

NEW *in vitro* Evidence

AQUACEL[®] Ag
Hydrofiber[®] Dressing with Silver

What did we find **living** under
some silver dressings?*

Not all silver dressings are created equal.

AQUACEL[®] Ag dressing. Micro-contouring, bacteria killing*^{1,2}



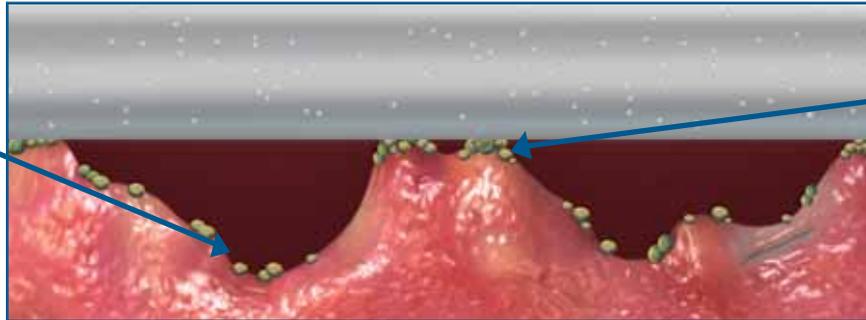
*As demonstrated *in vitro*



Dressing technology can play an important role in helping to manage wound infection.³ It is critical to consider the following when selecting a silver dressing.

- Does it micro-contour to the wound bed?
- Does it respond to wound conditions, making silver available when it's needed most?

It is important for a dressing to micro-contour to the wound bed to minimise voids where bacteria can grow.



Even when the dressing does contact the wound bed, it is important to make silver available to the bacteria in order to kill the bacteria.

AQUACEL® Ag dressing, powered by Hydrofiber® Technology, provides rapid and sustained antimicrobial activity when needed.*2,11,12

AQUACEL® Ag dressing can play an important role in helping to manage wound infection because it:

Locks in	Micro-Contours	Responds
		
<p>Locks in wound exudate and traps bacteria.*4,5,6</p> <ul style="list-style-type: none"> • Helps protect periwound skin and reduce maceration.^{7,8} • May help to minimise wound & cross-infection during removal.^{5,9} 	<p>Micro-Contours to the wound bed.*1</p> <ul style="list-style-type: none"> • Minimises 'dead space' where bacteria can grow.¹ • Maintains moisture balance in the wound bed.¹⁰ 	<p>Responds to wound conditions by providing rapid and sustained anti-microbial activity on demand.*2,11,12</p> <ul style="list-style-type: none"> • Forms a cohesive gel when in contact with exudate. • Kills a broad spectrum of pathogens, including MRSA and VRE.²

* As demonstrated *in vitro*. All images are artist's impressions

References

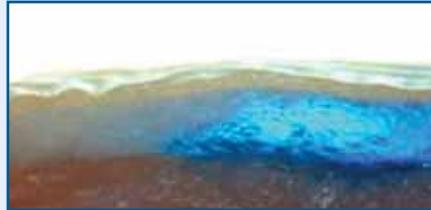
1. Jones S, Bowler PG, Walker M. Antimicrobial activity of silver-containing dressings is influenced by dressing conformability with a wound surface. *WOUNDS*. 2005;17(9):263-270. 2. Jones SA, Bowler PG, Walker M, Parsons D. Controlling wound bioburden with a novel silver-containing Hydrofiber dressing. *Wound Repair Regen*. 2004;12(3):288-294. 3. Cutting K, White R, Hoekstra H. Topical silver-impregnated dressings and the importance of the dressing technology. *Int Wound J*. 2009;6:396-402. 4. Waring MJ, Parsons D. Physico-chemical characterisation of carboxymethylated spun cellulose fibres. *Biomaterials*. 2001;22:903-912. 5. Walker M, Hobot JA, Newman GR, Bowler PG. Scanning electron microscopic examination of bacterial immobilisation in a carboxymethylcellulose (Aquacel) and alginate dressings. *Biomaterials*. 2003;24(5):883-890. 6. Newman GR, Walker M, Hobot J, Bowler P. Visualisation of bacterial sequestration and bactericidal activity within hydrating Hydrofiber® wound dressings. *Biomaterials*. 2006;27:1129-1139. 7. Coutts P, Sibbald RG. The effect of a silver-containing Hydrofiber dressing on superficial wound bed and bacterial balance of chronic wounds. *Int Wound J*. 2005;2(4):348-356. 8. Robinson BJ. The use of a hydrofiber dressing in wound management. *J Wound Care*. 2000;9(1):32-34. 9. Bowler PG, Jones SA, Davies BJ, Coyle E. Infection control properties of some wound dressings. *J Wound Care*. 1999;8(10):499-502. 10. Bishop SM, Walker M, Rogers AA, Chen WYJ. Moisture balance: optimising the wound-dressing interface. *J Wound Care*. 2003;12:125-128

