

Optim 1 Environmental Surface Cleaning Investigation

Objective:

The study was undertaken to evaluate *Optim 1 (SciCan)* wipes using three parameters:

1. Ability to clean environmental surfaces coated with dried organic debris,
2. Ability to remove protein from environmental surfaces as a more stringent cleaning parameter, and
3. Cleaning capability compared to that observed for competitor surface disinfectants.

Materials and Methods:

Cleaning:

Freshly collected heparinized human blood was diluted using sterile saline to yield 5%, 25%, and 50% preparations. Whole blood served as the 100% blood suspension. These 4 bioburden dilution samples were then used to coat experimental environmental surfaces (6 tiles; 1 control tile and 5 test tiles) by adding 0.2 mL of fluid onto 2x2 in. laminated countertop tiles. The material was spread over the surface using sterile cotton swabs, and allowed 1-2 hours to dry at room temperature.

Test disinfectant wipes (Table 1) [*Optim 1 (SciCan)*, *Birex (Biotrol)*, *Monarch Surface Disinfectant Wipes (Air Techniques)*, and *Caviwipes (Kerr TotalCare)*] were applied onto tiles with consistent mechanical force and wiped 3-5 times. Tiles treated with disinfectant were then visually analyzed and photographed.

Protein Removal:

Following each cleaning/disinfectant treatment, *Hemastix* test strips (*Siemens*) were immersed in sterile saline and rubbed across treated test tiles (100% whole blood) to detect the presence of hemoglobin (protein). Traditionally these strips are used in medicine to detect trace amounts of blood (hemoglobin) in urine but have made their way into forensics as a way to detect the presence of blood on surfaces. Results are qualitative distinguishing between an absence of hemoglobin and the presence of small, moderate, and large amounts.

Table 1. Test surface disinfectants, tuberculocidal contact time, and active ingredients

Surface Disinfectant	Contact Time (Minutes)	Active Ingredients
<i>Optim 1 (SciCan)</i>	1	0.5% hydrogen peroxide
<i>Caviwipes (Kerr TotalCare)</i>	2	17.5% isopropanol, 0.28% diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride
<i>Birex (Biotrol)</i>	10	0.28% o-phenylphenol, 0.03% o-benzyl-p-chlorophenol
<i>Monarch (Air Techniques)</i>	1	72.5% Ethyl Alcohol, 0.33% Didecyl Dimethyl Ammonium Chloride

Results:

Cleaning:

Following treatment, **Optim 1** and other water-based surface disinfectants (**Caviwipes**, and **Birex**) successfully removed all visible blood for all blood dilutions (Figures 1 and 2). In contrast, tiles treated with a high-alcohol surface disinfectant wipes (**Monarch**) had much of the organic debris remaining on the 100% and 50% dilutions, a moderate amount on the 25% dilution, and almost all removed on the 5% dilution tiles (Figure 3).

Protein Removal:

When looking at protein (hemoglobin) removal as a measurement for cleaning, **Optim 1** was the only surface disinfectant to almost completely remove proteins from the tiles covered with 100% whole blood (Figure 4). **Caviwipes** and **Birex**, although proficient at cleaning visible, organic debris, were unable to remove the majority of proteins. Lastly, **Monarch** surface disinfectant was unable to clean visible organic debris nor remove residual proteins.

