

ABSTRACT

Streptomyces, filamentous Gram-positive bacteria are producers of more than 70% of antibiotics used in human therapy and agriculture. They are remarkable because of their complex life cycle (morphological differentiation) which leads to a formation of dormant spores able to survive unfavorable living conditions and allowing long-term survival of the organism. Soil represents their mostly natural living environment. In laboratory conditions they are cultivated in liquid media or on agar. We have developed in our laboratory two phase cultivation system which allows quantitative and reproducible preparation of samples for proteomic, transcriptomic and metabolomic analyses of Streptomyces differentiation. The system is composed of inert micro-beads submerged in liquid medium. We used two types of micro-beads in our studies, glass and zirconia/silica beads. We followed the surface growth and differentiation of Streptomyces on both types of beads using optical and electron microscopy (SEM) techniques. We observed major growth and higher antibiotic production on glass beads. Another difference we observed was in size and shape of colonies. In further research, using comparative proteomics, we attempted to identify proteins which might be responsible for recognition and adhesion of Streptomyces to diverse surfaces. In three groups of experiments, using qualitative and quantitative analyses, we have evaluated several groups of proteins connected with the growth on glass and zirconia beads.

Key words: Streptomyces, two-phase cultivation system, comparative proteomics, 2D-electrophoresis, glass beads, zirconia beads, SEM, granaticin