How micro-contouring works

AQUACEL® Ag dressing, powered by Hydrofiber® Technology, micro-contours to the simulated wound bed, helping eliminate voids where bacteria can grow.^{1,13}



AQUACEL® Ag dressing covered by DuoDERM® Extra Thin dressing, applied to the simulated wound surface



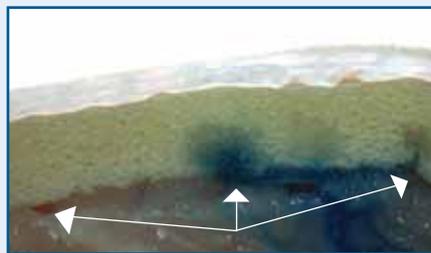
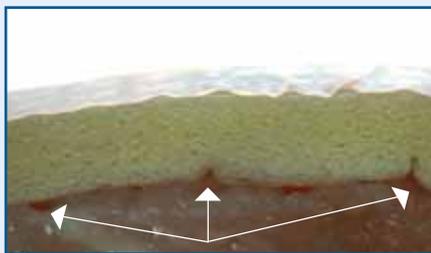
Gelling commences as AQUACEL® Ag dressing absorbs exudate



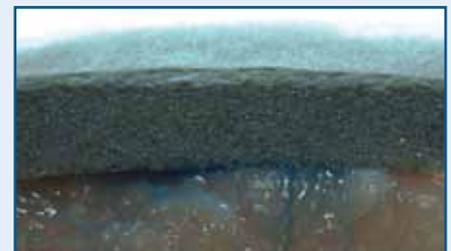
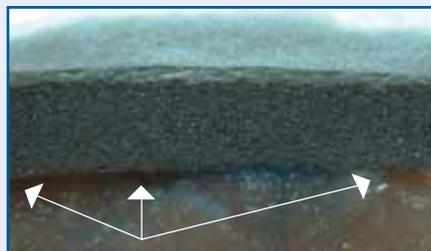
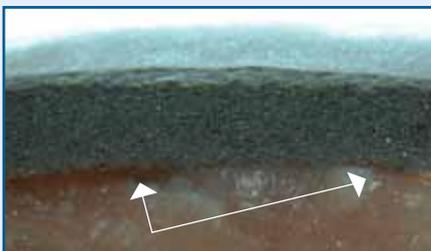
AQUACEL® Ag dressing forms intimate contact with the simulated wound surface, limiting spaces where bacteria can thrive

Both ALLEVYN™ Ag Adhesive dressing and Mepilex® Ag dressing were observed to not conform as well as AQUACEL® Ag dressing in an *in vitro* study, and there was evidence of fluid accumulation within the voids between the dressing and the simulated wound surface.¹³

Conformability of ALLEVYN™ Ag dressing to an uneven tissue surface



Conformability of Mepilex® Ag dressing to an uneven tissue surface



In these figures, pieces of dressing were placed on simulated wound tissue (pork belly). A needle containing dyed physiological saline solution was inserted through the base of the tissue. The solution was then inoculated into the 'wound space' to simulate an exuding wound. Arrows indicate voids.¹³