Figure 1: Representative untreated blood tiles

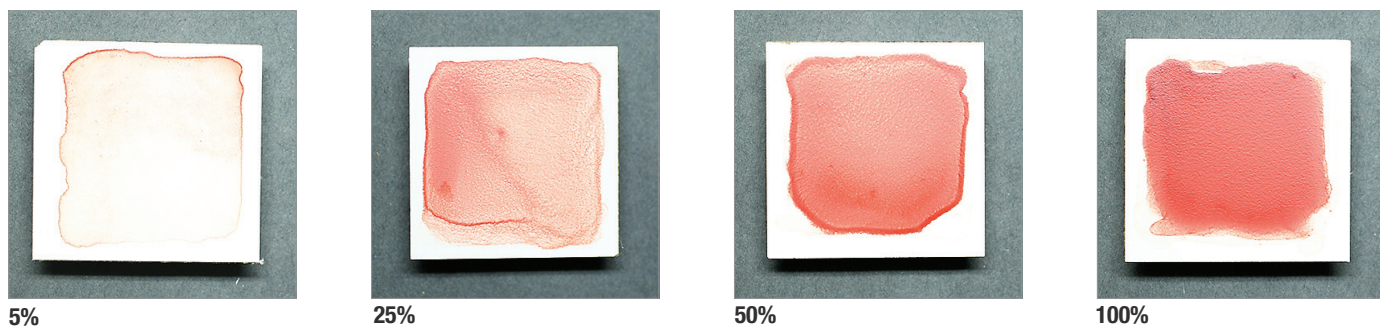


Figure 2: Representative blood tiles treated with **Optim 1**

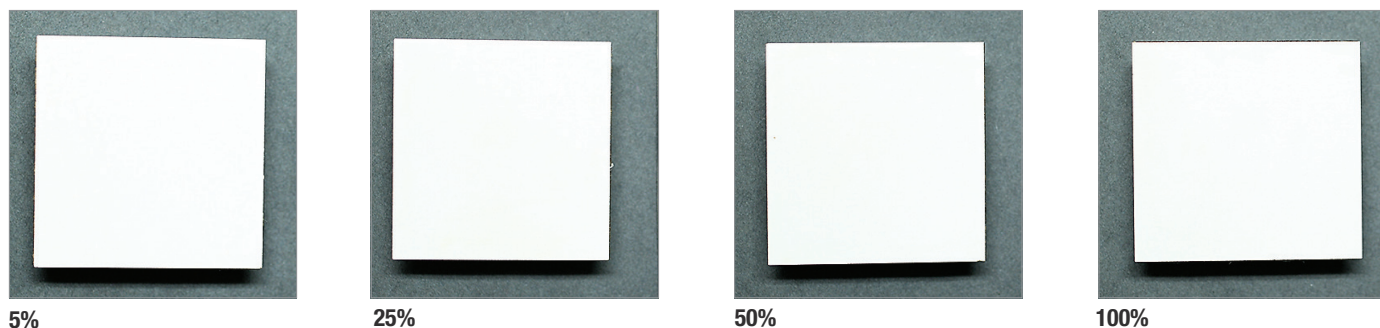


Figure 3: Representative blood tiles treated with high-alcohol surface disinfectant

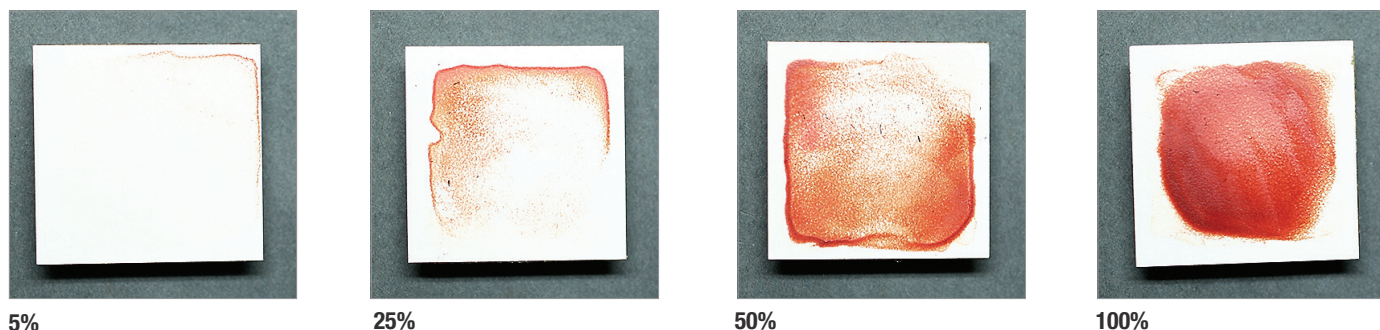
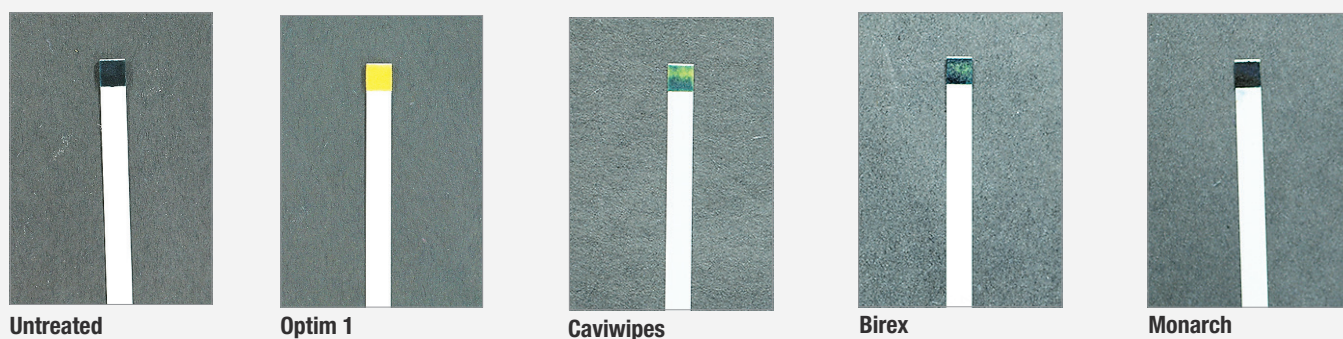


Figure 4: Hemastix protein removal (hemoglobin) test strips collected after cleaning/disinfectant treatment (Yellow = no protein, green = some protein, dark green/blue = a lot of protein) (Optim 1, Caviwipes, Birex, and Monarch)



Conclusion:

In the present investigation, intermediate-level disinfectants containing different chemical antimicrobials were evaluated for their cleaning and protein removal capabilities. *Optim 1* was the only disinfectant wipe to successfully clean and remove proteins with a single application.



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