



# Investigating The Rapid Antimicrobial Action of a Silicone PHMB Foam Dressing

## Introduction

With a multitude of dressings in the wound care market, it is important for a healthcare provider to administer the most appropriate product. The ability for rapid and sustained antimicrobial activity of an antimicrobial dressing is a significant benefit to wound management and is a vital component to consider.

In chronic wounds, the presence of microorganisms, is a major contributing factor to delayed wound healing<sup>1</sup>. Aside from the increased patient morbidity related to chronic wounds, impacting patients' lives, the financial implications to healthcare providers is also a considerable burden. In the US alone, it is claimed that an excess of US\$25 billion is spent annually on treatment of chronic wounds<sup>2</sup>.

The development of an antimicrobial Silicone Foam wound dressing, by Advanced Medical Solutions (AMS) containing polyhexamethylenebiguanide (PHMB); is indicated for moderate to heavily exuding chronic and acute wounds, and is designed to provide secure, non-irritating adhesion, whilst supporting non-traumatic removal – **Figure 1**.



Fig 1 – Silicone PHMB Foam Dressing (Border and Non-Border)

PHMB is a broad spectrum antimicrobial, that is able to have effective, fast acting activity, combined with low cytotoxicity and does not promote bacterial resistance<sup>3</sup>.

The following study aims to demonstrate the rapid antimicrobial capabilities of the Silicone PHMB Foam dressing plus an additional PHMB foam product developed by an alternative supplier, using a log reduction assay. The *in vitro* testing is designed to simulate clinical use of the product, replicating key conditions, including temperature, preconditioning with wound exudate, dynamic environment, wear time i.e. 7 days, and will address potential microbial reformation.