References

11. Bowler PG, Jones SA, Walker M, Parsons D. Microbicidal properties of a silver-containing Hydrofiber dressing against a variety of burn wound pathogens. *J Burn Care Rehabil.* 2004;25:92-196.
12. Bowler PG. Progression towards healing: wound infection and the role of an advanced silver-containing Hydrofiber® dressing. *Ostomy Wound Manage.* 2003;49:(8) (suppl):S2-S5.
13. Antimicrobial activity of silver-containing wound dressings using a shallow wound microbial model. Scientific Background Report WHRI3307 MA143. 2010 Data on File, ConvaTec.
14. Silver bioavailability and antimicrobial activity in silver-containing wound dressings. *Scientific Background Report.* WHRI3417 MA164. 2011 Data on File, ConvaTec.
15. Cavanagh R, Burrell R, Nadworny P. Evaluating antimicrobial efficacy of new commercially available silver dressings. *International Wound Journal.* 2010;7(5):394-405.
16. The antimicrobial activity of silver-containing wound dressings on a simulated colonised wound surface. *Scientific Background Report.* WHRI3415 MA162. 2011 Data on File, ConvaTec.
17. Observed Antimicrobial Activity of Mepilex® Border Ag Dressing Using Two In Vitro Models. *Scientific Background Report.* WHRI3405 MA160. 2011 Data on File, ConvaTec.
18. Further Investigations into the In Vitro Antimicrobial Activity of Silver-Containing Wound Dressings. *Scientific Background Report.* WHRI3401 MA159. 2011 Data on File, ConvaTec.

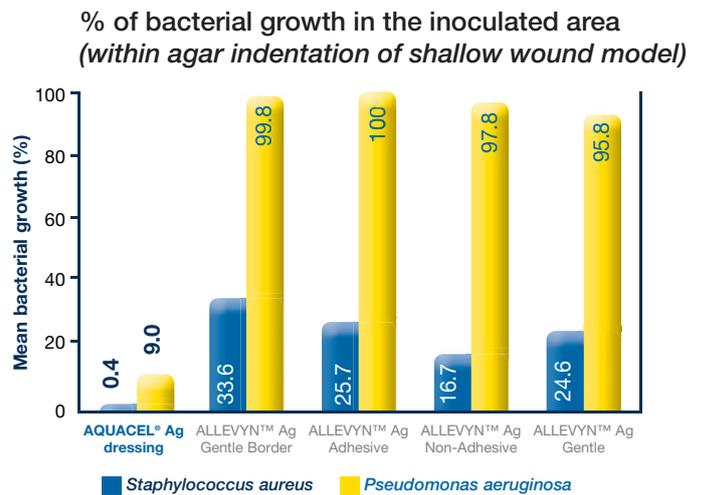
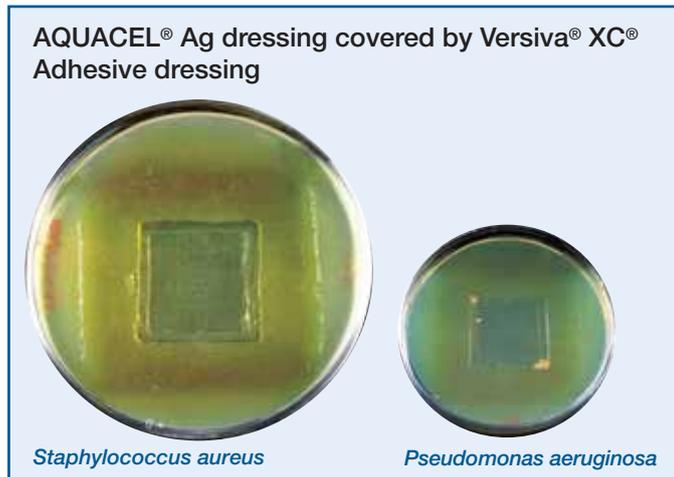
AQUACEL® Ag & ALLEVYN™ Ag dressings: Antimicrobial activity

