INTENSIFICATION OF BIOSURFACTANT SYNTHESIS BY Nocardia vaccinii IMB B-7405 ON A GLUCOSE–GLYCEROL MIXTURE

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The purpose of this study was to establish optimal molar glycerol to glucose ratio for enhanced
biosurfactant synthesis by the cultivation of *Nocardia vaccinii* MV B-7405 on a mixture of energetically nonequivalent substrates (glucose and glycerol).

Based on theoretical calculations of the energy requirements for biomass production and the synthesis of surface-active trehalose monomycolates on the energy-deficient substrate (glycerol), the concentration of the energy-excessive substrate (glucose), which increased the efficiency of the substrate carbon conversion to biosurfactant, was determined. It was found that the synthesis of extracellular biosurfactant on a mixture of glucose and glycerol at molar ratio of 1.0:2.5 increased 2.0–2.3-fold compared to that on corresponding monosubstrates.

The increased level of biosurfactant on the mixed substrate is determined by intensification of surface-active trehalose monomycolate synthesis, confirmed by 1.2-5.7-fold increase in activity of the enzymes involved in their biosynthesis (trehalose phosphate synthase, phosphoenolpyruvate carboxykinase, phosphoenolpyruvate-synthetase) compared to cultivation on monosubstrates glucose and glycerol. The results indicate the feasibility of using a mixture of energetically nonequivalent substrates for enhancing the synthesis of secondary metabolites, as well as possibility of achieving the high efficiency of these mixed substrates if they are properly chosen and the molar ratio of their concentrations are correctly determined.

**Key words:** *Nocardia vaccinii* IMB B-7405, biosurfactant, energetically nonequivalent substrates.


