

Effects of Bacillus Serine Proteases on the Bacterial Biofilms

Mitrofanova O., Mardanov A., Evtugyn V., Bogomolnaya L., Sharipova M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2017 Olga Mitrofanova et al. *Serratia marcescens* is an emerging opportunistic pathogen responsible for many hospital-acquired infections including catheter-associated bacteremia and urinary tract and respiratory tract infections. Biofilm formation is one of the mechanisms employed by *S. marcescens* to increase its virulence and pathogenicity. Here, we have investigated the main steps of the biofilm formation by *S. marcescens* SR 41-8000. It was found that the biofilm growth is stimulated by the nutrient-rich environment. The time-course experiments showed that *S. marcescens* cells adhere to the surface of the catheter and start to produce extracellular polymeric substances (EPS) within the first 2 days of growth. After 7 days, *S. marcescens* biofilms mature and consist of bacterial cells embedded in a self-produced matrix of hydrated EPS. In this study, the effect of *Bacillus pumilus* 3-19 proteolytic enzymes on the structure of 7-day-old *S. marcescens* biofilms was examined. Using quantitative methods and scanning electron microscopy for the detection of biofilm, we demonstrated a high efficacy of subtilisin-like protease and glutamyl endopeptidase in biofilm removal. Enzymatic treatment resulted in the degradation of the EPS components and significant eradication of the biofilms.

<http://dx.doi.org/10.1155/2017/8525912>

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