It is important for a dressing to micro-contour to the wound bed to minimise voids where bacteria can grow.²

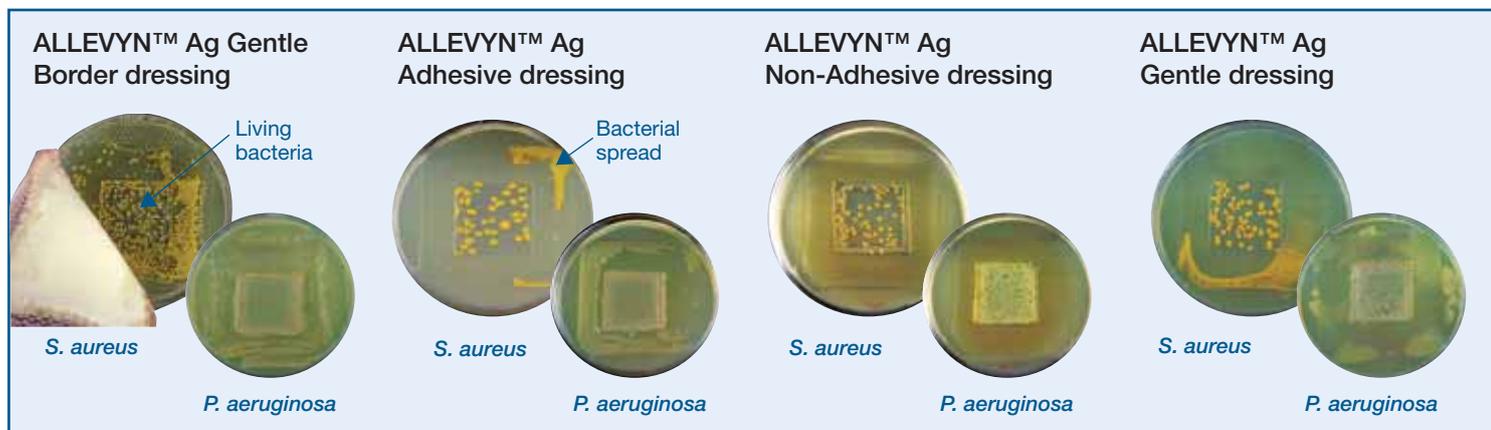
AQUACEL® Ag and various other silver dressings, including ALLEVYN™ Ag dressings, were tested in an *in vitro* shallow wound model. This model is designed to represent the irregular surfaces of a wound bed.¹³

- **AQUACEL® Ag dressing killed more bacteria than ALLEVYN™ Ag dressing in an *in vitro* study.*¹³**
- **AQUACEL® Ag dressing was observed to control the spread of bacteria under the dressing better than ALLEVYN™ Ag dressings in an *in vitro* study.*¹³**

AQUACEL® Ag dressing



ALLEVYN™ Ag dressings



* As demonstrated *in vitro* against ALLEVYN™ Ag Adhesive, ALLEVYN™ Ag Non-Adhesive, ALLEVYN™ Ag Gentle & ALLEVYN™ Ag Gentle Border dressings.

The testing of all products was performed three times. The graph percentages represent the mean of these three tests. The photos are representative of the visually observed results. Ranges of bacterial growth in dressing tests:

• AQUACEL® Ag covered by Versiva® XC® Adhesive (*S. aureus* 0.0% – 1.2%; *P. aeruginosa* 2.7% – 20.8%)
 • ALLEVYN™ Ag Gentle Border (*S. aureus* 31.0% – 37.3%; *P. aeruginosa* 99.4% - 100%) • ALLEVYN™ Ag Adhesive (*S. aureus* 21.0% – 30.8%; *P. aeruginosa* all 100%) • ALLEVYN™ Ag Non-Adhesive (*S. aureus* 14.6% – 18.4%; *P. aeruginosa* 96.1% - 99.4%)
 • ALLEVYN™ Ag Gentle (*S. aureus* 21.7% – 26.3%; *P. aeruginosa* 95.1% - 96.6%)

