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Decreasing the impact of metal mining effluents from abandoned mines on freshwater ecosystems

Lidia Vendrell, Meritxell Abril, Carmen Espinosa, Joan Colón, Sergio Ponsá and Laia Llenas
BETA Technological Center, University of Vic - Central University of Catalonia, Spain. e-mail
contact: lidia.vendrell@uvic.cat

Abandoned mines cause serious environmental damage to their surroundings, with considerable impacts on freshwater ecosystems. These impacts occurred mainly through the uncontrolled discharge of polluted effluents, which may contain high concentrations of heavy metals. Currently, no real solution exists for this significant environmental problem, leaving a legacy of global pollution.

The final aim of LIFE DEMINE project is to demonstrate the efficiency of an innovative treatment based on membrane processes and electrocoagulation in decreasing the overall environmental and ecological impact caused by metal mining effluents from abandoned mines on freshwater ecosystems, using the aquatic biofilm as ecological indicator.

To do that, we incubated natural biofilm from a reference stream in a set of microcosms under controlled temperature and light conditions. After two weeks of colonization, the incubated biofilm was exposed to untreated and treated mining effluents, simulating their entrance into the aquatic ecosystems. After two weeks of exposure, we observed a clear reduction in the photosynthetic efficiency and a clear shift in the algal community composition of the aquatic biofilm affected by the untreated mining effluent compared to the treated one. These observations evidenced the negative ecological impact caused by metal mining effluents on aquatic ecosystems and the potential of the innovative treatment proposed in LIFE DEMINE to improve the quality and biodiversity of the water bodies affected by abandoned mines.