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THE OPTIMIZATION OF THE FUNCTIONING OF BIOLOGICAL REACTOR
IN THE ASPECT OF VARIABILITY OF POLLUTIONS LOAD INFLOWING
TO THE WASTEWATER TREATMENT PLANT IN NOWY TARG

Abstract

The main objective of the doctoral dissertation was to identify the factors influencing the increase in the effectiveness of the collective wastewater treatment plant in Nowy Targ by optimizing the treatment processes in a biological reactor. The sewage network in Nowy Targ during the research period was 86.9 km. The wastewater treatment plant in Nowy Targ is located at 49°29'N, 20°3'E. The technological system of the treatment plant is: dense step screen, horizontal sand trap, horizontal preliminary settling tank, 3 sequential SBR biological reactors. After treatment, wastewater flows to the receiver, which is the Dunajec River. The research was conducted in two stages. The first stage covered the years from 2006 to 2017, while the second stage covered the period 2016-2018. Based on the conducted research published in a thematically coherent collection of scientific articles, it was found that the wastewater treatment plant in Nowy Targ is unstable, which results from irregularities in the amount of inflowing wastewater and contained in impurities. Moreover, a serious problem in the sewage system is the significant admixture of chromium ions in the wastewater subjected to treatment processes. In the analytical part of the work, guidelines were developed regarding the amount of wastewater, wastewater quality, sludge concentration in the bioreactor and the maximum concentration of chromium ions in the inflowing wastewater, which will guarantee stable and highly effective operation of the wastewater treatment plant. In order to increase the efficiency of removing pollutants in the subject wastewater treatment plant, the technological system of the Bardenpho type biological reactor was proposed and developed as an alternative to the current biological reactor in a sequential system. The Bardenpho biological reactor is a system that guarantees high efficiency in the elimination of organic compounds and biogenic compounds from wastewater that has undergone an initial mechanical treatment process.

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