Third Party Studies

Summaries

Table of Contents

NSF International - Applied Research Center

789 N. Dixboro Rd. Ann Arbor, MI 48015 | Report Date: August 23, 2019 | Performed By: S. Hatt

Title

Efficacy of an Ozone-Generating Whole-Shoe Disinfection Device at Three Time Points

Overview

An efficacy study was performed using a UV-C and ozone-generating device against Escherichia coli, Pseudomonas aeruginosa, Methicillin-resistant Staphylococcus aureus, Vancomycin-resistant Enterococcus faecalis, Carbapenem-resistant Klebsiella pneumoniae, Candida auris, Aspergillus brasiliensis, and Clostridioides difficile. Log and percent reduction were quantified for each microorganism at three exposure times: 6, 8, and 10 seconds.

Summary

Challenge microorganisms:

- Escherichia coli ATCC 11229
- Pseudomonas aeruginosa ATCC BAA- 2108
- Methicillin-resistant Staphylococcus aureus (MRSA) ATCC 33592
- Vancomycin-resistant Enterococcus faecalis (VRE) ATCC 51299
- Carbapenem-resistant Klebsiella pneumoniae (CRE) ATCC BAA-1705
- Candida auris CDC B11903
- Aspergillus brasiliensis ATCC 16404
- Clostridioides difficile ATCC 43598

Test Product:

- PathO3Gen Solutions UVZone® Shoe Sanitizing Station

Results

Carrier density for each of the carriers inoculated with E. coli and exposed to the disinfection device. The results shown are the geomean of each of the carriers, which were plated in triplicate.

NSF INTERNATIONAL APPLIED RESEARCH CENTER			
Efficacy of an Ozone-Generating Whole-Shoe Disinfection Device at Three Time Points			
Organism	**Time Point**	**Percent Reduction**	**Log reduction**
Escherichia coli - ATCC 11229	6 seconds	99.1297%	2.06
	8 seconds	99.9725%	3.56
	10 seconds	99.9989%	4.96
Pseudomonas aeruginosa - ATCC BAA- 2108	6 seconds	99.8287%	2.77
	8 seconds	99.9976%	4.62
	10 seconds	99.9970%	4.53
Methicillin-resistant Staphylococcus aureus - ATCC 33592	6 seconds	99.8647%	2.87
	8 seconds	99.9842%	3.80
	10 seconds	99.9969%	4.51
Vancomycin-resistant Enterococcus faecalis - ATCC 51299	6 seconds	98.5863%	1.85
	8 seconds	99.9865%	3.87
	10 seconds	99.9862%	3.86
Carbapenem-resistant Klebsiella pneumoniae - ATCC BAA-1705	6 seconds	99.6384%	2.44
	8 seconds	99.9573%	3.37
	10 seconds	99.9986%	4.86
Candida auris - CDC B11903	6 seconds	99.9904%	4.02
	8 seconds	99.9974%	4.58
	10 seconds	99.9993%	5.16
Aspergillus brasiliensis - ATCC 16404	6 seconds	83.1453%	0.77
	8 seconds	89.8956%	1.00
	10 seconds	96.1744%	1.42
Clostridioides difficile - ATCC 43598	6 seconds	98.9140%	1.96
	8 seconds	99.9440%	3.25
	10 seconds	99.9960%	4.40

Microchem Laboratory

Microchem Laboratory, 1304 W. Industrial Blvd, Round Rock, TX 78681

Testing performed by: Kyra Christensen Date Performed: 26th July 2022

Title

Antibacterial Activity and Efficacy of Patho3gen Solutions' UVZone Shoe Sanitizing Station Device

Overview

An efficacy study was performed using a UV-C and ozone-generating device against Salmonella enterica, Cronobacter sakazakii, Listeria monocytogenes. Log and percent reduction were quantified for each microorganism at three exposure times: 6, 8, and 10 seconds.

Summary:

Challenge microorganism:

- Salmonella enterica ATCC 10708
- Cronobacter sakazakii ATCC 29004
- Listeria monocytogenes ATCC 19115

Test Product:

- PathO3Gen Solutions UVZone® Shoe Sanitizing Station

Results

Microchem Laboratory			
Antibacterial Activity and Efficacy of Patho3gen Solutions' UVZone Shoe Sanitizing Station Device			
Organism	**Time Point**	**Percent Reduction**	**Log reduction**
Salmonella enterica ATCC 10708	6 seconds	99.9980%	>4.81
	8 seconds	99.9970%	>4.58
	10 seconds	99.9800%	>3.71
Cronobacter sakazakii ATCC 29004	6 seconds	>99.991%	>4.04
	8 seconds	>99.97%	>3.48
	10 seconds	>99.991	>4.04
Listeria monocytogenes ATCC 19115	6 seconds	>99.95%	>3.29
	8 seconds	>99.994%	>4.21
	10 seconds	>99.9897	>3.99

CREM CO. Laboratory - Human Coronavirus

3403 American Dr., Mississauga, Ontario, Canada L4V 1T4 | Date Performed: March 20, 2020 |
Performed By: Syed A. Sattar, PhD; Bahram Zargar, PhD Sepideh Khoshnevis, MSC.