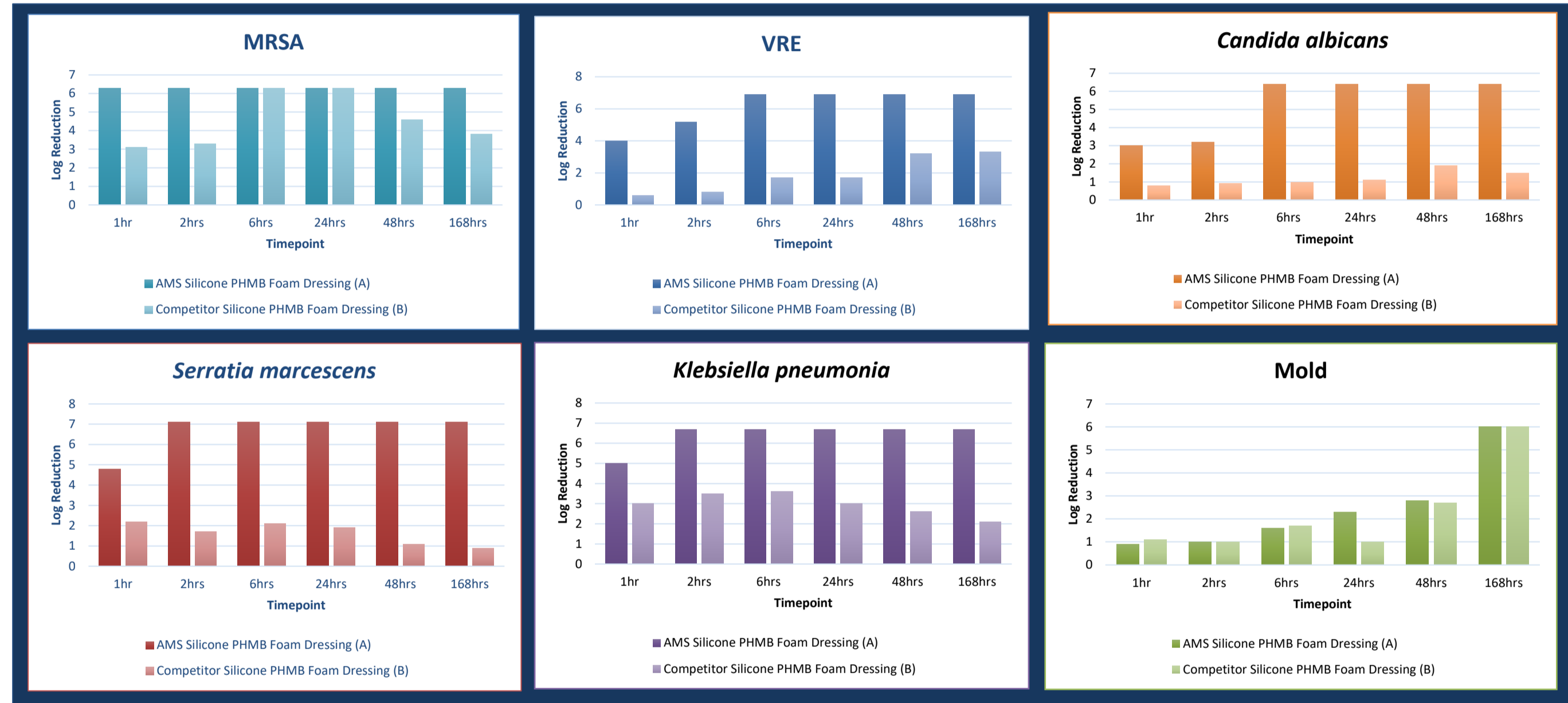
## Method

- Testing performed in accordance with modified AATCC TM100 guidelines, a quantitative and reproducible method that analyses the antimicrobial activity within the device.
- Representative clinically relevant wound isolates utilised, including MRSA and *Klebsiella pneumonia*.
- Challenge timepoints assessed 1hr, 2hrs, 6hrs, 24hrs, 48hrs and 168hrs (7 days)
- Microbial re-challenge employed at several intervals between 24hrs and 168hrs.

## References:

1 - Hooper SJ, Percival SL, Hill KE, Thomas DW, Hayes AJ, Williams DW. The visualisation and speed of kill of wound isolates on a silver alginate dressing. *Int Wound J* 2012; 9:633–642  
 2 - Human Skin Wounds: A Major and Snowballing Threat to Public Health and the Economy *Wound Repair Regen*. 2009 ; 17(6): 763–771. doi:10.1111/j.1524-475X.2009.00543.x.  
 3 - PHMB Made Easy – Wounds International April 2017 [www.woundsinternational.com](http://www.woundsinternational.com)  
 Data on file: LD127-23  
 Dressing A- Silicone PHMB Foam Dressing - Advanced Medical Solutions Ltd Dressing B – Silicone PHMB Foam Dressing – Competitor Product

## Results – Log Reduction Data:



## Discussion

The data demonstrates **Dressing A** to reduce the microbial bioburden within a minimal time period, with majority of microorganisms obtaining a greater than 4 log reduction within 1hr, and complete eradication occurring within 2-6 hrs. The antimicrobial activity is maintained throughout the challenge period, taking into account re-challenge with the microorganism.

The alternative product, **Dressing B**, has reduced antimicrobial activity, and it is also apparent that the product has limited ability to maintain its efficacy, for several microorganisms, including *S. marcescens* and *K. pneumonia*, when subjected to being re-challenged, this is particularly noticeable at the 168hr timepoint, where the log reduction value has decreased

The differences in antimicrobial activity between the two dressings analysed, clearly indicates that there are inherent differences between products in the marketplace that are of a similar composition and antimicrobial agent. Therefore, visibility of the performance data is critical to ensure informed decisions are made regarding using the appropriate dressing for the indicated wound type.

## Conclusion

The Silicone PHMB Foam dressing is a highly absorbent device, designed to handle moderate to heavy wound exudate. The moist wound environment facilitated by the foam dressing prevents damage to periwound skin, while enabling autolytic debridement and reducing pain. The device is indicated for chronic and acute wounds, and may be used during the healing process on:

- Venous stasis ulcers
- Pressure Sores
- Diabetic ulcers
- Post Surgical Incisions
- Burns (superficial / partial thickness)

The immense economic and social impact of wounds in our society<sup>2</sup> requires the appropriate use of woundcare products to be selected, to promote wound healing, with the ability for a dressing to rapidly reduce, eradicate and prevent microbial re-colonisation.

The experimental evidence documented has enabled the fast acting antimicrobial properties of the Silicone PHMB foam dressing to be demonstrated, in addition to the sustained antimicrobial performance being effectively maintained following multiple re-inoculations, therefore demonstrating the dressing to be an effective and appropriate wound care treatment