AQUACEL® Ag & ALLEVYN™ Ag dressings: Silver availability¹⁴

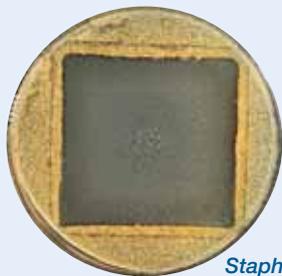
Even when the dressing does contact the wound bed, it is important to maximise exposure of antimicrobials to the wound bioburden.²

AQUACEL® Ag and various other silver dressings, including ALLEVYN™ Ag dressings, were tested using an *in vitro* flat wound model, seeded with bacteria. This model was designed to **maximise contact** between the dressing and the flat wound surface.¹⁶

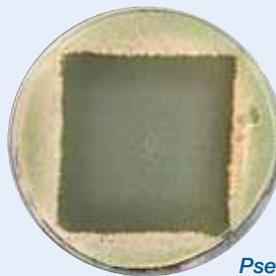
- In this *in vitro* study, **AQUACEL® Ag dressing, covered with Versiva® XC® Adhesive dressing, killed both *Staphylococcus aureus* and *Pseudomonas aeruginosa* on the simulated colonised wound surface, as indicated by a stab culture within the *in vitro* study.**^{*16}
- In the same *in vitro* study, **ALLEVYN™ Ag Adhesive, ALLEVYN™ Ag Gentle dressing and ALLEVYN™ Ag Gentle Border dressings did not appear to prevent the growth of bacteria, and bacterial growth was observed beneath the dressings.**¹⁶
- **ALLEVYN™ Ag Non-Adhesive dressing appeared to prevent the growth of bacteria on the simulated colonised wound surface. However, a stab culture indicated the continued presence of living bacteria.**^{*16}

AQUACEL® Ag dressing

AQUACEL® Ag dressing covered by Versiva® XC® Adhesive dressing



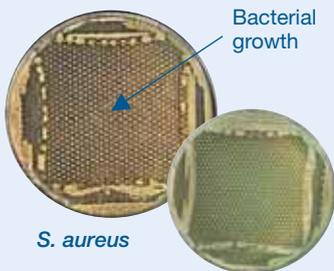
Staphylococcus aureus



Pseudomonas aeruginosa

ALLEVYN™ Ag dressings

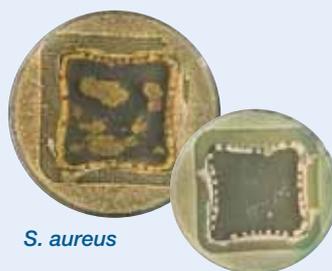
ALLEVYN™ Ag Gentle Border dressing



S. aureus

P. aeruginosa

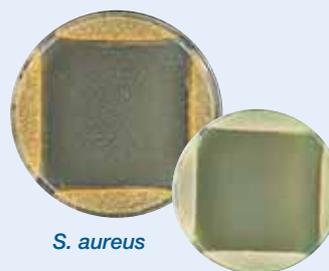
ALLEVYN™ Ag Adhesive dressing



S. aureus

P. aeruginosa

ALLEVYN™ Ag Non-Adhesive dressing



S. aureus

P. aeruginosa

ALLEVYN™ Ag Gentle dressing



S. aureus

P. aeruginosa

The testing of all products was performed three times. These photos are representative of the visually observed results.

* To assess whether the dressings were bactericidal in this *in vitro* model, a stab culture (i.e. a sterile loop inserted into the bacteria seeded agar) was taken from the center of each seeded agar plate and neutralized to eliminate residual silver activity. All plates, including negative control, were incubated for at least 24 hours prior to visual observation for bacterial growth or no growth.

