

# IMPACT OF SURFACE COATING ON THE ADHERENCE OF SLIME PRODUCING AND NONPRODUCING *STAPHYLOCOCCUS EPIDERMIDIS*

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## SUMMARY

*The ability of Staphylococcus epidermidis to grow in the form of a biofilm not only facilitates its persistence in the host, but also allows it to survive at antibiotic concentrations several orders higher than the Minimum Inhibitory Concentration (MIC). We evaluated different surface treatments of hardened polystyrene in order to develop a model system for growth of S. epidermidis as a biofilm. We assayed for biofilm growth of S. epidermidis clinical isolates on unmodified polystyrene, on polystyrene modified by chemical abrasion and on polystyrene modified by sulfonation, using either Tryptic Soya Broth or Brain Heart Infusion as a growth medium. We concluded that sulfonated polystyrene and Brain Heart Infusion provided the best growth system for predicting the ability of a clinical isolate to form biofilm (Akaike value 23.680). Using this method, biofilm formation was detected in 14 (70%) of ica-positive strains and negative in 16 (80%) of ica-negative strains.*

**KEY WORDS:** *Staphylococcus; epidermidis; biofilm; polystyrene; growth conditions; adhesion; ica-operone*

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## INTRODUCTION

Coagulase-negative staphylococci and particularly *Staphylococcus epidermidis* are the most frequent causes of nosocomial infections, especially catheter- and medical device-related sepsis. Many pathogenic strains of *S. epidermidis* are slime producers and can grow in a biofilm form. Several methods describe how to determine the ability of bacteria to produce slime and grow in a biofilm (Christensen *et al.*, 1982; Christensen *et al.*, 1985; Mulder *et al.*, 1998; Stepanovic *et al.*, 2000; An *et al.*, 2001 and others); however, for the study of antimicrobial resistance under routine laboratory conditions, these methods are difficult to use, time-consuming, or completely inappropriate. For example, (Ceri *et al.*, 1999);

described a method for detection of biofilm growth and evaluation of antimicrobial resistance using a device known as the Calgary Biofilm Device. The device seems to be convenient for the assessment of the antimicrobial resistance, but the method is not available for routine laboratory use. The aim of our study was to evaluate the applicability of different surface treatments of hardened-polystyrene-pegged plates for biofilm formation and for subsequent assessment of minimum biofilm inhibitory concentration of antibiotics (MBIC) in routine laboratory conditions.

Forty *Staphylococcus epidermidis* strains isolated from blood cultures of patients with bacteraemia were used in this study. Isolates were identified to the species level by the STAPHYtest