ANTIBACTERIAL EFFECT OF ALGINATE AND CMC DRESSINGS WITH AND W/O SILVER ON *PSEUDOMONAS AERUGINOSA* AND *A STAPHYLOCOCCUS AUREUS* BIOFILM

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Introduction

There has been a return to topical antiseptics to control bioburden in wounds, emphasized by the awareness of increasing antibiotic resistance. However, although it is clearly indicated that therapies should address biofilm in wounds, only few wound care products have been evaluated for their antibiofilm effect. Here, the efficacy of silver-containing CMC dressings* against a *Staphylococcus aureus* biofilm was evaluated *in vitro* and compared to CMC alone**, an alginate dressing#, and a silver/alginate dressing##. Moreover, antibacterial activity was evaluated in a direct contact method against *Staphylococcus aureus* and *Pseusomonas aeruginosa*.

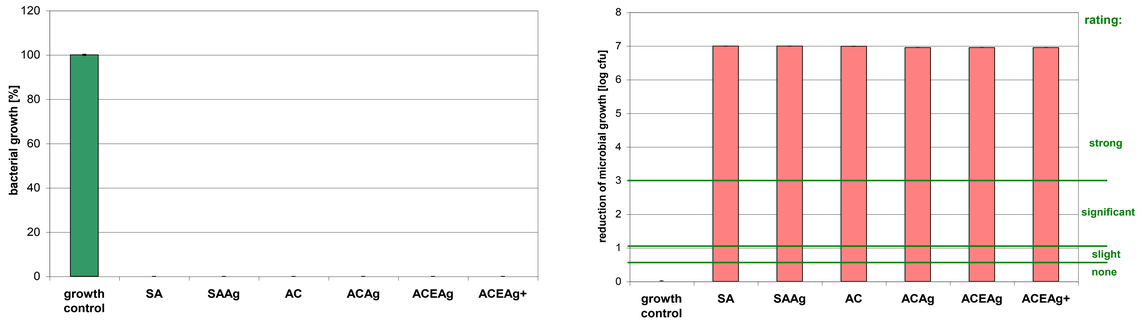

Figure 1: Growth of *S. aureus* under the influence of the dressings* over 24 hours (left) and the reduction of bacterial growth achieved in [log cfu] (right). The antibacterial activity was rated according to the JIS L 1902:2002.

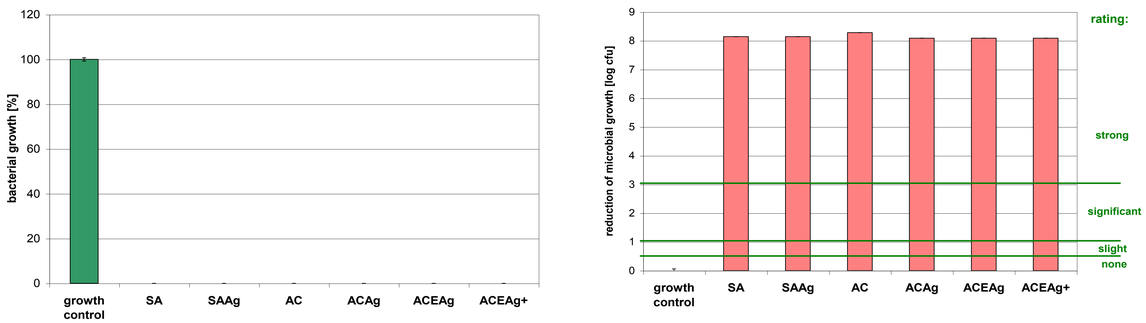

Figure 2: Growth of *P. aeruginosa* under the influence of the dressings* over 24 hours (left) and the reduction of bacterial growth achieved in [log cfu] (right). The antibacterial activity was rated according to the JIS L 1902:2002.

Material & Methods

Antibacterial activity against *S. aureus* and *P.aeruginosa* was tested according to JISL1902:2002. *S.aureus* biofilm was cultivated on glass plates, covered with dressings, and incubated for 24h at 37°C. Biomass was evaluated directly after dressing removal and following 48h regrowth period using the alamar blue assay.