AQUACEL® Ag & Mepilex® Ag dressings: Antimicrobial activity

It is important for a dressing to micro-contour to the wound bed to minimise voids where bacteria can grow.²

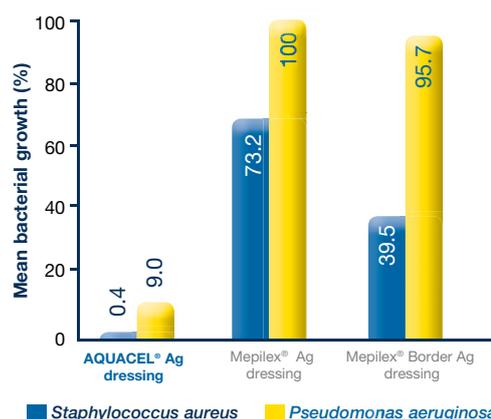
AQUACEL® Ag and various other silver dressings, including Mepilex® Ag dressings, were tested in an *in vitro* shallow wound model.^{13,17} This model is designed to represent the irregular surfaces of a wound bed.

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- **AQUACEL® Ag dressing was observed to control the spread of bacteria under the dressing better than Mepilex® Ag dressings in an *in vitro* study.**^{*13,17}

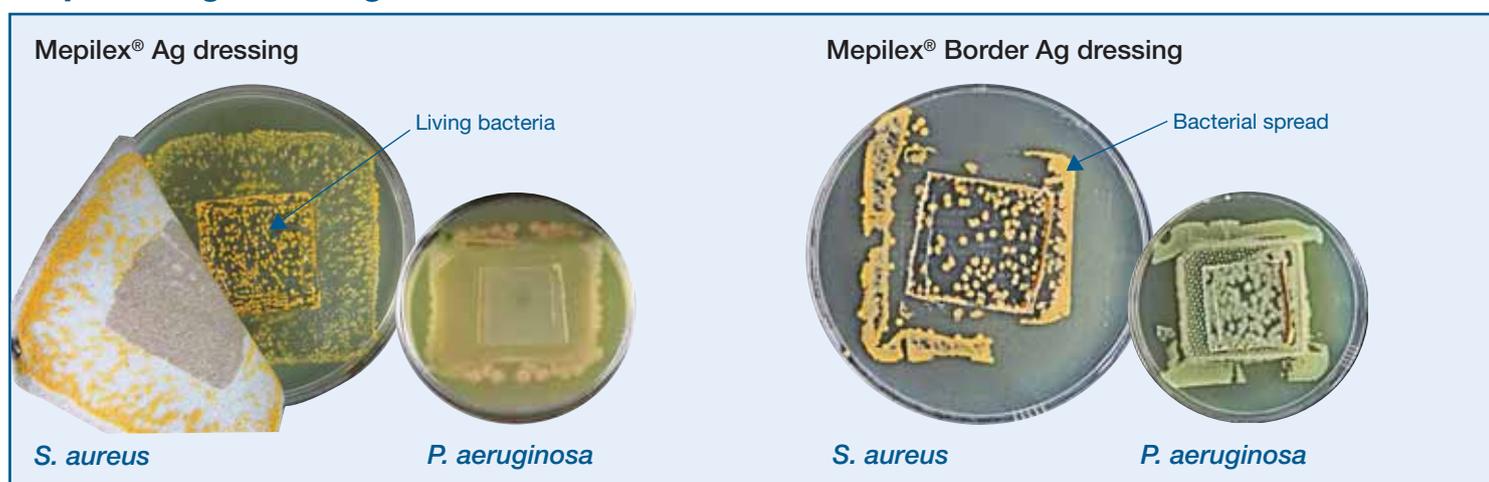
AQUACEL® Ag dressing



% of bacterial growth in the inoculated area (within agar indentation of shallow wound model)



Mepilex® Ag dressings



* As demonstrated *in vitro* against Mepilex® Ag and Mepilex® Border Ag dressings.

