



Interface Research and Development  
Tel: (706) 812-6266; Fax: (706) 883-6198  
1603 Executive Drive  
Lagrange, GA 30241

Lab Log # M17-092

## Microbiology Laboratory Report

**To:** Les Bridwell, Cleaner Solutions LLC  
**From:** Daniel Price, Ph.D., and Brandi Prestridge  
**Date:** 30 May 2017  
**Re:** ASTM 2149 Test of MICROSTATIC Treated Fabric Samples

### Introduction:

MICROSTATIC treated fabric samples labeled as follows were submitted for antibacterial activity against:

*Escherichia coli* ATCC 25922

*Staphylococcus aureus* ATCC 6538

*Staphylococcus aureus* ATCC 43300 (MRSA)

*Pseudomonas aeruginosa* ATCC 15442

The samples were labeled as follows:

New control towel

Sample #1 Wash test 28/56/83

Sample #2 Wash test 28/56/83

Sample #3 Wash test 28/56/83

### 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*

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aureus ATCC 43300(MRSA), and *Pseudomonas aeruginosa* ATCC 15442. The contact time specified was 24 hours.

## Results:

*Escherichia coli* ATCC 25922

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
New control towel	$3.0 \times 10^5$	$<1.0 \times 10^2$	3.50	99.968
Sample #1 Wash test 28/56/83	$3.0 \times 10^5$	$1.0 \times 10^2$	3.48	99.967
Sample #2 Wash test 28/56/83	$3.0 \times 10^5$	$5.92 \times 10^2$	2.71	99.803
Sample #3 Wash test 28/56/83	$3.0 \times 10^5$	$2.0 \times 10^2$	3.20	99.936

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*Staphylococcus aureus* 6538

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
New control towel	$2.0 \times 10^5$	$<1.0 \times 10^2$	3.35	99.95
Sample #1 Wash test 28/56/83	$2.0 \times 10^5$	$1.0 \times 10^2$	3.30	99.95
Sample #2 Wash test 28/56/83	$2.0 \times 10^5$	$2.24 \times 10^2$	2.98	99.89
Sample #3 Wash test 28/56/83	$2.0 \times 10^5$	$2.83 \times 10^2$	2.85	99.86

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*Staphylococcus aureus* ATCC 43300(MRSA)

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
New control towel	$1.0 \times 10^5$	$<1.0 \times 10^2$	3.05	99.91
Sample #1 Wash test 28/56/83	$1.0 \times 10^5$	$6.32 \times 10^2$	2.24	99.43
Sample #2 Wash test 28/56/83	$1.0 \times 10^5$	$4.47 \times 10^2$	2.37	99.57
Sample #3 Wash test 28/56/83	$1.0 \times 10^5$	$5.20 \times 10^2$	2.39	99.59

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*Pseudomonas aeruginosa* ATCC 15442

Sample	Avg. 24 hr Control CFU	Avg. 24 hr Treated CFU	Log Reduction	Percent Reduction
New control towel	$2.0 \times 10^5$	$<1.0 \times 10^2$	3.35	99.95
Sample #1 Wash test 28/56/83	$2.0 \times 10^5$	$1.73 \times 10^2$	3.08	99.91
Sample #2 Wash test 28/56/83	$2.0 \times 10^5$	$1.0 \times 10^2$	3.30	99.95
Sample #3 Wash test 28/56/83	$2.0 \times 10^5$	$1.41 \times 10^2$	3.16	99.93

Formula for Log reduction:

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

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

Determine geometric mean of control samples:

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

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

Determine geometric mean of treated samples:

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

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

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

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 control and washed towels demonstrated multiple log reduction of *Escherichia coli*, both species of *Staphylococcus* bacteria and *Pseudomonas aeruginosa* challenge under these test conditions.

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