

Description for the general public of the project: ‘Bioremediation of water pollution caused by drugs and cosmetics by *Cunninghamella* fungi - a biotechnological strategy for environmental clean-up’

Both drugs and cosmetics have become a long time ago an inherent part of our everyday life, and their use on a global scale is still showing an upward trend. Do people reaching for these products wonder what happens with these substances when they are released into the surrounding environment? Studies demonstrate that these agents are emerging contaminants of aquatic environment and are toxic to plants, crustaceans, molluscs and fish that live in this environment. These adverse effects may be associated with altered development and behavior of some aquatic organisms, and disturbance of the specific condition of natural ecosystems. Moreover, another big problem is drugs and cosmetics bioaccumulation in aquatic organisms including fish intended for human consumption.

Considering the increasing worldwide use of drugs and cosmetics, there is no doubt that there is a justified need for searching of new and effective methods and tools to remove various chemical substances from the environment. Especially those, that are related to the improper disposal of expired drugs or wash-off the surface of the skin, such as cosmetics containing UV filters that protect the skin from ultraviolet (UV) radiation.

The term ‘bioremediation’ refers to the utilization of various alive microorganisms such as fungi for the rapid removal of hazardous (mainly organic) contaminants. In this process, the starting substances are transformed into less harmful forms. Fungi represent a promising tool for environmental clean-up, because they are equipped with special enzymes, able to utilize *i.a.* drugs, textile dyes and certain substances that may be carcinogenic.

Considering the facts mentioned above, in recent years much attention is paid to the search for new, environmentally friendly strategies for environmental clean-up of hazardous substances.

Within the proposed project we plan to use naturally occurring in the environment filamentous fungus *Cunninghamella* to eliminate from the aquatic environment the contaminants related to drugs and cosmetics. It will be the answer to the expectations of both institutions responsible for environment protection and society with respect to the global problem of environmental pollution. Within the project we will evaluate *Cunninghamella* degradation of dozens of organic chemical compounds belonging to commonly used drugs (such as antibiotics and antidiabetics) and cosmetics (UV filters). The most important parts of the project will be the identification of the fungal transformation pathways of tested substances, the resulting products identification and the evaluation whether they are safe for the natural environment. For that purpose we will use the recommended and well established scientific procedures involving appropriate cell lines, bacterial strains and algal cultures. Noteworthy, such environmental cleaning through fungi is a part of white biotechnology, whose main purpose is the use of biological systems in industry and environmental protection.