

Poole Waite Test Report

Evaluation of the antimicrobial properties of various types of escutcheon plates

The objective of this trial was to determine the antibacterial properties of Self-Sanitising Antimicrobial Escutcheons produced by Poole Waite & Co Ltd. The company provided the following plates of metal used in the production of their escutcheons for use in testing:

- 10 blank escutcheons ref: AMFS0412 – treated black
- 10 blank escutcheons ref: AMFS0412 – treated white
- 10 blank escutcheons ref: AMFS0412 – treated clearcoat

Laboratory procedure

Preparation of test suspensions

Overnight culture suspensions (18 – 24 hours depending on the strain) of *Escherichia coli* NCTC 9001 and methicillin resistant *Staphylococcus aureus* (MRSA) NCTC 12493 were prepared before testing began. Immediately before use, aliquots of these suspensions were serially diluted and a known volume of each dilution plated on Tryptone Soya Agar (TSA) plates. Once the inocula had dried, the plates were incubated at 37°C for 24 hours. The number of colonies on countable plates were then counted and the colony forming unit (cfu) count/ml of each bacterial suspension calculated.

Inoculation of metal plates

The trial was carried out at ambient temperature (20°C – 22°C).

The client had requested contact times of 10 min and 2 hours, with duplicate metal plates for each time interval and each organism.

One type of metal plate was inoculated at a time. Before inoculation, eight plates of the same type were laid out in pairs on a sterile surface and liberally swabbed with propanol to sanitize the surfaces before inoculation. This allowed 2 plates for testing 10 minutes after inoculation and 2 plates to be tested 2 hours after inoculation for each organism.

For each organism, the metal plates were inoculated with 0.1 ml of the overnight bacterial suspension, which was carefully spread over the surface of each plate until the inoculum had dried. After 10 minutes, a sterile sponge swab moistened with neutralizing diluent was used for each plate to swab the entire plate surface thoroughly in order to harvest the recovery of any viable bacteria. The swab was then placed in 10 ml of neutralizing diluent and the enclosing bag placed in a peristaltic mixer for 1 minute to facilitate the release of organisms into the diluent. The free liquid was then used to prepare serial decimal dilutions, defined volumes of which were plated onto TSA plates. Following incubation at 37°C for 24 hours, these agar plates were examined and the number of bacterial colonies on each dilution plate were counted. This procedure was then repeated 2 hours after the inoculum had been applied to another two plates.

Results

Organism level in overnight suspensions

Methicillin resistant *Staphylococcus aureus*: 2.6×10^8 (260 million) cfu /ml
Escherichia coli: 5.0×10^8 (500 million) cfu/ml

Organism level in 0.1 ml inocula

Methicillin resistant *Staphylococcus aureus*: 2.6×10^7 (26 million) cfu
Escherichia coli: 5.0×10^7 (50 million) cfu

Recovery

Sample	Methicillin resistant <i>Staphylococcus aureus</i> (cfu)			
	10 min		2 hours	
	Replicate A	Replicate B	Replicate A	Replicate B
Treated black escutcheon	9.1×10^2	4.4×10^2	1.2×10^3	5.9×10^2
Treated white escutcheon	3.3×10^2	4.1×10^2	4.8×10^2	5.0×10^2
Treated clear escutcheon	3.4×10^2	4.4×10^2	1.0×10^3	5.4×10^2
Mean count of treated escutcheons	5.3×10^2	4.3×10^2	8.9×10^2	5.4×10^2
Percentage reduction of inoculum				
Treated escutcheons	99.99796	99.99834	99.99657	99.99792

Sample	<i>Escherichia coli</i> count (cfu)			
	10 min		2 hours	
	Replicate A	Replicate B	Replicate A	Replicate B
Treated black escutcheon	<20	37	<20	<20
Treated white escutcheon	<20	37	<20	<20
Treated clear escutcheon	20	1.0×10^2	<20	<20
Mean count of treated escutcheons	≤ 20	58	<20	<20
Percentage reduction of inoculum				
Treated escutcheons	>99.99996	99.99988	>99.99996	>99.99996

The results for the treated escutcheon plates were so similar that a mean count of results for residual contamination after inoculation was calculated to determine the percentage reduction.

The differences in percentage reductions for MRSA were slightly lower than for *E.coli*; this is due to differences in the composition of the cell wall of each organism type which impart greater resistance to the MRSA strain.

A reduction of >99.99% was achieved within 10 minutes for MRSA on all types of plate. This reduction was not increased after 2 hours.

For *E.coli*, a reduction of > 99.999% was achieved for all types of plate within 10 min. There was no recovery after 2 hours.

Conclusion

All types of escutcheon plate demonstrated antibacterial properties, achieving a minimum reduction of 99.99% within 10 minutes of inoculation with methicillin resistant *Staphylococcus aureus* and a minimum reduction of 99.999% within 10 minutes of inoculation with *Escherichia coli*. This means that the Self-Sanitising Anti-Microbial Escutcheons ref: AMFS0412 will kill most if not all bacteria within a short time of contact.

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