



Interface Research and Development
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Lab Log # M17-057

Microbiology Laboratory Report

To: Les Bridwell, Cleaner Solutions LLC
From: Daniel Price, Ph.D., and Brandi Prestridge
Date: 10 April 2017
Re: ASTM 2149 Test of MICROSTATIC Treated Fabric Samples

Introduction:

MICROSTATIC treated fabric samples labeled as follows were submitted for antibacterial activity against *E. coli*.

PVHNS312 (NS)

PVHNT312 (NT)

PSHNT312 (ST)

Materials and Methods:

ASTM 2149-12 was used to quantitatively assess the antibacterial activity of these samples. The bacteria species specified for these challenges were: *Escherichia coli* ATCC 25922, *Staphylococcus aureus* 6538, *Staphylococcus aureus* ATCC 43300(MRSA), and *Pseudomonas aeruginosa* ATCC 15442. The contact time specified was 24 hours.

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Results:

Escherichia coli ATCC 25922

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
PVHNS312 (New Sheet)	7.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PVHNT312 (New Towel)	7.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PSHNT312 (Soiled Towel)	7.0×10^5	1.34×10^2	3.72	99.981

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Staphylococcus aureus 6538

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
PVHNS312 (New Sheet)	1.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PVHNT312 (New Towel)	1.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PSHNT312 (Soiled Towel)	1.0×10^5	$<1.0 \times 10^2$	3.89	99.987

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Staphylococcus aureus ATCC 43300(MRSA)

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
PVHNS312 (New Sheet)	1.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PVHNT312 (New Towel)	1.0×10^5	$<1.0 \times 10^2$	3.89	99.987
PSHNT312 (Soiled Towel)	1.0×10^5	$<1.0 \times 10^2$	3.87	99.986

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Pseudomonas aeruginosa ATCC 15442

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
PVHNS312 (New Sheet)	2.0×10^5	$<1.0 \times 10^2$	3.35	99.95
PVHNT312 (New Towel)	2.0×10^5	$<1.0 \times 10^2$	3.35	99.95
PSHNT312 (Soiled Towel)	2.0×10^5	$<1.0 \times 10^2$	3.35	99.95

Formula for Log reduction:

Determine Log ($x \times 10^a$) of control samples

Determine Log ($x \times 10^a$) of treated samples

Determine geometric mean of control samples:

Log values of control samples: $b_1, b_2, b_3, \dots, b_n$

Mean = $(b_1 * b_2 * b_3 * \dots * b_n)^{1/n}$

Determine geometric mean of treated samples:

Log values of treated samples: $c_1, c_2, c_3, \dots, c_n$

Mean = $(c_1 * c_2 * c_3 * \dots * c_n)^{1/n}$

Log reduction = geometric mean of the control samples – geometric mean of the treated samples

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Where:

x=value of samples

a=exponent value

b=log value of control samples

c=log value of treated samples

n=number of log values in set

Formula for Percent Reduction:

$$(1-10^{-\log \text{reduction}}) \times 100$$

Discussion:

All of MICROSTATIC treated sheet, treated towel, and soiled treated towel samples tested demonstrated multiple log reduction of *Escherichia coli*, both species of Staphylococcus bacteria and *Pseudomonas aeruginosa* challenge under these test conditions.

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