March 24, 2016

TTM srl / GmbH
Kiefernhainweg 102/A
39026 Prad am Stj.
Italy

Quantitative Assessment of One ISOLPAK ALU AB Sample

3203815

One ISOLPAK ALU AB sample, treated with Ultra-Fresh CA-16, was received from a supplier on March 03, 2016. At Thomson Research Associates Inc., the sample was tested for antibacterial activity using a quantitative test method.

PROCEDURE

Quantitative Antibacterial Assessment:

ISO 22196:2011 was used to quantitatively test the specimen for antibacterial activity. In brief:

1. The sample was placed into a container with a lid.
2. A 0.3 mL inoculum of *Escherichia coli* (ATCC #8739) or Methicillin Resistant *Staphylococcus aureus* (ATCC #33591) or *Salmonella choleraesuis* (ATCC #10708) was placed, in microdroplets, on the surface of the samples.
3. The specimen was incubated 24 hours at 37C.
4. 20 mL of Letheen broth was added to the container and shook. The liquid was plated using dilution techniques.
5. The "Value of Antimicrobial Activity" was carried out using the formula

$$R = [\log (B/C)]$$

Where:

R= value of antimicrobial activity

B = Average of the number of viable cells of bacteria on the untreated test piece / inoculum control after 24 hours

C = Average of the number of viable cells of bacteria on the antimicrobial test piece after 24 hours.

THOMSON RESEARCH ASSOCIATES INC.

49 Gervais Drive, Toronto, Ontario, Canada, M3C 1Y9
Tel: 416.955.1881 • Fax: 416.955.1887 • Email: lab@ultra-fresh.com
Ultra-Fresh is a registered trademark of Thomson Research Associates Inc.
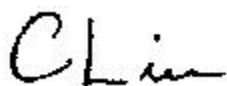
RESULTS

Quantitative Assessment of Activity - ISO 22196:2011 *E. coli*				
Concentration of starting inoculum		5.31×10^5		
Sample Description	**No. Bacteria Recovered**	**Log Value**	**R = [log(B/C)]**	**% Reduction**
1 ISOLPAK ALU AB Treated with 0.4% Ultra-Fresh CA-16 in LDPE top layer, white side	3.09×10^2	2.5	4.6	>99.9%
Inoculum Control	1.15×10^7	7.1	----	----

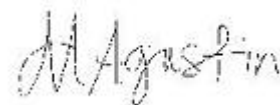| Quantitative Assessment of Activity - ISO 22196:2011 *MRSA*				
Concentration of starting inoculum		1.97×10^5		
Sample Description	**No. Bacteria Recovered**	**Log Value**	**R = [log(B/C)]**	**% Reduction**
1 ISOLPAK ALU AB Treated with 0.4% Ultra-Fresh CA-16 in LDPE top layer, white side	3.28×10^1	1.5	4.0	>99.9%
Inoculum Control	3.16×10^5	5.5	----	----

Quantitative Assessment of Activity - ISO 22196:2011 *S. choleraesuis*				
Concentration of starting inoculum		3.09×10^5		
Sample Description	**No. Bacteria Recovered**	**Log Value**	**R = [log(B/C)]**	**% Reduction**
1 ISOLPAK ALU AB Treated with 0.4% Ultra-Fresh CA-16 in LDPE top layer, white side	$<2.00 \times 10^1$	<1.3	>4.6	>99.9%
Inoculum Control	7.16×10^5	5.9	----	----

Note: The level of treatment stated above indicates theoretical levels only.

THOMSON RESEARCH ASSOCIATES INC.

Microbiology Manager   Microbiologist