



Minnicare® and Actril® Cold Sterilants

Technical Bulletin: Effectiveness Against MRSA & MSS

Introduction

Actril and Minnicare Cold Sterilants are EPA registered high level disinfectants that have demonstrated effectiveness against a broad range of organisms. These microbes include: Pseudomonas aeruginosa, Salmonella thymurium, Hepatitis B, HIV, Mycobacterium bovis (TB surrogate), and Bacillus subtilis.^{1,2} This technical white paper examines the efficacy of Actril and Minnicare against MSSA and MRSA for hard surface disinfection.

History of MRSA

As the latest data has shown, deaths due to Methicillin-resistant Staphylococcus aureus (MRSA) are no longer a rare event, but has actually surpassed deaths due to HIV in the USA.³ Since its discovery as a distinct, methicillin-resistant strain of Staphylococcus aureus (S. aureus) in the early 1960's, MRSA has rapidly evolved to become pervasive in healthcare, long-term care and even community settings. Today, MRSA accounts for almost 50% of the Staphylococcus aureus in healthcare facilities.⁴

While a major issue in healthcare facilities, MRSA has made the "leap" into the community and in this setting is labeled Community Aquired-MRSA (CA-MRSA). Unlike in healthcare facilities where many of the infections attacked the immuno-compromised, CA-MRSA has been hitting those who are healthy. High school, college, and professional athletes⁵ have all been impacted by CA-MRSA, which in the worst case has even shutdown entire athletic programs.

Just this past year, multiple schools were shutdown for cleaning and disinfection because of the spread of MRSA within the student body.⁶

Disinfectants and MRSA

Although a variety of bacteria have developed antibiotic resistance, this does not imply they are resistant to

disinfectants. Multiple studies have been conducted and there is no evidence of MRSA showing resistance to disinfectants. In fact, the various strains have shown statistically no difference in terms of resistance when exposed to disinfectants.⁸

The reason behind this is that unlike antibiotics that disrupt singular processes within a cell, disinfectants, such as Actril or Minnicare actually disrupt the entire cell membrane. In essence, they blow a hole in the cell membrane whether it is MRSA or MSSA.

Expeiment

Test organisms used for this experiment are:

ATCC 6538 (S. aureus) ATCC 33592 (CA-MRSA)

These organisms were tested using a modified AOAC UseDilution Method. (The modification was simply in the total number of carriers used from 60 to 15 and 20 for MSSA and MRSA, respectively.) Actril Cold Sterilant, a ready to use disinfectant, was tested at full strength, which consists of 850 ppm of Peracetic Acid (PAA). Minnicare Cold Sterilant was diluted with DI water to a 1% solution, which consists of 500 ppm of PPA.

| MSSA | | |
|--------|--------|--------------|
| | Actril | 1% Minnicare |
| 1 min | 13/15 | 12/15 |
| 3 min | 15/15 | 15/15 |
| 5 min | 15/15 | 15/15 |
| 10 min | 15/15 | 15/15 |
| MRSA | | |
| | Actril | 1% Minnicare |
| 1 min | 13/15 | 12/15 |

- Population for MSSA was 1.3x10⁶ and MRSA was 1.03x10⁷
- Negative carriers/total carriers
- A 15/15 or 20/20 result is interpreted as complete kill

Discussion

The AOAC Use-Dilution Method is used in the submission for EPA claims for effectiveness against MSSA and MRSA. Both Actril Cold Sterilant and 1% Minncare Solution passed the modified AOAC Use-Dilution Method for MSSA at 3 minutes, killing 10⁶ organisms. For both disinfectants, total kill of MSSA were noted on 80% or better of the carriers at one minute.

For MRSA, both disinfectants passed the modified AOAC Use-Dilution Method at two minutes, killing 10⁷ organisms on all the carriers.

Conclusion

Actril Cold Sterilant and 1% Minncare Solution passed the modified AOAC Use-Dilution Method for both MSSA and MRSA at 3 and 2 minutes, respectively. Based on these extremely positive results, further investigation using Actril and Minncare Cold Sterilants as a disinfectant to overcome MSSA and MRSA is warranted.

Terminology

MSSA --- Methicillin-susceptible *S. aureus*. This is the regular (non-resistant) strain of *S. aureus*.

MRSA – Methicillin-resistant *S. aureus*, which today refers not only to just strains that are methicillin-resistant, but also any beta-lactam antibiotic, such as amoxicillin and penicillin.

HA-MRSA – a MRSA infection acquired during a stay in or immediately after discharge from a hospital or other health care setting.³

CA-MRSA – an infection with MRSA in a person who does not have any prior history of health care exposure such as hospitalization, surgery or a permanent intravenous lines or other indwelling devices or hemodialysis.

References

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