



OPTIM 33TB Surface Cleaning Investigation

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Objectives:

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

Materials and Methods:

Freshly collected heparinized human blood was diluted using sterile saline to yield 5%, 25%, 50%, and 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 [*OPTIM 33TB* (SciCan), *Ultra Swipes Plus* (USP) (*Germiphene*), *tb Minuteman* (Maxill), *BioSURF* (Micrylium) and *Caviwipes* (Kerr TotalCare)] (Table 1) were applied onto tiles with consistent mechanical force and wiped 3-5 times. Tiles treated with disinfectants were then allowed to remain in contact with applied liquid for the manufacturers' recommended intermediate-level disinfection (i.e. tuberculocidal contact time) interval (Table 1). Positive, control blood tiles were left untreated and photographed (Figure 1).

Protein Removal

Following each cleaning/disinfectant treatment, Hemastix test strips (*Siemens*) were immersed in sterile saline and rubbed across the lowest dilution of treated test tiles (100% 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 has made its 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

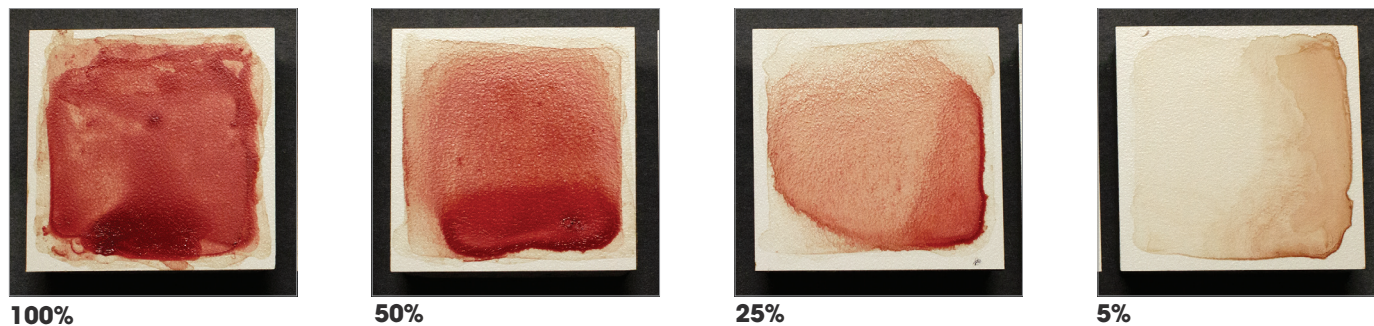
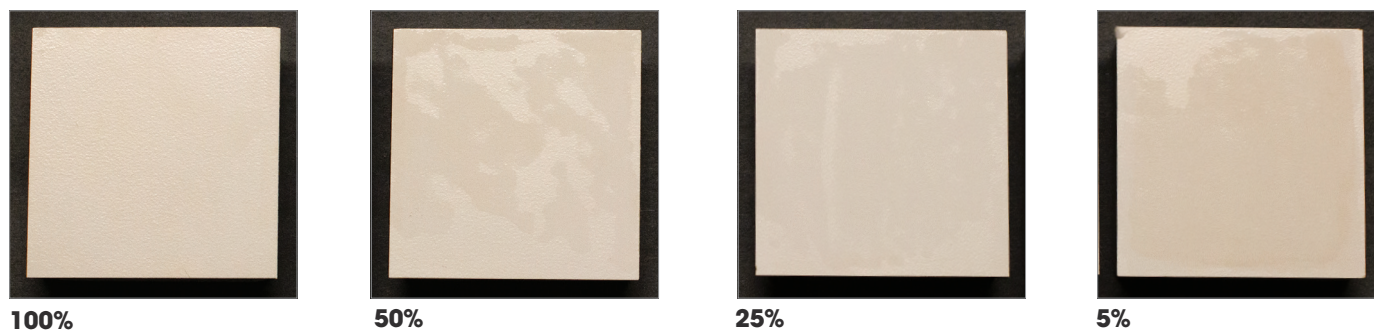
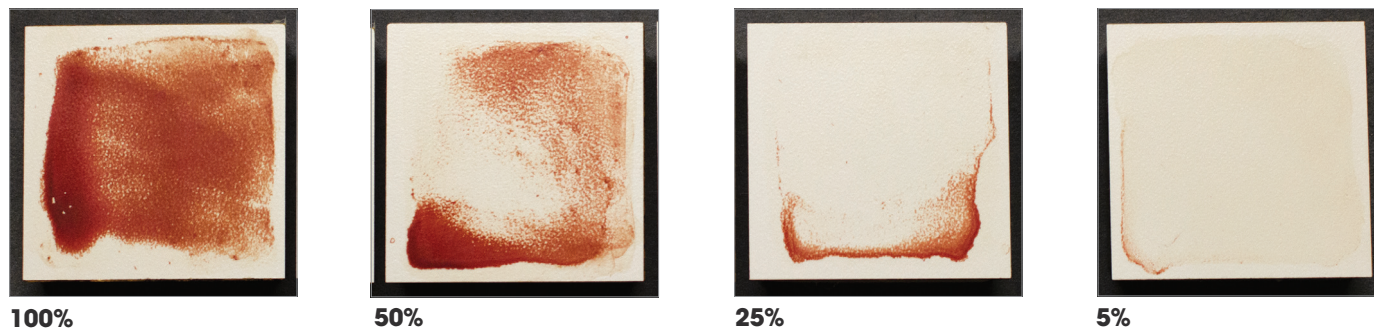
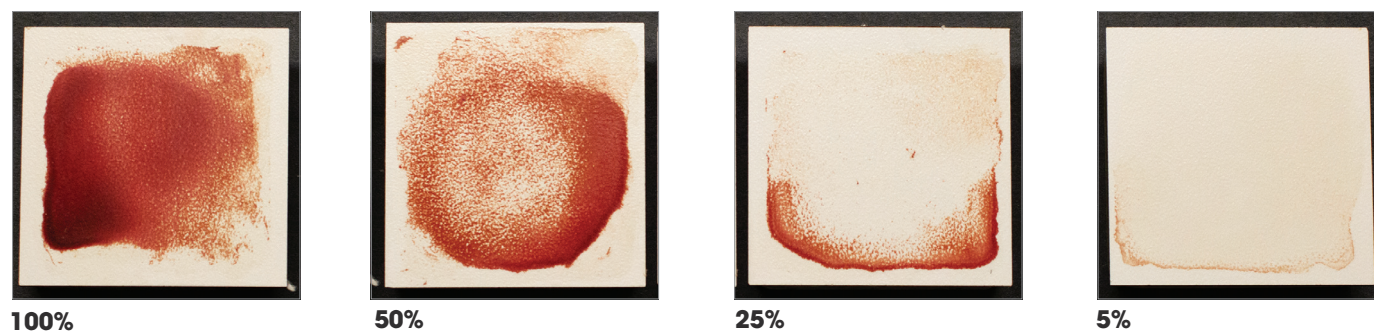
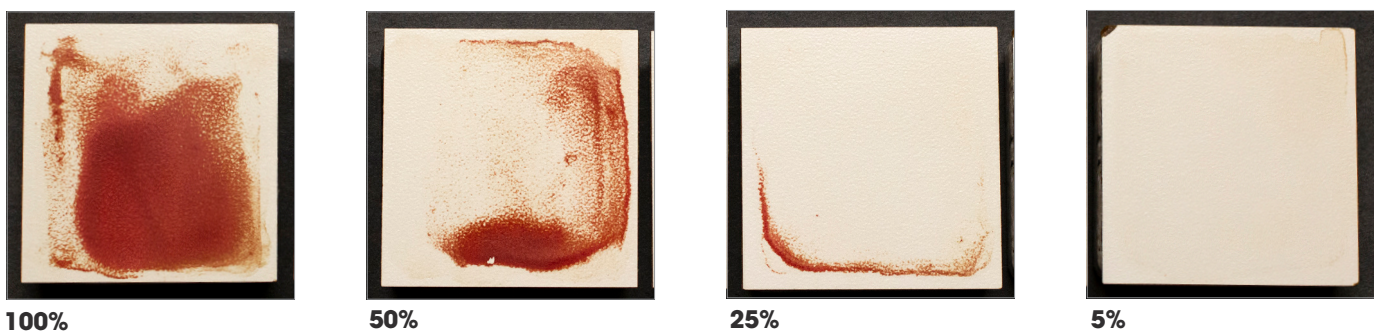
Surface Disinfectant	TB Contact Time	Active Ingredients
<i>OPTIM 33TB</i> (SciCan)	1 min	0.5% hydrogen peroxide
<i>tb Minuteman</i> (Maxill)	1 min	79% ethyl alcohol, o-phenylphenol, 0.2% benzalkonium chloride
<i>BioSURF</i> (Micrylium)	50 sec	70.5% ethanol, 0.2% Chlorhexidine Gluconate
<i>Ultra Swipes Plus</i> (Germiphene)	3 min	79% ethanol, 0.1% o-phenylphenol, 0.2% benzalkonium chloride
<i>Caviwipes</i> (Kerr Totalcare)	2	17.5% isopropanol, 0.28% diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride

