

# IN-VITRO PROPERTIES OF AN ELEMENTAL SILVER ALGINATE WOUND DRESSING FOR USE ON CHRONIC WOUNDS

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## Abstract

An elemental Silver Alginate Dressing composed of calcium alginate, carboxymethylcellulose (CMC) and silver coated fibers, **SILVERCEL\***, was evaluated in a number of *in-vitro* simulated in-use tests to determine the dressings suitability for use as a chronic wound dressing.

*In-vitro* testing was performed looking at the following dressing characteristics for the Silver Alginate Dressing: A) Total fluid handling capacity of the dressing in combination with a secondary adhesive dressing over time using the BS EN 13726-1:2002 Test Method for Primary Wound Dressings, Part 1: Aspects of Absorbency test. B) Silver release profile of the dressing over a number of days with a daily challenge in simulated wound fluid. C) Extended zone of inhibition testing, challenging a dressing piece to a freshly prepared microbial lawn over a number of days with different common chronic wound pathogens.

Test results have demonstrated that the total fluid handling properties of the Silver Alginate Dressing in-use provide a high level of exudates management. Silver release from the Silver Alginate Dressing continues over a number of days providing consistent levels of silver ions. Antimicrobial testing also demonstrates a continued activity over a number of days to different common wound pathogens.

In conclusion the Silver Alginate Dressing provides a wide range of properties that are important in the management of chronic wounds, antimicrobial efficacy, continued silver release and a capacity to handle a large volume of exudates.

## Objectives

- Demonstrate by means of *in-vitro* tests functionality of SILVERCEL\* Antimicrobial Alginate Dressing
- Combination of test mimic highly exuding microbially contaminated wounds – assess dressings for effective chronic wound management
- Comparisons with other absorbent silver containing dressings

## Methods

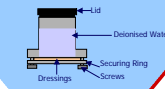
- Simulated in-use tests used in this study were:
  - Total Fluid Handling Capacity (based on BS EN ISO 13726)
  - Silver Release by Atomic Absorption
  - 7 Day repeat challenge zone of inhibition test using *Pseudomonas aeruginosa* and MRSA

## Results

- High Total Fluid Handling Capacity demonstrated over 7 days with SILVERCEL\* Dressing and TIELLE\* Plus compared with Aquacel Ag\*\* and DuoDerm\*\*
- Continued Silver Release over 7 days demonstrated by SILVERCEL\* Dressing
- Antimicrobial activity of SILVERCEL\* Dressing effective over 7 days using *Pseudomonas aeruginosa* and MRSA

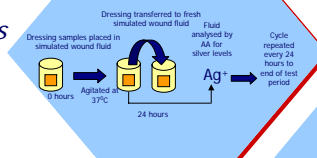
### Total Fluid Handling

1. Cut out combination of dressings into a circle (5.5cm diameter) and weigh.
2. Clamp the dressing combinations together and weigh.
3. Add a known volume of deionised water and weigh.
4. Incubate at 37°C for the appropriate length of time.
5. Reweigh the apparatus.



### Silver Release

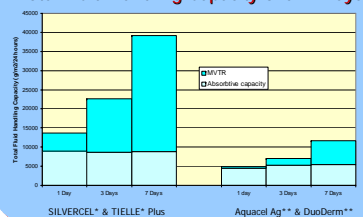
Silver release evaluated by Atomic Absorption (AA) Spectroscopy



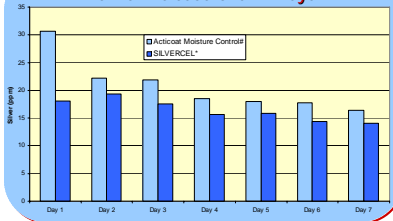
### Zone of Inhibition

1. Pre-wet dressing in simulated wound fluid
2. Place dressing on bacterial lawn Inc 24 hours / 37°C
3. Measure average zone of inhibition

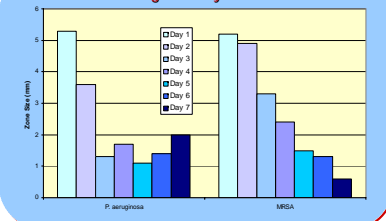
### Total Fluid Handling Capacity over 7 Days



### Silver Release over 7 Days



### SILVERCEL\* Dressing in 7 Day Zone of Inhibition Test



## Conclusions

- Demonstrates High Exudate Management
- Demonstrates Sustained Antimicrobial Activity
- Demonstrates effectiveness against antibiotic resistant strains
- This combination makes SILVERCEL\* Antimicrobial Alginate Dressing ideal for the management of chronic wounds

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