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STUDY TITLE

Evaluation of Antimicrobial Activity of UV Illumination -
Healthcare or Medical Setting

Test Organisms:

Pseudomonas aeruginosa (ATCC 15442)
Methicillin Resistant *Staphylococcus aureus* - MRSA (ATCC 33592)

PRODUCT IDENTITY

Odorox Mobile Disinfection Unit Hydroxyl Generator

AUTHOR

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STUDY COMPLETION DATE

November 26, 2008

PERFORMING LABORATORY

ATS Labs
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SPONSOR

Safety Performance Solutions, Inc.
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Bismarck, ND 58503

PROJECT NUMBER

A06915

STUDY REPORT

GENERAL STUDY INFORMATION

Study Title: Evaluation of Antimicrobial Activity of UV Illumination – Healthcare or Medical Setting

Project Number: A06915

TRF Number: SPS01100108.CUST.1

TEST SUBSTANCE IDENTITY

Test Substance Name: Odorox Mobile Disinfection Unit Hydroxyl Generator

STUDY DATES

Date Sample Received: September 30, 2008

Study Initiation Date: October 9, 2008

Experimental Start Date: October 30, 2008

Experimental End Date: November 3, 2008

Study Completion Date: November 26, 2008

Test Organism	ATCC #	Culture Medium	Subculture Plate Medium
<i>Pseudomonas aeruginosa</i>	15442	Nutrient Broth	Tryptic Soy Agar + 5% Sheep's blood (BAP)
Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA	33592	Synthetic Broth	

The microorganisms used in this study were obtained from the American Type Culture Collection (ATCC), Manassas, Virginia.

Test Exposure: 4 hours
Exposure Temperature: Room temperature
Number of Carriers Tested/lot: Duplicate carriers utilizing two carrier types, 1" x 1" stainless steel and 1" x 1" cotton fabric.
Soil Load Description: No organic soil load required.
Neutralizing Subculture Medium: Lethen Broth with 0.07% Lecithin and 0.5% Tween 80

EXPERIMENTAL DESIGN

A room (approximately 14' by 24' x 10') was prepared for testing by sealing all HVAC vents and the single doorway with 4 mil polypropylene plastic sheeting and duct tape. The Odorox Mobile Disinfection Unit Hydroxyl Generator was powered on and was allowed to run for 54 minutes in the prepared room. Duplicate test carriers, per carrier type, per test organism, inoculated with a dried film of test culture, were placed within the room. Fabric carriers were allowed to hang freely, while stainless steel carriers were exposed within Petri dishes with the dish lids fully ajar. Following a 4 hour exposure, the carriers were neutralized, mixed and assayed for survivors. Appropriate purity, carrier sterility, neutralizing subculture medium sterility, and carrier quantitation controls were performed. Percent and log₁₀ reductions were determined for the test carriers as compared to the untreated (carrier quantitation control) carriers.

TABLE 1: CONTROL RESULTS

Type of Control	Results	
	<i>Pseudomonas aeruginosa</i> (ATCC 15442)	Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA (ATCC 33592)
Purity Control	Pure	Pure
Neutralizing Subculture Medium Sterility Control	No Growth	
Carrier Sterility Control	Stainless Steel	No Growth
	Cotton Fabric	No Growth

TABLE 2: EVALUATION OF CARRIER QUANTITATION CONTROL CARRIER DATA

Test Organism	Carrier type	Average CFU/carrier	Average Log ₁₀
<i>Pseudomonas aeruginosa</i> (ATCC 15442)	Stainless Steel	2.97 x 10 ⁶	6.472
	Cotton Fabric	1.7 x 10 ⁶	6.21
Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA (ATCC 33592)	Stainless Steel	6.3 x 10 ⁶	6.79
	Cotton Fabric	2.5 x 10 ⁶	6.39

CFU = Colony Forming Unit

TABLE 3: EVALUATION OF TEST CARRIER DATA

Test Substance	Test Organism	Carrier type	Average CFU/carrier	Average Log ₁₀
Odorox Mobile Disinfection Unit Hydroxyl Generator	<i>Pseudomonas aeruginosa</i> (ATCC 15442)	Stainless Steel	2.40 x 10 ⁵	5.380
		Cotton Fabric	6.2 x 10 ²	2.77
	Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA (ATCC 33592)	Stainless Steel	2.2 x 10 ⁶	6.26
		Cotton Fabric	1.4 x 10 ⁵	5.11

CFU = Colony Forming Unit

TABLE 4: CALCULATED VALUES

Test Substance	Test Organism	Carrier type	Percent Reduction	Log ₁₀ Reduction
Odorox Mobile Disinfection Unit Hydroxyl Generator	<i>Pseudomonas aeruginosa</i> (ATCC 15442)	Stainless Steel	91.9%	1.092
		Cotton Fabric	99.9%	3.44
	Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA (ATCC 33592)	Stainless Steel	65.1%	0.53
		Cotton Fabric	94.4%	1.28

CFU = Colony Forming Unit

TABLE 5: VERIFICATION OF ANTIBIOTIC RESISTANCE

Organism (ATCC)	Zone of Inhibition (mm)	CLSI* Resistant Range (mm)
Methicillin Resistant <i>Staphylococcus aureus</i> - MRSA (ATCC 33592)	6	≤ 10
Quality Control Organism	Zone of Inhibition (mm)	CLSI* Acceptable Range (mm)
<i>Staphylococcus aureus</i> (ATCC 25923)	18	18 - 24

*CLSI = Clinical and Laboratory Standards Institute

CONTROL RESULTS

The results of controls run for purity, carrier sterility, neutralizing subculture medium sterility, antibiotic resistance verification and carrier quantitation were all acceptable.

ANALYSIS

Odorox Mobile Disinfection Unit Hydroxyl Generator, demonstrated a 91.9% (1.092 log₁₀) reduction on stainless steel and a 99.9% (3.44 log₁₀) reduction on cotton fabric for *Pseudomonas aeruginosa* (ATCC 15442) following a 4 hour exposure period when tested at room temperature.


Odorox Mobile Disinfection Unit Hydroxyl Generator, demonstrated a 65.1% (0.53 log₁₀) reduction on stainless steel and a 94.4% (1.28 log₁₀) reduction on cotton fabric for Methicillin Resistant *Staphylococcus aureus* - MRSA (ATCC 33592) following a 4 hour exposure period when tested at room temperature.

This study was performed following ATS Labs' Standard Operating Procedures (SOPs) and internal quality systems.

PROFESSIONAL PERSONNEL INVOLVED:

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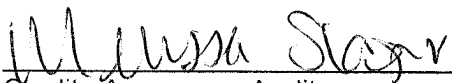
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11-26-08
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