The testing of all products was performed three times. The graph percentages represent the mean of these three tests. The photos are representative of the visually observed results. Dressing Test Ranges:

- AQUACEL® Ag covered by Versiva® XC® Adhesive (*S. aureus* 0.0% – 1.2%; *P. aeruginosa* 2.7% – 20.8%)
- Mepilex® Ag (*S. aureus* 65.9% – 80.6%; *P. aeruginosa* all 100%)
- Mepilex® Border Ag (*S. aureus* 31.8% – 49.9%; *P. aeruginosa* 89.8% – 100%)

AQUACEL[®] Ag & Mepilex[®] Ag dressings: Silver availability¹⁴

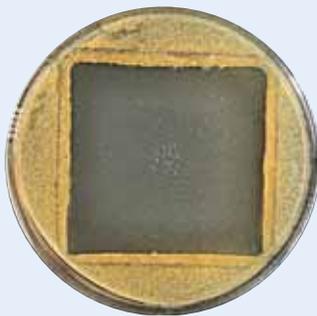
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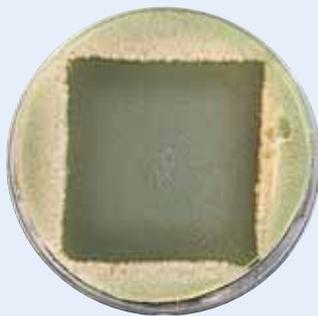
- In this *in vitro* study, AQUACEL[®] Ag dressing, covered with Versiva[®] XC[®] Adhesive dressing, killed both *Staphylococcus aureus* and *Pseudomonas aeruginosa* on the simulated colonised wound surface, as indicated by a stab culture within the *in vitro* study.^{*16,17}
- In the same *in vitro* study, Mepilex[®] Ag dressings did not appear to prevent the growth of bacteria, and bacterial growth was observed beneath the dressings.^{16,17}

AQUACEL[®] Ag dressing

AQUACEL[®] Ag dressing covered by Versiva[®] XC[®] Adhesive dressing



Staphylococcus aureus



Pseudomonas aeruginosa

Mepilex[®] Ag dressings

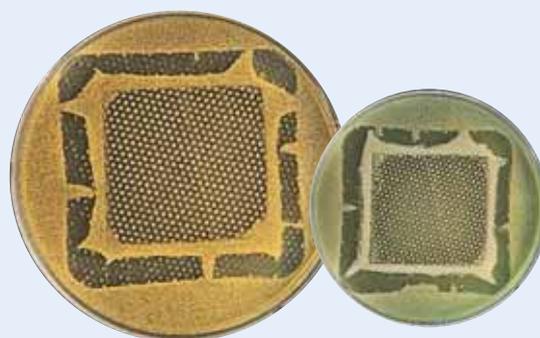
Mepilex[®] Ag dressing



S. aureus

P. aeruginosa

Mepilex[®] Border Ag dressing



S. aureus

P. aeruginosa

As demonstrated *in vitro* against Mepilex[®] Ag and Mepilex[®] Border Ag dressings.

The testing of all products was performed three times. These photos are representative of the visually observed results.

* To assess whether the dressings were bactericidal in this *in vitro* model, a stab culture (i.e. a sterile loop inserted into the bacteria seeded agar) was taken from the center of each seeded agar plate and neutralized to eliminate residual silver activity. All plates, including negative control, were incubated for at least 24 hours prior to visual observation for bacterial growth or no growth.

A study independent of ConvaTec had observations consistent with ConvaTec's observations¹⁴

Study Observations

Study details

Publication: Evaluating antimicrobial efficacy of new commercially available silver dressings. Cavanagh MH, Burrell RE, Nadworny PL. International Wound Journal 2010; 7(5):394-405

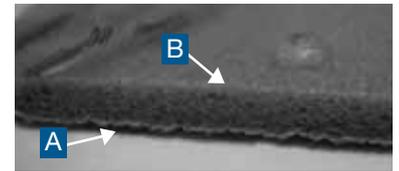
Design

This study compared the activity of some recently available silver-containing dressings, including Mepilex® Ag silver sulphate dressing.

