

**NON-GLP STUDY REPORT**STUDY TITLE

Quantitative Evaluation of Active Ion  
Applications on Glass Surfaces

**Test Organisms:**

*Escherichia coli* (ATCC 11229)  
*Staphylococcus aureus* (ATCC 6538)

PRODUCT IDENTITY

Activeion # 1760906080

AUTHOR

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Research Scientist I

STUDY COMPLETION DATE

July 9, 2009

PERFORMING LABORATORY

ATS Labs  
1285 Corporate Center Drive, Suite 110  
Eagan, MN 55121

SPONSOR

Activeion Cleaning Solutions  
21308 John Milless Dr.  
Rogers, MN 55374

PROJECT NUMBER

A07901

This study was not performed under  
EPA Good Laboratory Practice Regulations  
(40 CFR Part 160)

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## STUDY REPORT

### GENERAL STUDY INFORMATION

**Study Title:** Quantitative Evaluation of Active Ion Applications on Glass Surfaces  
**Project Number:** A07901  
**TRF Number:** ACT01061009.CUST

### TEST SUBSTANCE IDENTITY

**Test Substance Name:** Activeion # 1760906080

### STUDY DATES

**Date Sample Received:** July 2, 2009  
**Study Initiation Date:** July 2, 2009  
**Experimental Start Date:** July 2, 2009  
**Experimental End Date:** July 6, 2009  
**Study Completion Date:** July 9, 2009

Test Organism	ATCC #	Growth Medium	Subculture Plate Medium
<i>Escherichia coli</i>	11229	Synthetic Broth	Tryptic Soy Agar + 5% Sheep Blood (BAP)
<i>Staphylococcus aureus</i>	6538	Synthetic Broth	Tryptic Soy Agar + 5% Sheep Blood (BAP)

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

**Test Exposure:** 4 second spray, 3-4 inches from carrier surface  
**Dilution:** Ready to use (RTU) – 200 ppm Hard water added to sprayer  
**Exposure Temperature:** Room temperature (20°C)  
**Number of Carriers Tested/ Lot:** Duplicate carriers  
**Soil Load Description:** None required  
**Spraying Conditions:** Spray & Wipe  
**Neutralizing Subculture Medium:** Lethen Broth + 0.1% Sodium Thiosulfate

### EXPERIMENTAL DESIGN

A film of bacterial cells dried on a surface of glass slide carriers (3" x 1") was exposed to the test substance for a 4 second spray period at approximately 3-4" from the carrier surface in a horizontal position. After exposure, the surface of the carriers were wiped three times left to right and the back of the carrier with one pass left to right with the Sponsor provided towelette. The carrier, wipe and overspray were transferred into individual jars of neutralizing subculture medium and assayed for survivors. Wet carrier quantitation, dried carrier quantitation, and neutralization confirmation controls were also performed.

**TABLE 1: INOCULUM COUNT RESULTS**

Test Organism	Initial Suspension
<i>Escherichia coli</i> (ATCC 11229)	3.3 x 10 <sup>8</sup> CFU/mL
<i>Staphylococcus aureus</i> (ATCC 6538)	6.2 x 10 <sup>8</sup> CFU/mL

**TABLE 2: EVALUATION OF DRIED CONTROL CARRIER DATA**

Test Organism	Carrier #	CFU/Carrier	Average CFU/Carrier	Average Log <sub>10</sub>
<i>Escherichia coli</i> (ATCC 11229)	1	5.32 x 10 <sup>6</sup>	5.72 x 10 <sup>6</sup>	6.757
	2	6.12 x 10 <sup>6</sup>		
<i>Staphylococcus aureus</i> (ATCC 6538)	1	7.12 x 10 <sup>6</sup>	7.04 x 10 <sup>6</sup>	6.848
	2	6.96 x 10 <sup>6</sup>		

CFU = Colony Forming Unit

# of Subs

**TABLE 3: EVALUATION OF WET CONTROL CARRIER DATA**

Test Organism	Carrier #	CFU/Carrier	Average CFU/Carrier	Average Log <sub>10</sub>
<i>Escherichia coli</i> (ATCC 11229)	1	<4 x 10 <sup>2</sup>	<4 x 10 <sup>2</sup>	<2.6
	2	<4 x 10 <sup>2</sup>		
<i>Staphylococcus aureus</i> (ATCC 6538)	1	<4 x 10 <sup>2</sup>	<4 x 10 <sup>2</sup>	<2.6
	2	<4 x 10 <sup>2</sup>		

CFU = Colony Forming Unit

**TABLE 4: NEUTRALIZATION CONFIRMATION CONTROL RESULTS**

NO MORE  
 ANTI-MICROBIAL  
 ACTIVITY

Test Substance	Test Organism	Dilution Plated	Neutralization Confirmation (Number of Survivors/mL)		±1.0 Log <sub>10</sub>	Pass/Fail
			Numbers Control	Results		
Activeion #1760906080	<i>Escherichia coli</i> (ATCC 11229)	10 <sup>-5</sup>	89, 97	88, 79	0.05	Pass
	<i>Staphylococcus aureus</i> (ATCC 6538)	10 <sup>-6</sup>	18, 23	6, 14	0.32	Pass

**TABLE 5: EVALUATION OF TEST CARRIER DATA**

THIS PROVES THAT OUR THING DID THE KILL AND NOTHING ELSE.

Test Substance: Activeion #1760906080

DILUTION	Test Organism: <i>Escherichia coli</i> (ATCC 11229)					
	Carrier, Wipe or Overspray					
	Carrier 1	Carrier 2	Wipe 1	Wipe 2	Overspray 1	Overspray 2
	Number of Survivors					
10 <sup>0</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-1</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-2</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-3</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0

A value of <1 was used in place of zero for calculation purposes only

Test Substance: Activeion #1760906080

DILUTION	Test Organism: <i>Staphylococcus aureus</i> (ATCC 6538)					
	Carrier, Wipe or Overspray					
	Carrier 1	Carrier 2	Wipe 1	Wipe 2	Overspray 1	Overspray 2
	Number of Survivors					
10 <sup>0</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-1</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-2</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0
10 <sup>-3</sup>	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0

A value of <1 was used in place of zero for calculation purposes only

**TABLE 6: CALCULATED VALUES**

Test Substance: Activeion #1760906080						
Organism	Replicate#	CFU/Carrier	Average CFU/Carrier	Average Log <sub>10</sub>	Percent Reduction	Log <sub>10</sub> Reduction
<i>Escherichia coli</i> (ATCC 11229)	Carrier 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Carrier 2	<4 x 10 <sup>1</sup>				
	Wipe 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Wipe 2	<4 x 10 <sup>1</sup>				
	Overspray 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Overspray 2	<4 x 10 <sup>1</sup>				
<i>Staphylococcus aureus</i> (ATCC 6538)	Carrier 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Carrier 2	<4 x 10 <sup>1</sup>				
	Wipe 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Wipe 2	<4 x 10 <sup>1</sup>				
	Overspray 1	<4 x 10 <sup>1</sup>	<4 x 10 <sup>1</sup>	<1.6	>99.999	>5.2
	Overspray 2	<4 x 10 <sup>1</sup>				

CFU = Colony Forming Unit

**ANALYSIS**

For Percent and Log<sub>10</sub> reductions, see Table 6.

**PROFESSIONAL PERSONNEL INVOLVED:**


Amy S. Jeske, B.S.	- Manager, Microbiology Operations
Scott R. Steinagel, B.S.	- Manager, Microbiology Laboratory Operations
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