disinfectants to penetrate and preclean surfaces contaminated with blood, saliva, and exudate (bioburden) is a fundamental consideration in the selection of an appropriate disinfecting agent. The ability of available disinfectants to preclean surfaces can vary, and therefore, comparison of disinfectants under the same conditions is important in establishing their efficacy. The purposes of this study were to:

1. Evaluate the ability of *Opti-Cide³* surface disinfectant and *Opti-Cide³* surface disinfectant wipes to clean environmental surfaces coated with bacteria-contaminated, dried organic debris;
2. Compare the cleaning capability of *Opti-Cide³* disinfectant spray and *Opti-Cide³* wipes with that observed for surface disinfectants containing high alcohol concentrations; and
3. Investigate the ability of the disinfectants tested to remove contaminating bacteria in organic debris on environmental surfaces.

Materials and Methods

All disinfectants evaluated in this study were commercially purchased by Biotrol. Disinfectants evaluated in this study include: *Opti-Cide³ Spray*, *Opti-Cide³ Wipes*, *DisCide Ultra Spray*, *DisCide Ultra Wipes*, *Super Sani-Cloth Wipes* and *Lysol II Spray*. Manufacturers' directions for use of the sprays and wipes were followed. Freshly collected heparinized whole blood was used as the organic debris challenge for environmental surfaces. A 24-hour bacterial culture of *Staphylococcus aureus* ATCC# 25923 was added to vials of blood to yield a final 1:10,000 use-dilution.

Tile Contamination and Wiping Procedures

Laminated countertop material previously cut into 2 x 2-in squares was used as the test environmental surface. Individual squares were prepared by applying 0.2 mL of contaminated blood onto the squares and spreading it with pre-moistened, cotton applicators. Wetted surfaces were allowed to air dry before assay. Next, coated squares were treated with a single spray of *Opti-Cide³* disinfectant, followed in 10 seconds by 5-6 wipes with sterile 4 x 4-in gauze. Other experimental squares were similarly treated using prepared *Opti-Cide³* disinfectant wipes. For comparison, commercial tuberculocidal disinfectants containing 55%, 63.25% and 79.0% alcohol, respectively, were assayed on prepared counter squares. This comparison was done to evaluate the cleaning efficiency of the lower alcohol (21%) *Opti-Cide³* spray and wipe products with that observed for the high alcohol-containing disinfectants. Initial cleaning of blood-coated tiles was also assessed using distilled water only to remove the bacterial/blood debris.

Replica Plating Procedure

Detection of viable bacteria present on the surface 3 minutes after the wiping procedure was determined by replica plating treated squares on tryptic soy agar plates and tryptic soy agar plates containing 5% sheep blood. Plates were incubated aerobically at 37° C for 24 hours before microbial growth was observed and counted. Bacterial growth was recorded as colony forming units (CFU). Each product was tested using five procedural replications.

Table 1. Bacterial Growth on Treated Countertop Squares	
Treatment	Mean Colony Forming Units (CFU) [range]
Control (untreated)	Too Numerous To Count *(TNTC)
Distilled water	220 (136-350)
Opti-Cide ³ spray	101 (10-185)
Opti-Cide ³ wipes	5 (1-11)
DisCide Ultra Liquid	857 (752-900)
DisCide Ultra Wipes	760 (654- >1000)
Super Sani-Cloth Wipes	544 (462-620)
Lysol II Spray	> 800 (800-TNTC)