Results

- "The wound-contacting surface of [Mepilex® Ag] dressing [was] hydrophobic...[it] repelled water droplets – preventing fluid from entering."
- "Mepilex® Ag was not able to generate any log reduction in 30 minutes or any CZOI (Corrected Zone of Inhibition), with bacteria growing under the wound contacting surface of the dressing."

Reproduced with permission from Blackwell Publishing Ltd.* Testing was performed over a 30-minute period.

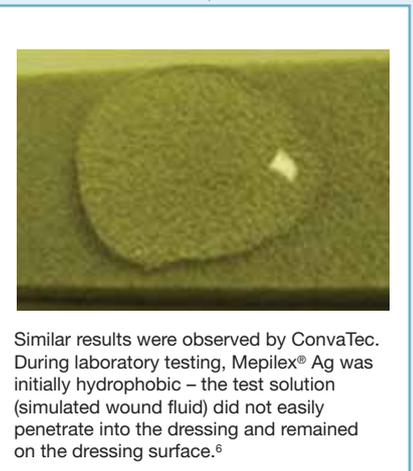
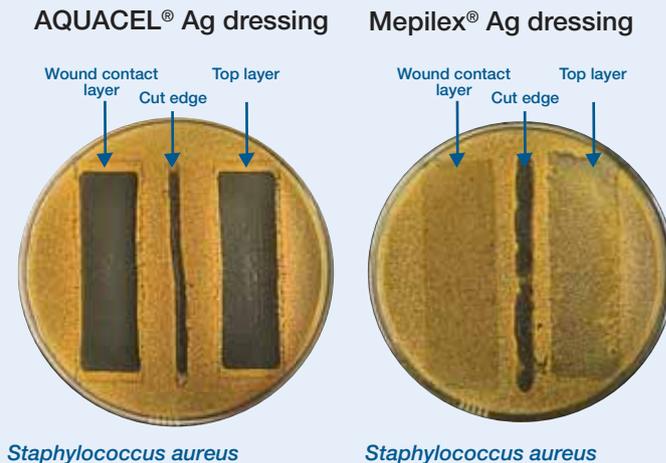


Dressing configuration for the silver sulphate dressing. The top surface of the dressing (a) and the wound-contacting adhesive surface of the dressing (b) both appear to be hydrophobic, as demonstrated by a water droplet placed on the wound contact surface.

ConvaTec Observations

The top, wound contact layer and cut edge of AQUACEL® Ag and Mepilex® Ag dressings were tested for antimicrobial activity against *S.aureus* and *Paeruginosa*. In both cases, the top and edges of Mepilex® Ag dressing appeared to kill more bacteria than the wound contact layer based on visual observation.

ConvaTec's observations suggest the silicone adhesive on the wound contact layer of Mepilex® Ag dressing may be a physical barrier to the silver contained within the dressing.¹⁸



Similar results were observed by ConvaTec. During laboratory testing, Mepilex® Ag was initially hydrophobic – the test solution (simulated wound fluid) did not easily penetrate into the dressing and remained on the dressing surface.⁶

Description	Pack Size	Product Code	NHS Code	PIP Code
5cm x 5cm	10	S7505AG	ELY109	292-6350
10cm x 10cm	10	S7506AG	ELY110	292-6376
15cm x 15cm	5	S7507AG	ELY111	292-6392
20cm x 30cm	5	S7508AG	ELY112	292-6418
1cm x 45cm (ribbon)	5	420128	ELY369	362-3808
2cm x 45cm (ribbon)	5	S7509AG	ELY113	292-6434
4cm x 10cm	10	S7513AG	ELY166	318-1484
4cm x 20cm	10	S7514AG	ELY167	318-1492
4cm x 30cm	10	S7515AG	ELY168	318-1500

NEW*

To find out more about AQUACEL® Ag dressing, visit www.hydrofiber.com

ConvaTec Clinical Support Line: Freephone 0800 289 738 (UK) 1800 946 938 (Republic of Ireland)