

**WAY OF REGULATION OF BIOLOGICAL ACTIVITY OF
SURFACTANTS UNDER CULTIVATION OF *ACINETOBACTER
CALCOACETICUS* IMB B-7241 ON GLYCEROL OF VARIOUS DEGREES
OF PURIFICATION**

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The aim of this work was to study the biological activity of surfactants synthesized by *Acinetobacter calcoaceticus* IMV B-7241 in medium with glycerol of various degrees of purification and high content of calcium cations (activators of NADH⁺-dependent glutamate dehydrogenase – key enzyme of biosynthesis of surface-active aminolipids responsible for antimicrobial activity of surfactant complex) [1].

Cultivation of *A. calcoaceticus* IMV B-7241 was carried out in liquid mineral medium using as substrates refined glycerol and the waste of biodiesel production in equimolar carbon concentration. The base medium did not contain calcium chloride, the content of CaCl₂ in the modified medium was 0.1 and 0.2 g/l. Surfactants were extracted from the supernatant of the culture liquid with a modified mixture of Folch (chloroform – methanol – 1 N HCl = 4:3:2). The number of adhered cells and the degree of biofilm destruction in the presence of surfactants was determined by spectrophotometric method, antimicrobial activity of surfactants – by the minimum inhibitory concentration (MIC) [2].

It was found that the additional introduction of 0.1–0.2 g/l of CaCl₂ into *A. calcoaceticus* IMV B-7241 cultivation medium with refined glycerol was accompanied by the synthesis of surfactants, the MIC of which against bacteria (*Bacillus subtilis* BT-2, *Enterobacter cloacae* C-8, *Staphylococcus aureus* BMS-1) and yeast (*Candida albicans* D-6) were 1.01–21.3 µg/ml and were 1.4–29 times lower compared to the MIC of surfactants obtained in base medium (1.83–58.8 µg/ml). The adhesion of bacterial and yeast test cultures on abiotic materials (tile, steel, glass) treated with such surfactants was 8-13% lower, and the degree of biofilms destruction was 5-19% higher compared to the values, established for surfactants obtained on base medium.

The increasing antimicrobial and anti-adhesive activity of surfactants synthesized on waste of biodiesel production was observed only when calcium chloride was introduced into the medium at a concentration of 0.2 g/l. Surfactants synthesized in the presence of calcium cations in the medium with the waste of biodiesel production proved to be more effective destructors of bacterial biofilms in comparison with those obtained in the base medium only at low concentrations (0.7–5.5 µg/ml).

The results demonstrate the possibility of regulating the biological activity of *A. calcoaceticus* IMV B-7241 surfactants by changing in the composition of medium with refined glycerol and waste of biodiesel production content of calcium cations - activators of NADH⁺-dependent glutamate dehydrogenase. Surfactants synthesized under different cultivation conditions of *A. calcoaceticus* IMB B-7241 on refined glycerol and waste of biodiesel production are more effective biofilm destructors and antimicrobial agents compared to the known lipopeptides and rhamnolipids formed on glycerol.

References.

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