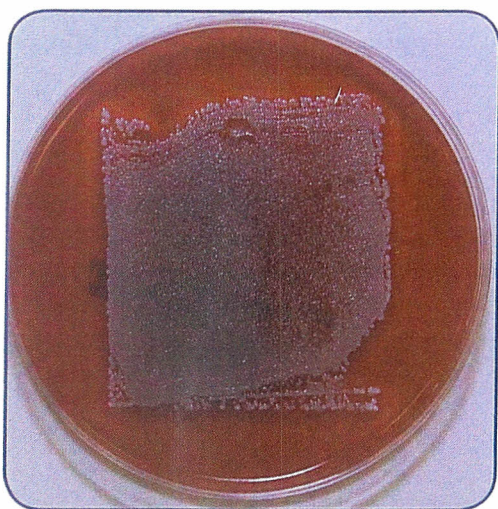


Figure 1 Replica plate culture of untreated blood tile with *S. aureus*

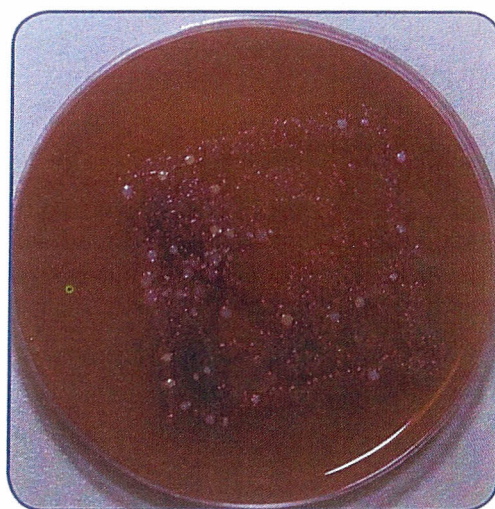


Figure 2 Post-treatment with Distilled H₂O



Figure 3 Post-treatment with Opti-Cide³ spray



Figure 4 Post-treatment with Opti-Cide³ wipes

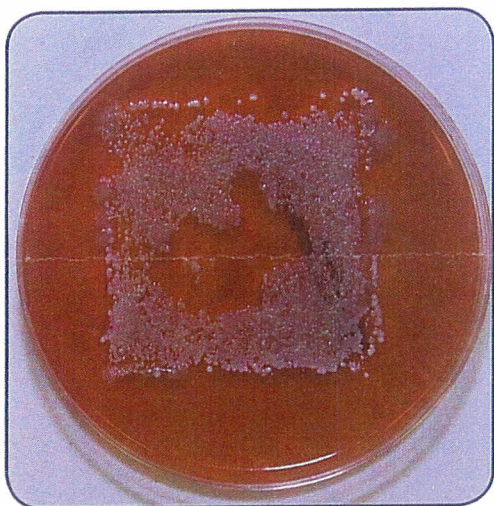


Figure 5 Post-treatment with DisCide Ultra spray



Figure 6 Post-treatment with DisCide Ultra wipes

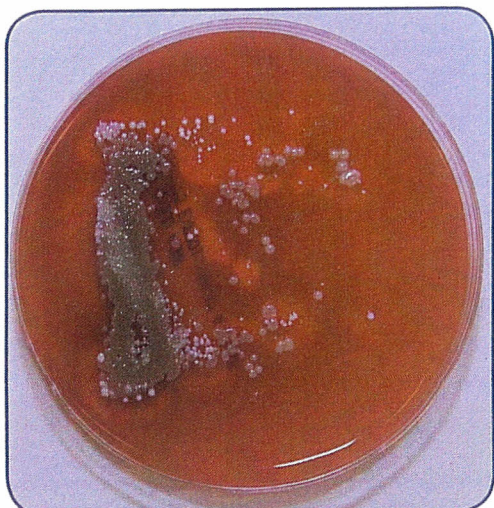


Figure 7 Post-treatment with Super Sani-Cloth wipes

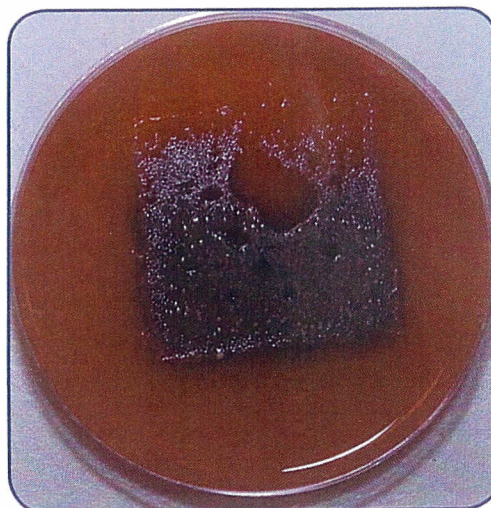


Figure 8 Post-treatment with Lysol II spray

Results: Control untreated tiles were replica-plated on agar plates to assess baseline bacterial concentrations in blood. These yielded confluent growth after 24-hour incubation. Application of both the *Opti-Cide*³ disinfectant spray and wipes removed the overwhelming majority of dried blood from the tile surfaces in the wiped areas. Replica plating of those treated countertop squares further demonstrated a significant reduction in bacterial presence after cleaning with these products. Control tiles cleaned with water only also resulted in reduced organic burden and fewer remaining *S. aureus* colonies compared with the results from untreated tiles. In contrast, observations following spray and wipe procedures using disinfectants containing either 55%, 63.25% or 79.0% alcohol indicated that much less of the dried bacterial/blood debris was removed from the surfaces.

Conclusions: Initial cleaning and subsequent disinfection are important because together they minimize the potential for cross-infection from environmental surfaces. Based on this study evaluating the ability of surface disinfectants to remove test bacteria in the presence of organic debris, the *Opti-Cide*³ disinfectants assayed (*Opti-Cide*³ spray and *Opti-Cide*³ wipes) were able to accomplish cleaning of contaminated prepared surfaces to a much greater extent than other commercial disinfectants containing greater than 50% alcohol in their formulations. In fact, the other commercial disinfectants removed less dried bacteria/blood debris than using water alone, as described in the study results.