

# **A Surface-Active Agent from *Saccharomyces cerevisiae* Influences Staphylococcal Adhesion and Biofilm Development**

Elzbieta Walencka<sup>a</sup>, Marzena Wieckowska-Szakiel<sup>a</sup>, Sylwia Rozalska<sup>b</sup>,  
Beata Sadowska<sup>a</sup>, and Barbara Rozalska<sup>a,\*</sup>

<sup>a</sup> Department of Immunology and Infectious Biology, Institute of Microbiology and Immunology, University of Lodz, 90-237 Lodz, Banacha 12, Poland.  
Fax: +48426655818. E-mail: rozab@biol.uni.lodz.pl

<sup>b</sup> Department of Industrial Microbiology and Biotechnology, Institute of Microbiology and Immunology, University of Lodz, Lodz, Poland

\* Author for correspondence and reprint requests

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Bacterial biofilms which are responsible for a number of diseases are very difficult to control effectively because of their high resistance to antibiotics and the host defence system. The use of natural products decreasing or preventing initial adhesion of bacteria and biofilm formation is one of the alternative therapeutic strategies taken into consideration. We ask the question, whether a crude extract from the cell wall of *Saccharomyces cerevisiae* (mannoprotein), which possesses surfactant activity, may be used as inhibitor of *Staphylococcus aureus* and *S. epidermidis* biofilm development. By using the “bactericidal spot assay” it was demonstrated that mannoprotein had no direct antibiotic activity against the tested strains. The influence of this extract on initial adhesion, biofilm formation and dispersal of preformed biofilms was studied using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) reduction assay. In this assay, live bacteria with an active electron transport system reduce the tetrazolium salt to a water-soluble purple formazan product, and optical density reading ( $A_{550}$ ) values are directly dependent on their cell numbers. Yeast-derived surfactant, when adsorbed in the microplate wells or present in the medium, was effective both in decreasing the initial deposition of staphylococci and in reducing the amount of growing biofilm, quantitated after 24 h of co-incubation with the bacteria. It also changed the parameters of biofilm morphology analyzed by PHLIP – the confocal laser scanning microscopy image quantification package. Mannoprotein also accelerated the detachment of mature staphylococcal biofilms, preformed in optimal conditions. It was concluded that mannoprotein anti-biofilm action reflects its influence on cell surface hydrophobicity.

**Key words:** Mannoprotein, Staphylococci, Biofilm