

Investigating the antibiofilm properties of saltwater isolates against methicillin-resistant *Staphylococcus aureus* and clinical *Staphylococcal* strains

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Abstract

Background

Resistance to antibiotics make *Staphylococcus aureus* infections notoriously hard to treat. The emergence of antibiotic resistant strains such as MRSA, and the ability to form robust biofilms provide protection against antibiotics and host immune responses. Significantly, more than 80% of bacterial infections are biofilm mediated. The goal of this study was to evaluate the antimicrobial potential of isolates from marine environments against MRSA and four clinical *S. aureus* strains in terms of biofilm inhibition and eradication.

Method

A large bank of salt water bacterial isolates was cultured in glucose-supplemented trypticase soy broth (TSBg) and resulting colonies were screened against *S. aureus* strains. Bacterial isolates of interest were further examined for bactericidal and antibiofilm activity.

All bacterial strains and bacterial isolates were standardised using McFarland standards. The minimum biofilm inhibitory and eradication concentrations (MBIC and MBEC) was measured using a crystal violet staining assay. Bacterial viability in biofilms was determined as the reduction [%] in metabolic activity determined by the 2,3,5-triphenyltetrazolium chloride (TTC) assay.

Results

The obtained results suggest that one of the saltwater isolates analysed reduced the ability of all the *S. aureus* strains tested to form biofilm. MBIC was achieved at an isolate concentration of 3×10^4 CFU/mL. A reduction in preformed biofilms was also observed across all *S. aureus* strains, however, this was strain specific.

Conclusion

Selected saltwater bacterial isolates have demonstrated inhibitory potential against biofilm forming *S. aureus* strains. However, further investigation is needed to characterise and improve their activity against mature biofilms.

Keywords: *S. aureus*, Biofilm Inhibition, Biofilm Eradication.