Title

Assessment of PathO3Gen SolutionsTM Footwear Sanitizing Station for Decontaminating Hard, Non-Porous Environmental Surfaces: Testing against Human Respiratory Coronavirus 229E (ATCC VR-740) as a representative Healthcare-Associated Pathogen

Overview

An efficacy study was performed using a UV-C and ozone-generating device against Coronavirus 229E (ATCC VR-740). Log and percent reduction were quantified for each microorganism at three exposure times: 6, 8, and 10 seconds.

Summary:

Challenge microorganism:

- Coronavirus 229E (ATCC VR-740)

Test Product:

- PathO3Gen Solutions UVZone® Shoe Sanitizing Station

Results

The initial challenge on each carrier were 3.68, 3.73 and 3.65 log10 PFU in three different tests performed on PathO3Gen Solutions Shoe Sanitizing Station.

Table 1 shows the result of log10 reduction for each contact time. In this test, the drying time of inoculated disks was reduced to 1 hr. In all contact times the log10 reduction was more than 3. **No plaque was detected for 8 and 10 seconds contact times.**

Virucidal Efficacy Test of PathO3Gen Solutions Shoe Sanitizing Station against Coronavirus 229E (ATCC VR-740) with three different contact times					
Contact Time	Log Reduction in PFU				% Reduction
	Test 1	**Test 2**	**Test 3**	**Average of Three Tests**	**Average of Three Tests**
6 seconds	3.07	3.28	3.42	3.27	99.9463%
8 seconds	3.68	3.73	3.65	3.69	99.9796%
10 seconds	3.68	3.73	3.65	3.69	99.9796%

CREM CO. Laboratory - Norovirus

CREM Co. Labs. Units 1-2, 3403 American Dr., Mississauga, Ontario,
Canada L4V 1T4 | Date Performed: February 22, 2021

Title

Assessment of PathO3Gen Solutions Ozone + UVC (UVZone) Shoe Sanitizing Station for Decontaminating Hard, Non-Porous Environmental Surfaces: Testing against Murine Norovirus (Strain S99) as a representative Healthcare-Associated Pathogen

Overview

An efficacy study was performed using a UV-C and ozone-generating device against Murine Norovirus (Strain S99).Log and percent reduction were quantified for each microorganism at three exposure times: 6, 8, and 10 seconds.

Summary:

Challenge microorganism:

- Murine Norovirus (Strain S99)

Test Product:

- PathO3Gen Solutions UVZone® Shoe Sanitizing Station

Results

The initial levels of challenge on each carrier were 4.15, 4.36 and 4.41 log10 PFU in three different tests performed on PathO3Gen Solutions Shoe Sanitizing Station.

Table 1 shows the result of log10 reductions for each contact time. In this test, the drying time of inoculated disks was reduced to 1 hr. In all contact times the log10 reduction was more than 4.31. **No plaque was detected for 6, 8 and 10 seconds contact times.**

Table 1: Virucidal Efficacy Test of PathO3Gen Solutions Shoe Sanitizing Station against Murine Norovirus (Strain S99) with three different contact times

Contact Time	Log Reduction in PFU			
	Test 1	**Test 2**	**Test 3**	**Average of Three Tests**
6 seconds	>4.15	>4.36	>4.41	>4.31
8 seconds	>4.15	>4.36	>4.41	>4.31
10 seconds	>4.15	>4.36	>4.41	>4.31

University of Minnesota

Author(s): Angie Quiñonez Muñoz, Trisha Sharma, Madeeha Gohar, Faisal Ahmad, Cesar Corzo, Sagar M. Goyal - Veterinary Diagnostic Laboratory and Department of Veterinary Population Medicine, College of Veterinary Medicine

Title

Inactivation of two swine viruses on shoes by UVZone Shoe Sanitizing Station

Overview

The objective of this study was to assess the inactivation rate of PRRSv and PEDv on rubber soles and polyblend boot material by the UVZone Shoe Sanitizing Station.

Experimental

Challenge microorganisms:

- Porcine Reproductive and Respiratory Syndrome virus (PRRSv)
- Porcine Epidemic Diarrhea virus (PEDv)

Test Product:

- PathO3Gen Solutions UVZone® Shoe Sanitizing Station

Results

On an average, ≥99% of the PRRSv was inactivated on both rubber sole and polyblend boot material. In addition, an average of 98.55 % and ≥99% of PEDv was inactivated on rubber sole and polyblend material, respectively.

These findings demonstrate the efficacy of UVZone Stations in inactivating swine pathogens in shoe materials and its potential use to enhance biosecurity practices in swine farms.

Table 1. Inactivation of PRRSV on polyblend boot material after 8 seconds of exposure

	Log Reduction	% inactivation
Coupon 1	**3.30**	**99.95**
Coupon 2	**3.30**	**99.95**
Coupon 3	**3.30**	**99.95**
Coupon 4	**4.00**	**99.99**
Average	**3.40**	**99.96**

Table 2. Inactivation of PEDV on polyblend boot material after 8 seconds of exposure

	Log Reduction	% inactivation
Coupon 1	**2.34**	**99.54**
Coupon 2	**1.67**	**97.86**
Coupon 3	**2.33**	**99.53**
Coupon 4	**3.00**	**99.90**
Average	**2.33**	**99.53**