Мікробіота і біотопи водних екосистем // Microbiota and biotopes of aquatic ecosystems

Microbiological analysis of activated sludge from the Reghin sewage treatment plant, Romania

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Water pollution comes from all sectors of human activity (industrial, agricultural, etc.) and is not only caused by human and natural residues, but also by synthetic substances produced by chemical industries such as dyes, fertilizers, pesticides, radioactive materials, metals, etc. and also various pathogens.

The main purpose of this study is to present and identify microorganisms found in activated sludge, in the stage of biological water treatment, from the treatment plant of the Reghin city, Mureș county; and a secondary aim is to emphasize how important the presence of wastewater treatment techniques is.

The final results for the quality indicator of the activated sludge obtained are approximately around the value of 6 (sample 1=6.181; sample 2=6.384; sample 3=6.465). This aspect indicates the high quality class of the activated sludge used at the Reghin Wastewater Treatment Plant. This sludge belongs to the 2nd quality class, having a stable microbial load and it also exhibits good performance in wastewater treatment processes.

Microbiological component of water – an indicator of its quality and purity

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The microbiological component of water is a critical indicator of water quality and purity. Microorganisms inhabiting natural aquatic habitats can be divided into autochthonous (native) and allochthonous (non-native). For autochthonous species (e.g. Pseudomonas, Flavobacterium, Aeromonas and Alcaligenes in freshwater) water is the primary and natural habitat. They are important in the self-cleaning process of water as their metabolic processes are involved in the cycling of solutes in water. Allochthonous microorganisms, on the other hand, enter water as part of sewage, various wastes (e.g. coliforms, fecal streptococci, Bacillus, Clostridium, Thiothrixa, Thiobacillus), or by leaching from soil (e.g. Azotobacter, Nitrosomonas, Nitrobacter). Many of these allochthonous microorganisms are significant pathogens and thus may ultimately pose a significant risk to humans. The most important pathogens that can occur in drinking water include bacteria, viruses and parasites. Their presence in drinking water can cause a variety of illnesses, ranging from mild gastrointestinal infections to serious diseases such as cholera or hepatitis A.

There are several ways in which the microbiological component of water can be tested. The most common are tests for bacteria, which involve culturing the microorganisms on solid media (also used to determine the number of CFU/ml of the water sample), detection by PCR (polymerase chain reaction), or even immunological tests. Various water quality indicators, such as the presence of coliform bacteria, which are indicators of the presence of faecal contamination, are often used in testing.