



AEMTEK Report for:

HideOut Products, Inc.
P.O. Box 462781
Escondido, CA 92046

MY BATHROOM BUTLER™ Antimicrobial Efficacy Study Project No: 16051094

Summary:

The objective of this study sought to evaluate the ability of the Oral Hygiene Hideout™ device to inactivate *Staphylococcus aureus* and *Escherichia coli* on the surface of a cell phone replica. To determine the inactivation of each of the strains after exposure to the UV light of the Oral Hygiene Hideout™ device, the cell phone replicas were inoculated with high numbers of organisms, between one million to ten million (i.e. 6 and 7 logs) bacterial cells. The inoculated surfaces were exposed to the UV light emitted by the Oral Hygiene Hideout™ device and tested after 10 and 30 minutes of exposure time. The results of this trial found that the greatest inactivation of bacteria (i.e., log reductions of bacterial population) were found when the inoculated surface was facing the light source. The reduction for *E. coli*, when compared to the control, was 2.51 logs at 10 minutes (99.7692%) and 3.91 logs (99.9914%) at 30 minutes, when facing the UV light source. The reduction for *S. aureus*, when compared to the control, was 2.42 logs (99.6022%) after 10 minutes and 4.44 logs (99.9959%) after 30 minutes, again when the inoculated surface was facing the UV light source.

Methods & Methods:

The test organisms included in this study were *Staphylococcus aureus* ATCC 6538 and *Escherichia coli* AT CC 25922. A modified ASTM method E2315 was followed to prepare the inoculum. The culture was grown and enumerated on Tryptic Soy Agar (TSA) and incubated at 35°C. The inoculum suspensions, in PBS, were serially diluted to reach the appropriate concentrations on the day of inoculation.

Each bacterium was inoculated onto a sterile surface of the cell phone replica with an appropriate amount of inoculum in order to achieve the desired final concentration of 6-7 logs. The inoculated solution was allowed to air dry prior to initiating the study. Once dry, the cell phone replicas were placed in the Oral Hygiene Hideout™ device and the UV sanitizing cycle was initiated. Samples were taken after 10 and 30 minutes of exposure to the UV light. Additionally, an inoculated control sample, without treatment, was included in the study. The inoculated



sample tests were repeated for a total of four replicates, two with the inoculated side facing the UV light source and two with the inoculated side facing away from the UV light source. The control sample tests were repeated for a total of two replicates.

After each of the two exposure times, the cell phone replicas were individually swabbed using a sterile sponge containing 1mL of neutralizing broth. Any necessary dilutions were made in PBS. From each appropriate dilution, 0.1mL was removed and spread plated onto Tryptic Soy Agar (TSA) and incubated at 35°C for 24 hours.

Results:

The results from the testing are shown in Table 1 and 2 below. Data is presented as CFU/g and the associated Log₁₀ values. The Log₁₀ reduction was calculated by taking the average Log₁₀ value of the exposed minus the average Log₁₀ value of the control. The percent reduction was calculated by dividing the difference in the two values (CFU/g) by the starting inoculation log value. Results for *E. coli* (Table 1) indicate that there was greater reduction when the inoculated surface was facing the UV light source. When this scenario was followed, there was a 2.51 log reduction (99.7692%) after 10 minutes and a 3.91 log reduction (99.9914%) after 30 minutes.

Similar to *E. coli*, results for *S. aureus* (Table 2) also demonstrate a greater reduction when the inoculated surface is facing the UV light source. There was a 2.42 log reduction (99.6022%) after 10 minutes and a 4.44 log reduction (99.9959%) after 30 minutes when the inoculated side was facing the UV light source.

Table 1: Log₁₀ Reduction of *E. coli* following 10 and 30 minutes at an inoculation of 6-7 logs.

Oral Hygiene Hideout™ Challenge Study					
<i>Escherichia coli</i>					
		t = 10 minutes		t = 30 minutes	
		CFU	Log ₁₀	CFU	Log ₁₀
Control	Trial 1	6.5E+05	5.81	4.7E+06	6.67
	Trial 2	7.2E+06	6.85	7.6E+05	5.88
	Average:	3.9E+06	6.33	2.7E+06	6.27
Exposed (Towards UV Light)	Trial 1	1.5E+04	4.18	2.4E+02	2.38
	Trial 2	3.0E+03	3.48	2.3E+02	2.35
	Average:	9.0E+03	3.83	2.3E+02	2.37
Log ₁₀ Reduction (Towards UV)			-2.51		-3.91
% Reduction (Towards UV)		99.7692%		99.9914%	



Table 2: Log₁₀ Reduction of *S. aureus* following 10 and 30 minutes at an inoculation of 6-7 logs.

Oral Hygiene Hideout™ Challenge Study <i>Staphylococcus aureus</i>					
		t = 10 minutes		t = 30 minutes	
		CFU	Log ₁₀	CFU	Log ₁₀
Control	Trial 1	2.7E+06	6.42	9.5E+06	6.98
	Trial 2	1.1E+07	7.03	6.6E+06	6.82
	Average:	6.7E+06	6.73	8.0E+06	6.90
Exposed (Towards UV Light)	Trial 1	4.4E+04	4.64	5.0E+02	2.70
	Trial 2	9.5E+03	3.98	1.6E+02	2.20
	Average:	2.7E+04	4.31	3.3E+02	2.45
	Log ₁₀ Reduction (Towards UV)		-2.42		-4.44
	% Reduction (Towards UV)	99.6022%		99.9959%	

Conclusion & Limitations:

This study evaluated the ability of the Oral Hygiene Hideout™ device to inactivate *Escherichia coli* and *Staphylococcus aureus* on the surface of a cell phone replica. The testing found that the greatest reductions were observed when the inoculated surface was facing the light source. Recommendations to improve the efficacy of the device in inactivating these select organisms was provided in the full report.

Best Regards,

Heidi Wright, Director of Research

AEMTEK, Inc.

heidi.wright@aemtek.com