

INTENSITY OF BIOFILM FORMATION BY *BACILLUS SIMPLEX* ISOLATED FROM SOIL FERROSPHERE UNDER THE INFLUENCE OF STREPTOMYCETES

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Background. Heterotrophic bacteria are involved in corrosion damage to materials. Previously, we isolated from the ferrosphere and identified some predominant representatives of heterotrophic bacteria: *Bacillus simplex*, actinobacteria *Streptomyces gardneri* and *S. canus*, their ability and intensity to biofilm formation have not yet been studied. **The aim** of this study was to investigate the adhesive properties of these bacteria in mono- and associative cultures.

Methods. Five-day pure cultures of *B. simplex* ChNPU F1 (KX349220 in the GenBank), *S. canus* NUChC F2 (MG924748 and MG924855 in the GenBank), *S. gardneri* ChNPU F3 (KX349221 in the GenBank) were used for the research. Bacteria were cultivated in glass tubes in meat-peptone broth (MPB). Suspensions with an optical density of 0.5 McFarland were prepared. A biofilm assay with crystal violet was used. Statistical analysis of the obtained results was performed using Microsoft Office Excel 2010.

Results. It was found that the ability to adhere of the studied bacteria in monocultures were moderately adhesive. The differences in the mass of the dye absorbed by the biofilm are statistically significant compared with the negative control (MPB without bacteria). The associative culture of *B. simplex* + *S. canus* was also moderately adhesive. However, the associative culture of *B. simplex* + *S. gardneri* showed weak adhesion. For associations, differences in the mass of dye absorbed by the biofilm are statistically significant compared with the negative control and with monocultures of the corresponding streptomycetes. The intensity of biofilm formation of associations was lower than that observed for the studied monocultures of streptomycetes.

Conclusions. Thus, co-cultivation of *B. simplex* ChNPU F1 with *S. canus* NUChC F2 and *S. gardneri* ChNPU F3 significantly reduces their adhesive properties. This suggests that associations involving streptomycetes need more attention when studying microbiologically influenced corrosion processes. Streptomycetes *S. canus* NUChC F2 and *S. gardneri* ChNPU F3 are promising agents for biocontrol of microbial damage.

Keywords: *ferrosphere, biofilm, Bacillus simplex, Streptomyces gardneri, Streptomyces canus.*