

A Comparison of Bacterial Sequestration in Two Superabsorbent Dressings

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Introduction

Superabsorbent dressings are commonly used to treat chronic wounds. They handle excessive exudate levels by absorbing wound exudate, and bacteria within it, into the core structure.

The colonisation of bacteria in a wound further inhibits the healing process of a chronic wound, affecting the healing outcome¹. A dressing's ability to keep bacteria and fungi in the wound fluid away from a wound's surface is therefore important in reducing one of the factors inhibiting wound closure.

This study looks at the ability of two commercially available superabsorbent dressings to sequester absorbed microorganisms in comparison to a gauze control.

Method

Dressings were tested with 5 microorganisms (MRSA, *S.aureus*, *P.aeruginosa*, Candida & Enterococcus)

Dressings were placed on top of 15ml of inoculum at a concentration of 10⁶CFU/ml. The wound contact side of each dressing was re-inoculated with 15ml each day for 7 days.

1cm² sections were taken from each dressing, and left to absorb and viable microorganisms quantified using standard microbiological techniques. Additional samples from the inner core were visualised using Environmental Scanning Electron Microscopy (ESEM) to image any bacteria within the core structure.

Results & Discussion-

Sequestration following absorption of microorganisms varied between both dressings and the test species. Table 1 shows the percentage reduction in viable microorganisms recovered from each dressing compared to a gauze control.

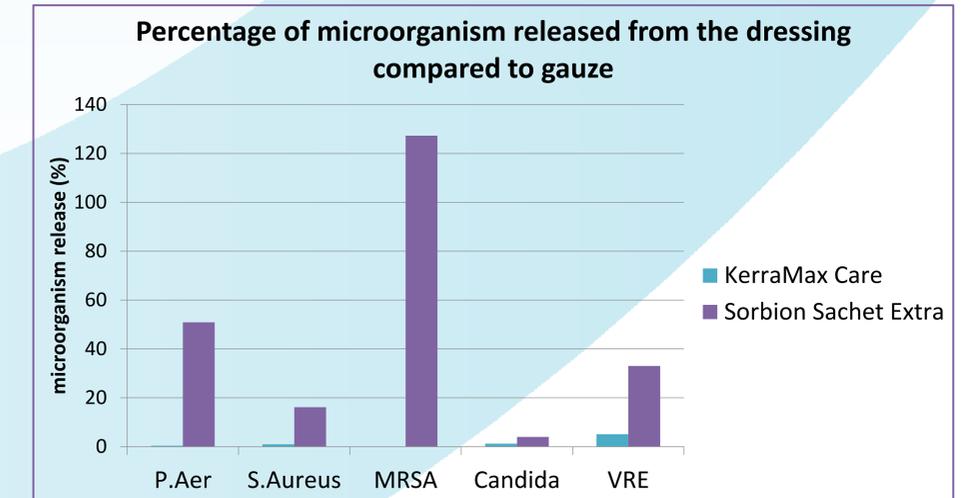
- KerraMax Care showed increased sequestration abilities with a >90% reduction in viable microorganisms (Table 1) compared to the gauze control.
- Sorbion Sachet Extra showed a more varied sequestration (Table 1), showing an increase in MRSA release compared to gauze, and reducing the release of other microorganisms by varying amounts (49.1-96.0%).

Microorganism	Reduction in viable microorganisms compared to gauze (%)	
	KerraMax Care	Sorbion Sachet Extra
<i>P.aeruginosa</i>	99.6	49.1
<i>S.aureus</i>	99.0	83.8
MRSA	99.9	-27.2 (increased release)
Candida	98.7	96.0
Vancomycin Resistant Enterococcus	94.0	66.9

Table 1- Percentage reduction in viable microorganism release compared to a gauze control

Graph 1 depicts the microorganism released from each dressing as a percentage of the gauze control. Clear variation can be seen between each dressing, and each microorganism tested.

Figure 1 shows ESEM images of the inner core of each dressing following absorption of MRSA. Colonies of the bacteria can be seen along the surface of Sorbion Sachet Extra, however no bacteria were able to be visualised on KerraMax Care. It is hypothesised that the bacteria has been encapsulated within the gel structure and is therefore not available to be visualised.



Graph 1- Microorganism release from each dressing as a percentage of the gauze control.

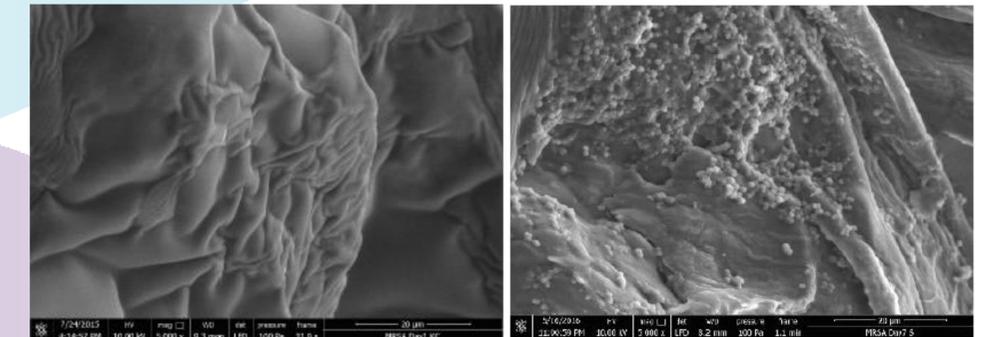


Figure 1- ESEM images of KerraMax Care (Left) and Sorbion Sachet Extra (Right). MRSA can be visualised on the core of Sorbion Sachet Extra, but is unable to be detected on KerraMax Care.

Conclusion-

- KerraMax Care was seen to have a high level of sequestration across all 5 inoculums. Showing an increased sequestration over both gauze and Sorbion Sachet Extra.
- Sorbion Sachet Extra demonstrated a range of sequestration, showing an increase compared to gauze in 4 out of 5 inoculums, however releasing more MRSA than the gauze control.

References-

1) Gardner, S.E. & Frantz, R.A., 2008. Wound bioburden and infection-related complications in diabetic foot ulcers. *Biological research for nursing*, 10, pp.44–53.