

Adaptation of the Cytoplasmic Membrane of the producer *B. subtilis* ATCC 21332 to Surfactin

Surfactin, one of the most powerful biosurfactant is produced by various strains of *Bacillus subtilis*. This acidic lipopeptide exhibits antiviral, antibacterial, antitumoral and haemolytic activities and has the advantages of low toxicity and biodegradability over the chemically synthesised surfactants. Due to its amphiphilic nature surfactin incorporates into the phospholipid bilayer and in vitro induces its permeabilisation and perturbation. The aim of this study has been to characterise the adaptive processes occurring at the level of cytoplasmic membrane of the surfactin producer *Bacillus subtilis* ATCC 21233 in response to surfactin production. The membrane phospholipids were routinely analysed by TLC on Silicagel G plates and the chemical description of the derived fatty acids composition was performed by GC/MS analysis. In parallel to the kinetics of surfactin synthesis, the membrane phospholipids have undergone complex reconstruction. Major phospholipids were gradually replaced by the negatively charged cardiolipin (up to 28% of the total) which increases the surface repulsive force of the membrane against the anionic lipopeptide surfactin. The change of the membrane surface was accompanied with the substantial rigidisation of the membrane interior as revealed by the steady-state fluorescence anisotropy of 1,6-diphenyl-1,3,5-hexatriene as the hydrophobic probe (rDPH). The biochemical profile of the membrane compartment has been completed with the membrane proteome separation by SDS-PAGE. The obtained data revealed an extensive modulation of the cytoplasmic membrane composition in response to surfactin, suggesting the possibility of membrane protection and cell viability.

Key words: *Bacillus subtilis*, surfactin, cytoplasmic membrane, phospholipids, adaptation

Klíčová slova: *Bacillus subtilis*, surfaktin, cytoplazmatická membrána, fosfolipidy, adaptace