



## V Scientific Conference of Young Researchers

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**DEGRADATION OF DUAL-SPECIES BIOFILMS UNDER THE ACTION OF  
RHODOCOCCUS ERYTHROPOLIS IMV AC-5017 SURFACTANTS SYNTHESIZED IN THE  
PRESENCE OF A YEAST INDUCER  
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**Relevance.** Combined biofilms are commonly encountered and are characterized by high resistance to antimicrobial agents [1]. Previous studies [2] have demonstrated that the biological activity of *Rhodococcus erythropolis* IMV Ac-5017 surfactants can be enhanced by introducing live cells of *Escherichia coli* IEM-1 and *Bacillus subtilis* BT-2 into the cultivation medium. Limited literature data also suggest the possibility of increasing the biological activity of microbial surfactants through the use of eukaryotic inducers.

**Research objective:** to determine the extent of degradation of dual-species bacterial and bacterial-yeast biofilms under the action of *R. erythropolis* IMV Ac-5017 surfactants, synthesized in the presence of a yeast inducer.

**Materials and methods.** *R. erythropolis* IMV Ac-5017 was cultured in a liquid mineral medium with 2% (v/v) ethanol as the carbon source. Live and heat-inactivated cells of *Saccharomyces cerevisiae* BTM-1, as well as the corresponding supernatant, were used as inducers. The concentration of extracellular surfactants was determined gravimetrically after extraction with a modified Folch mixture. The degree of degradation of combined biofilms (%) was determined using a spectrophotometric method.

**Results and discussion.** It has been established that, regardless of the physiological state of the inducer (live, inactivated cells, or supernatant) added to the cultivation medium of *R. erythropolis* IMV Ac-5017, the surfactants produced under these conditions across a wide concentrations range (1.25-640 µg/mL) caused more effective degradation of combined biofilms than the surfactants synthesized without an inducer. Under the action of the *R. erythropolis* IMV Ac-5017 surfactants synthesized in the presence of live *S. cerevisiae* BTM-1 cells, as well as the corresponding supernatant, the degree of degradation of combined biofilms formed by *E. coli* IEM-1 with *Pseudomonas* sp. MI-2 and *B. subtilis* BT-2 with *Staphylococcus aureus* BMS-1 increased by 2-28% compared to the effect of surfactants synthesized without an inducer. The degree of degradation of these biofilms under the influence of the surfactants obtained in the presence of inactivated inducer cells increased by only 1-11% compared to the control. In the case of treatment of *B. subtilis* BT-2 with *Candida albicans* D-6 and *E. coli* IEM-1 with *Candida utilis* BVS-65 biofilms with surfactants synthesized in the presence of live cells and supernatant of *S. cerevisiae* BTM-1, the degradation reached 52-67%. Meanwhile, under the influence of surfactants produced by the monoculture, it did not exceed 38-40%.

**Conclusions.** Consequently, as a result of the work carried out, the possibility of a significant increase in the degree of degradation of dual-species biofilms under the influence of *R. erythropolis* IMV Ac-5017 surfactants, synthesized in the presence of *S. cerevisiae* BTM-1, was established. This effect was notably higher compared to the biofilm degradation caused by surfactants obtained from the monoculture.

### References

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