DESCRIPTION FOR THE GENERAL PUBLIC

In an age of increasing urbanization, the environment gets more and more xenobiotics. Their accumulation in the environment has a negative effect on organisms. However, presence of xenobiotics have caused a development in microbiological degradative system. Isolation of microorganisms with desirable degradation properties allow their use in bioremediation systems with an aim to restore usefulness of contaminated environments. Long-term bioremediation systems are already formed and stable ecosystems, so the introduction of new strains of microorganisms often results in their fast expulsion. Microflora present in such systems consistently cause stress to the introduced microorganisms due to competition for nutrients and by antibiotic excretion. Conditions in new systems, such as pH or temperature, can also adversely affect microorganisms because they're often beyond their optimum.

Entrapping bacterial cells in polymers increases their chances of survival in new environment and reduces interactions with native microflora. However, the trapping process may be toxic to microorganisms. This is related to the type of used polymer cross-linker and the conditions that must be ensured for crosslinking to be done properly. Hence, it is important to know the impact of the crosslinking procedure on microorganisms in order to reduce impact of factors that causes cell death and thus maximize their survivability.

To thoroughly understand the impact of immobilization procedures on microorganisms, they will be trapped in xanthan gum cross-linked by various compounds and under various conditions, and then coated to increase mechanical strength. The degree of survival and physiological state of microorganisms and also their spatial distribution in obtained composites will be determined. Additionally, physico-chemical properties of the composites, their structure and morphology will be evaluated. The final element of the study will be biodegradation tests to determine the effect of trapping in crosslinked xanthan gum on degradability of immobilized bacterial cells in laboratory conditions and bioremediation system – trickling filter.

Obtained results will help to broaden the knowledge related to the design of immobilization procedures tailored to specific bioremediation studies and finally to maximize their effectiveness.