The aim of the project is to determine the way of growth (morphology) and biosynthetic potential of an actinomycete *Streptomyces rimosus* ATCC 10970 in the microparticle-enhanced cultivations (MPEC) conducted in stirred tank bioreactors.

S. rimosus is a filamentous actinomycete growing in the form of pseudomycelium. It is biotechnologically important owing to the production of the antibiotic oxytetracycline. However, it still has a wide spectrum of thrilling substances to reveal. In order to discover them, the metabolic potential of this actinomycete must be awoken. For this purpose microparticle-enhanced cultivations (MPEC) will be run. The effect of these cultivations is the change of the natural way of microbial growth, namely the change of shape and size of cellular agglomerates that influences its metabolic products. This method of cultivation is relatively simple and inexpensive.

In the last years, due to the abuse of antibiotics, bacterial strains developed resistance towards them. So there is a great need to search for new medicines, which will eliminate the pathogenic microorganisms. The lack of research in this field might lead to the shortage in the effective antibiotics. As a result, waves of dangerous infections at a global scale will be unstoppable. It made us start this study on the production of secondary metabolites, to which belong antibiotics produced by actinomycetes. Our preliminary experiments showed that the biosynthetic potential of *S. rimosus* includes fungicidal as well as germicidal molecules (e.g. rimocidins, oxidised milbemycins) which could be used as drugs in the future.

The project comprises the following stages of research:

1) selection of the mineral microparticles and determination of its effective concentration in MPEC of *S. rimosus* to change the morphology of the actinomycete,

2) studies of *S. rimosus* metabolic repertoire performed in the bioreactor cultivation without microparticles aimed at finding as many metabolites as possible with the use of mass spectrometry technique,

3) study of the influence of microparticles in MPEC on *S. rimosus* morphological development and its metabolism in the bioreactor processes; microscopic observations of developing *S. rimosus* and simultaneous analysis of metabolism will be made.

In the light of our previous experience with filamentous microorganisms and with various actinomycete in particular, we aim to demonstrate that *S. rimosus*, a strain that has been narrowly categorized simply as an "oxytetracycline producer", has a lot more to offer in a biotechnological context. Furthermore, our goal to prove that "teaching the old dog new tricks" is in this case possible. The description of the effects of microparticle addition on *S. rimosus* growth and metabolism can be a significant contribution in the fields of biotechnology and biochemical engineering. Hence, the results of the project are likely to be published in the renowned international journals.