

Our Ref: 10063 IA

30th November 2010

Taren Cleaning Supplies
Unit 1 29 Mangrove Lane
Taren Point NSW 2229

ATTENTION: MURRAY STANTON

Dear Carmelo,

RE: LAUNDRY TRIALS

1. Objective

Taren Cleaning Supplies approached Silliker Australia Pty Ltd to undertake a scientifically valid study to determine the effectiveness of specific laundry wash programs pursuant to AS/NZS 4146:2000, Section 3.5.3 of the Laundry Trial Practice standard. This trial was designed to assess the effectiveness of a washing cycle for clothes in removing bacteria. While, a 'kill' claim cannot be made based on the data generated by these trials as this protocol does not differentiate between killing a bacteria and removing bacteria, the data nonetheless provides post wash process microbiological enumeration and thus an appropriate measure of effectiveness pursuant to the standard.

The following two types of washing powders were used

1. Ultimate Front Washing Powder
2. Ultimate Top Washing Powder

The laundry process incorporates the use of a number of chemical products as defined within this report. The following wash cycles were assessed in duplicate for their effectiveness.

1. Ultimate Front Washing Powder

Rinse Cycles	Time [min]	Temp [°C]	Dosage [g/L]
2	26	26.4	10

2. Ultimate Top Washing Powder

Rinse Cycles	Time [min]	Temp [°C]	Dosage [g/L]
2	26	26.4	10

2. Methodology

A total of 2 bacterial strains were selected for the trial. These organisms are listed below

- *Escherichia coli* (ATCC 8739)
- *Staphylococcus aureus* (ATCC 6538)

These bacterial strains were prepared in nutrient broth at the appropriate time and temperatures. Swatches were prepared by cutting terry toweling nappies in 10x10 cm squares. These swatches were marked with organism ID using indelible ink markers and autoclaved at 121°C for 15 minutes. After autoclaving swatches were aseptically inoculated with 1 mL of overnight culture broths and put into individual sterile stomacher bags bearing ID for run, wash cycle, organism and swatch no. Triplicate swatches per cycle run were prepared. Control swatches were prepared to calculate the initial count per cm. sq of the swatch. Taren Cleaning Supplies was responsible for adding these inoculated swatches to the respective wash cycle and bringing these back to Siliker Australia Pty Ltd for residual microbial counts on the swatches.

The personnel involved were trained by Siliker Australia Pty Ltd in aseptic technique to enable swatches to be added and retrieved utilizing sterile tweezers and receptacles to prevent contamination of swatches.

The test swatches were retrieved aseptically and put into sterile stomacher bags at the end of the wash cycle. At the laboratory, to retrieve viable microorganisms, all the swatches including the negative controls were then washed with 100 mL of Recovery nutrient broth with 0.5% Tween 80 and blended in stomacher for one minute. Appropriate serial dilutions were prepared from the recovery broths up to -8 dilution for the controls. Test agar plates were surface inoculated with 0.5 mL of recovery diluent at the appropriate dilutions. Mannitol salt agar and MacConkey's agar were used respectively for *Staphylococcus aureus* and *E.coli* and incubated at 35°C for 2 days. At the end of the incubation counts were performed.

3. Results

Table 3.1: Ultimate Front Washing Powder

Ultimate Front Washing Powder				
<i>E.coli</i>				
Test No	Count@stomacher suspension	Count/ sq.cm	Log	Average
<u>Cycle A</u>				
E1	0,0	<1	0	0
E2	0,0	<1	0	
E3	0,0	<1	0	
<u>Cycle B</u>				
E1	0,1	1	0	0.100343332
E2	1,1	2	0.301029996	
E3	0,0	<1	0	
Final Average Log of count/sq.cm				0.05
Initial <i>E.coli</i> count/sq.cm.				25000000
Log of culture count				7.40
Log Reduction				>7.35
<i>Staphylococcus aureus</i>				
Test No	Count@stomacher suspension	Count/ sq.cm	Log	Average
<u>Cycle A</u>				
S1	0,0	<1	0	0.159040418
S2	2,1	3	0.477121255	
S3	1,0	1	0	
<u>Cycle B</u>				
S1	0,1	1	0	0.560413746
S2	31,17	48	1.681241237	
S3	0,0	<1	0	
Final Average Log of count/sq.cm				0.36
Initial <i>Staph.</i> count/sq.cm.				65000000
Log of culture count				7.81
Log Reduction				>7.45

Table 3.2:

Ultimate Top Washing Powder				
<i>E.coli</i>				
Test No	Count@stomacher suspension	Count/sq.cm	Log	Average
<u>Cycle A</u>				
E1	0,0	<1	0	0
E2	0,0	<1	0	
E3	0,0	<1	0	
<u>Cycle 2B</u>				
E1	0,0	<1	0	0
E2	0,0	<1	0	
E3	0,0	<1	0	
Final Average Log of count/sq.cm				0.00
Initial <i>E.coli</i> count/sq.cm.				25000000
Log of culture count				7.40
Log Reduction				>7.40
<i>Staphylococcus aureus</i>				
Test No	Count@stomacher suspension	Count/sq.cm	Log	Average
<u>Cycle A</u>				
S1	0,0	<1	0	0
S2	0,0	<1	0	
S3	0,0	<1	0	
<u>Cycle B</u>				
S1	0,0	<1	0	0.725363753
S2	52,98	150	2.176091259	
S3	0,0	<1	0	
Final Average Log of count/sq.cm				0.36
Initial <i>Staph.</i> count/sq.cm.				65000000
Log of culture count				7.81
Log Reduction				>7.45

Note: “>”= greater than, “<”= Less than

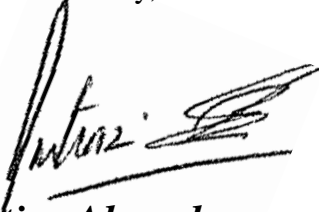
4. CONCLUSIONS

Both the wash cycles achieved the equivalent to a chemical disinfection process against the test organisms reported in these trials. Kill factors of greater than 7 log reduction were achieved against both the bacterial species. Disinfectants are typically required to achieve kill factors of greater than 6 log reductions. (AOAC Carrier tests and fungicidal tests)

A log 7 reduction represents that 10, 000, 000 bacteria being reduced to <1 per cm².

Under normal laundering conditions all the wash cycles at the conditions defined in this report would be capable of achieving final bacterial counts on textiles of less than 1 organism per sq.cm. and meet the chemical disinfection requirements of AS/NZS 4146:2000.

Yours faithfully,



Imtiaz Ahmed

Manager, Science Center
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