

Description for the general public

Human activities have a significant impact on the environment. Many substances produced in industrial processes are getting into water reservoirs, cause a deterioration of their quality and thus negatively affect the aquatic organisms. Particularly important problem is the accumulation of harmful substances such as heavy metals, dyes and petroleum products in aquatic environment. Therefore, it is extremely important to find efficient methods of treatment allowing the removing of products toxic for humans and the environment. Many different water treatment methods such as reverse osmosis, electrodialysis, flocculation, filtration, adsorption and ion exchange are applied currently. **Flocculation** is the most widely used method which removes suspended solids, colloids or cell debris of organisms from water solutions. However, synthetic flocculants applied in the flocculation process are known as substances which have negative impact on the human health and the environment. Therefore, the interesting solution might be the use of bioflocculant producing microorganisms because of their non-toxicity and high biodegradability. **Bioflocculants** are considered as a promising alternative to synthetic flocculants.

The receiving of the flocculants from microorganisms (fungi, bacteria) is associated with a very important aspect, which is the optimisation of the culture conditions of the microorganisms synthesising the flocculants. The selection of the optimal parameters for the microbial growth is significant to improve the synthesis efficiency of this compounds with very high flocculating activity. Therefore, the different variants of the growing medium parameters are applied, like the source and the concentration of carbon and nitrogen, the temperature and the pH values, the speed of mixing of the culture broth, and the presence of ions. The properly selected culture conditions are the starting point of every technological process in which the natural polymers are used. The crucial element is also the characteristic of the exopolymers composition and studies of their biological and physico-chemical properties, what conditions their application in different industrial processes.