THE STUDY OF POLLUTED AREAS ALGAE AS THE BASIS FOR REMEDIATION OF AQUATIC ECOSYSTEMS

Lusine Hambaryan

1Scientific Center of Zoology and Hydroecology of NAS RA, Republic of Armenia
2Yerevan State University, Department of Ecology and Nature Protection, Republic of Armenia

Corresponding author email: lus-ham@yandex.ru

ABSTRACT

Pollution of freshwater reservoirs by various pollutants, especially by heavy metals today is one of the global environmental problems. According to the UN about one billion people live in conditions of constant shortage of fresh water by 2050 their number will reach 6.3 billion (The fourth edition of the World Water Development Report (WWDR4)). Studies of algae in freshwater phytoplankton composition serve as a basis for biomonitoring of aquatic ecosystems. It is known that in composition of phytoplankton there are group of algae which can serve as objects for the bioremediation of contaminated water bodies. Armenia is not rich of water resources, a large freshwater lake Sevan (590m over Baltic Sea), which has been subjected to anthropogenic eutrophication due to contamination of allochthonous organic matter of catchment area, as well as a decrease of its level of more than 20 m. On the territory of Armenia's actively developing steel and mining industry (mainly mining ores rich of Cu, Ni, Co, Mn), as a result of which appeared big number of tailings requiring immediate detoxification and disposal. From this point of view, it is necessary to conduct biomonitoring of microalgae as a source for the absorption indicator species of heavy metals in natural conditions, and subsequently to isolate and use of laboratory strains. Some data are available on research of heavy metals in the river Hrazdan, where a good bioindicator is a coastal reed (Phragmites australis (Cav.) Trin. ex Steudel). Bur reed actively accumulates the basic set of elements-pollutants (Zn, Ag, Cd, etc.) from water and adequately reflects qualitative pollution of river waters (A.K. Saghatelyan et al., HEAVY METALS IN SYSTEM "WATER -- SILT -- PLANT", 2004). Studies of plankton microalgae and phytobenthos of rivers in technological areas Kajaran and Kapan molybdenum companies (closed loop recycling) in 2008-2010 and summer 2014, revealed the presence of indicator species (about 65%), which are widely used for cleaning purposes. As part of the greens found taxons of Scenedesmus and Chlorella genera, which are used for the bioremediation of contaminated waters. Particular attention is paid to the role of cyanobacteria in the plankton of technogenic ecosystems and identification of their role in the processes of biodegradation of ponds. Discovered species of the genera Oscillatoria, Anabaena, Spirulina, Phormidium, Aphanizomenon, many taxons of which are toxic. Cyanobacteria are known as organisms with persistent environmental pollution tolerance and a wide area of distribution, thus suitable for use as a test objects. The accumulated data for research of microalgae and sediment data (death of plankton leads to disposal of heavy metals in bottom sediments) can serve as a good scientific and practical basis for bioremediation of water. In terms of environmental degradation of technogenic areas should use the principles of implementation of the new current direction of bioremediation for Armenia.