*ACAg - AQUACEL™Ag, ACEAg - AQUACEL™EXTRA™Ag, and ACEAg+ - AQUACEL™Extra™Ag+ (ConvaTec); **AC - AQUACEL™ (ConvaTec); #SA - SuprasorbA (Lohmann&Rauscher); ##SAAg - SuprasorbA+Ag (Lohmann&Rauscher)

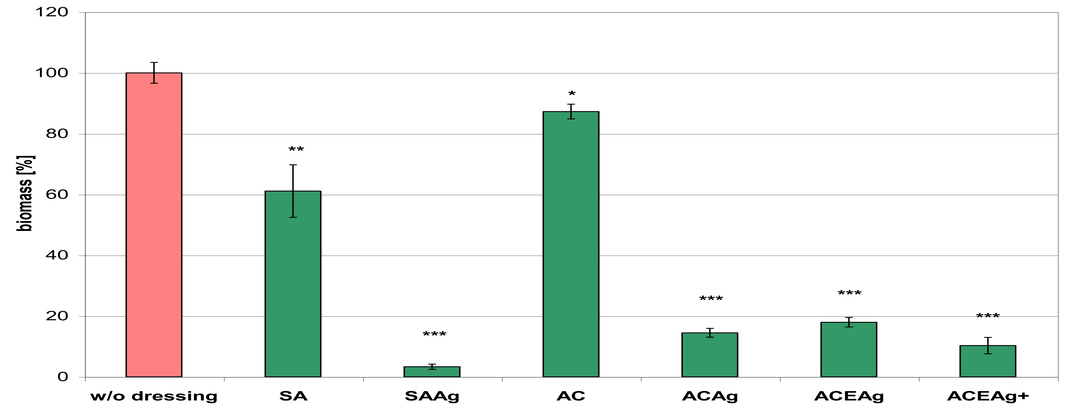

Figure 3: Decrease of *S. aureus* biomass on the glass plates during incubation with the wound dressings for 24 hours at 37°C.

Results

All dressings displayed complete inhibition of *S.aureus* (figure 1) and *P.aeruginosa* (figure 2) in the direct contact test, rated as strong antibacterial activity according to JISL1902:2002 (log-reduction > 3). Treatment of *S. aureus* biofilm with the silver-containing dressings efficiently reduced biomass and significantly less viable bacteria were observed with silver/alginate dressing## being the most effective (figure 3). In this test model SAAg showed comparable strong antimicrobial effects like ACAg, ACEAg andACEAg+. However, none of the dressings was able to inhibit biofilm regrowth over 48h (figure 4).

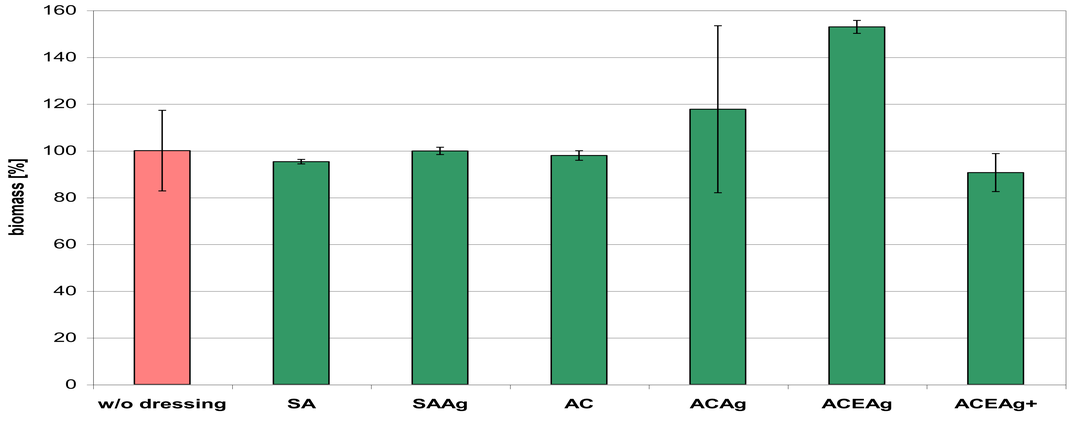

Figure 4: Regrowth of *S. aureus* biofilm on the glass plates after removal of the wound dressings (48h at 37°C).

Conclusions

CMC and alginate dressings can decrease planktonic bacteria progeny by binding into the dressing. Silver-containing dressings actively release Ag+ and reach bacteria beyond direct dressing contact. Here, silver/CMC** and a silver/alginate## dressing were found to efficiently reduce biofilm growth.

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