Results:

Cleaning

Following treatment, *OPTIM 33TB* and the other water-based surface disinfectant, *Caviwipes*, successfully removed all visible debris for all tested blood dilutions (Figure 2). In contrast, a majority of organic debris remained on the 100% blood contaminated tiles when treated with any of the 3 high-alcohol surface disinfectants (Figure 3). Higher blood dilution tiles, 50% and 25%, also exhibited residual contamination after treatment but varied in amount (25-75% debris remaining) with each disinfectant. Finally, little to no debris remained on the 5% blood tiles after treatment with any of the high-alcohol surface disinfectant solutions.

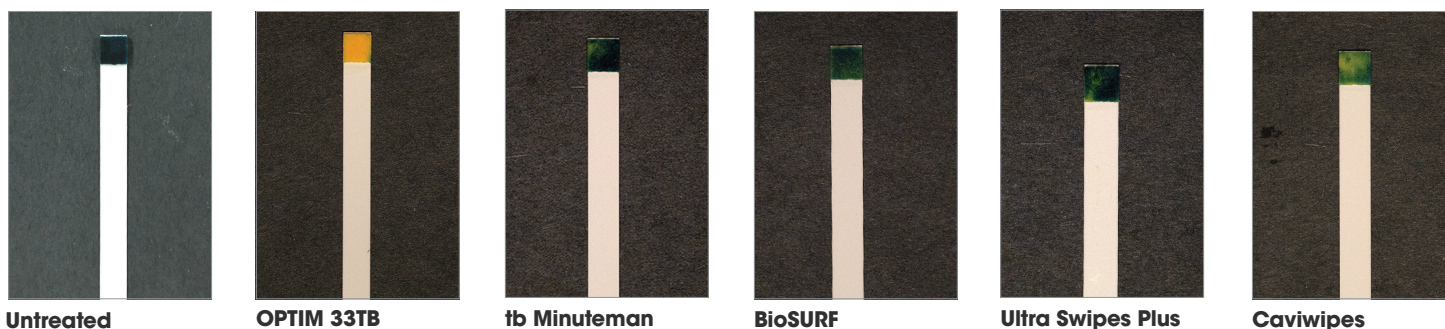
Figure 1. Untreated blood tiles (100%, 50%, 25% and 5%).

Figure 2. Representative of blood tiles treated with *OPTIM 33TB* and *Caviwipes* (100%, 50%, 25% and 5%).Figures 3a-c. Blood tiles treated with high-alcohol surface disinfectants a) *tb Minuteman*, b) *Ultra Swipes Plus*, and c) *BioSURF* (100%, 50%, 25% and 5%).a) *tb Minuteman*b) *Ultra Swipes Plus*c) *BioSURF*

Protein Detection

When looking at protein (hemoglobin) removal as a measurement of cleaning, **OPTIM 33TB** was the only surface disinfectant to almost completely remove proteins from the tiles covered with 100% blood (Figure 4a-f). **Caviwipes**, although proficient at cleaning visible, organic debris, was unable to remove a considerable amount of proteins. Lastly, High levels of protein were detected on the tiles treated with high alcohol surface disinfectants, **tb Minute Man**, **BioSURE**, and **Ultra Swipes Plus**.

Figure 4a-f. Hemastix protein removal (hemoglobin) test strips collected after cleaning/disinfectant a) Untreated, b) **OPTIM 33TB**, c) **tb Minuteman**, d) **BioSurf**, e) **Ultra Swipes Plus** (USP), f) **Caviwipes** (yellow = undetectable, green = some protein, dark green/blue = a lot of protein)



Conclusion:

In the present investigation, intermediate-level disinfectants containing chemical antimicrobials were evaluated for their cleaning capabilities. **OPTIM 33TB** was the only disinfectant to successfully clean and remove proteins with a single application.