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SUMMARY

Antimicrobial effects of bacterial binding to a dialkyl-carbamoyl chloride-coated wound dressing: an in vitro study

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The aim of this original article was to evaluate the antimicrobial activity of the dialkylcarbamoyl chloride (DACC™)-coated dressing against several World Health Organization (WHO)-prioritized wound pathogens, the effect of repeated bacterial challenge in an adverse wound environment, and antimicrobial performance at wound-related pH values.

Background

Wound dressings that inactivate or sequestrate microorganisms, such as those with a hydrophobic, bacteria-binding DACC™-coated surface, can reduce the risk of clinical infections. This 'passive' bioburden control, avoiding bacterial cell wall disruption with associated release of bacterial endotoxins aggravating inflammation, is beneficial when treating hard-to-heal wounds.

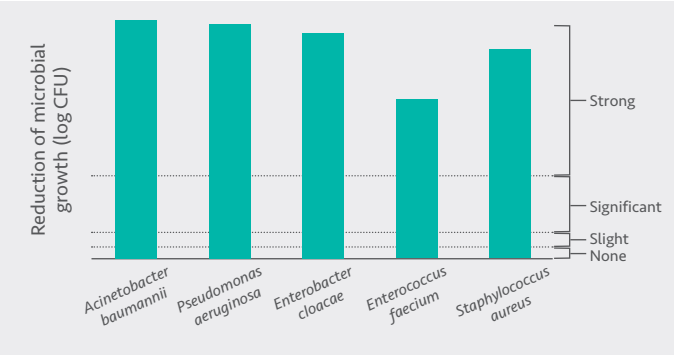
Methods

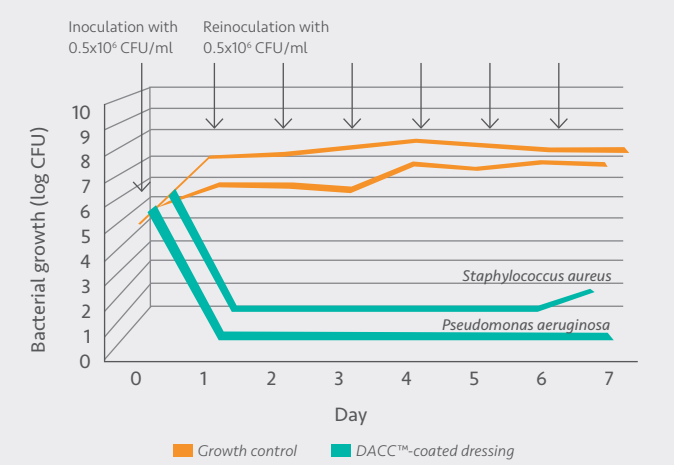
The Japanese Industrial Standard (JIS) L 1902 challenge test was used to evaluate the antimicrobial activity of the DACC™-coated dressing against several WHO-prioritized wound pathogens (e.g., meticillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus*, microorganisms with extended-spectrum beta-lactamases and *Acinetobacter baumannii*), the effect of repeated bacterial challenge in an adverse wound environment, and antimicrobial performance at wound-related pH values.

Results

High antibacterial activity of the DACC™-coated dressing against the WHO-prioritized bacteria strains by its irreversible binding and inhibition of growth of bound bacteria was confirmed using JIS L 1902. At increased inoculation densities, compared to standard conditions, the DACC™-coated dressing still achieved strong-to-significant anti-bacterial effects. Augmenting the media protein content also affected antibacterial performance; a 0.5–1 log reduction in antibacterial activity was observed upon addition of 10% fetal calf serum. The pH did not influence antibacterial performance. The DACC™-coated dressing also sustained antibacterial activity over subsequent reinfection steps.

High antibacterial activity of DACC™-coated dressings was confirmed in this *in vitro* model.





*CFU — colony-forming units

Conclusion

It can be assumed that the DACC™-coated dressing exerts beneficial effects in controlling the wound bioburden without using antimicrobial substances, possibly reducing the use of antibiotics.

The pH did not influence the antibacterial performance and the anti-microbial effect sustained over seven days.

Commercial involvement

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