ANTIBACTERIAL ACTIVITY AND EFFICACY OF A NON-POROUS TEST SUBSTANCE

A Study By Nycote Laboratories

International Organization for Standardization Method 22196 Measurement of Antibacterial Activity on Plastics and Other Non-porous Surfaces

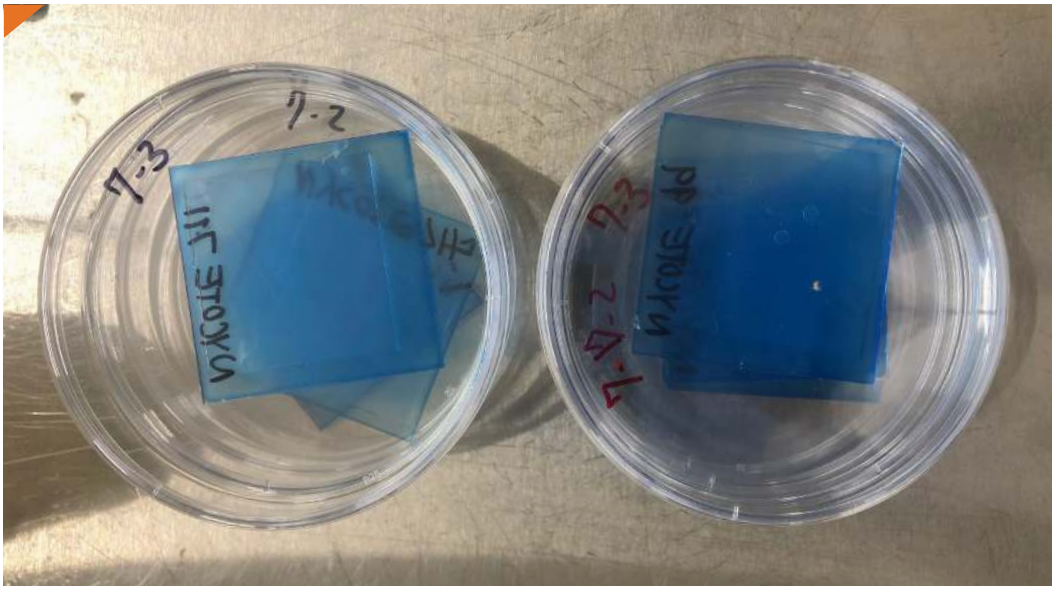
ISO 22196: General Information

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies that develops international standards for the production and assessment of a variety of materials and processes. The ISO method 22196 is a quantitative test designed to assess the performance of antimicrobial finishes on hard, non-porous surfaces.

The method can be conducted using contact times ranging from ten minutes up to 24 hours. For an ISO 22196 test, non-antimicrobial control surfaces are used as the baseline for calculations of microbial reduction. The method is versatile and can be used to determine the antimicrobial activity of a diverse array of surfaces including plastics, metals, and ceramics.

Test Substance Information

The test substances were received on 17 JUN 2020, and the following picture was taken.



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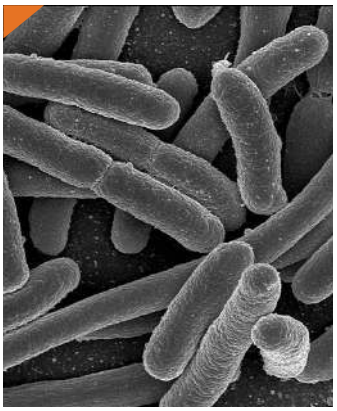
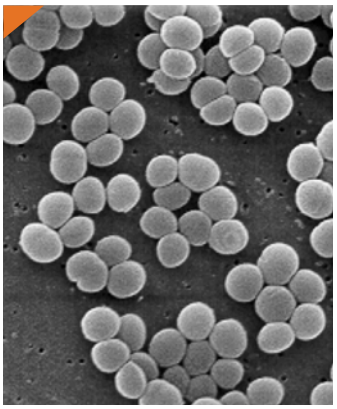
Test Microorganism Information

The test microorganism selected for this test:



Escherichia coli 8739

This bacteria is a Gram-negative, rod shaped, facultative anaerobe commonly found in the gastrointestinal tract of mammals. Although most serotypes of this microorganism are harmless there are pathogenic groups of *E. coli* such as enterohemorrhagic (EHEC), verocytotoxin producing (VTEC) and Shiga-like toxin producing (STEC) that can cause a multitude of illnesses. *E. coli* is relatively susceptible to disinfection when dried on a surface, yet it can be a challenging microorganism to mitigate in solution.



Staphylococcus aureus 6538

This bacterium is a Gram-positive, spherical-shaped, facultative anaerobe. *Staphylococcus* species are known to demonstrate resistance to antibiotics such as methicillin. *S. aureus* pathogenicity can range from commensal skin colonization to more severe diseases such as pneumonia and toxic shock syndrome (TSS). *S. aureus* is commonly used in several test methods as a model for gram positive bacteria. It can be difficult to disinfect but does demonstrate susceptibility to low level disinfectants.

Criteria for Scientific Defensibility of an ISO 22196 Study

For the laboratory to consider an ISO 22196 study to be scientifically defensible, the following criteria must be met:

1. The average number of viable bacteria recovered from the time zero samples must be approximately 1 x 10^4 cells/cm^2 or greater.
2. Ordinary consistency between replicates must be observed for the time zero samples.
3. The number of viable bacteria recovered from the control surface after the contact time must not be significantly (>2-Log_{10}) less than the original inoculum concentration.
4. Positive/Growth controls must demonstrate growth of appropriate test microorganism.
5. Negative/Purity controls must demonstrate no growth of test microorganism.

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Results of Testing with *S. aureus*

Test Microorganism	Contact Time	Test Substance	Replicate	CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to 24 Hour Control	Log_{10} Reduction Compared to 24 Hour Control
S. Aureus ATCC 6538	Time Zero	Control	1	9.50E + 04	1.20E + 05	N/A	N/A
			1	1.35E + 05			
			1	1.30E + 05			
	24 Hours	Control	1	9.95E + 04	1.03E + 05	N/A	N/A
			2	1.14E + 05			
			3	9.50E + 04			
		Nycote 7-11	1	<1.00E + 00	<1.00E + 00	>99.99903%	>5.01
			2	<1.00E + 00			
			3	<1.00E + 00			

Results of Testing with *E. coli*

Test Microorganism	Contact Time	Test Substance	Replicate	CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to 24 Hour Control	Log_{10} Reduction Compared to 24 Hour Control
E. coli ATCC 8739	Time Zero	Control	1	3.05E + 04	3.35E + 04	N/A	N/A
			1	3.50E + 04			
			1	3.50E + 04			
	24 Hours	Control	1	4.60E + 05	6.55E + 05	N/A	N/A
			2	4.05E + 05			
			3	1.10E + 06			
		Nycote 7-11	1	9.55E + 04	5.60E + 04	91.45%	1.07
			2	7.15E + 04			
			3	1.00E + 03			

Testing and results completed by an independent U.S. laboratory which maintains EPA compliance, FDA Good Laboratory Practices (GLPs) and ISO 17025 accreditation through ANSI National Accreditation Board (ANAB).

Nycote Laboratories Corporation operated on ISO 9001:2015 and AS9100D certified quality management system.

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