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THE USE OF CONSTRUCTED WETLANDS
FOR THE TREATMENT OF INDUSTRIAL WASTEWATER

Abstract

Constructed wetlands are characterized by specific conditions enabling simultaneous various physical and biochemical processes. This is the result of specific environment for the growth of microorganisms and hydrophytes (aquatic and semiaquatic plants) which are capable of living in aerobic, anaerobic and facultative anaerobic conditions. Their interaction contributes to the intensification of oxidation and reduction responsible for the removal and retention of pollutants. These processes are supported by sorption, sedimentation and assimilation. Thanks to these advantages, treatment wetland systems have been used in communal management for over 50 years. In recent years, thanks to its advantages, low operational costs and high removal efficiency, there is growing interest in the use of constructed wetlands for the treatment or pre-treatment of various types of industrial wastewater. The study analyzes current use of these facilities for the treatment of industrial wastewater in the world. The conditions of use and efficiency of pollutants removal from readily and slowly biodegradable wastewater, with special emphasis on specific and characteristic pollutants of particular industries were presented. The use of subsurface horizontal flow beds for the treatment of industrial wastewater, among others from crude oil processing, paper production, food industry including wineries and distillery, olive oil production and coffee processing was described. In Poland constructed wetlands are used for the treatment of sewage and sludge from milk processing in pilot scale or for dewatering of sewage sludge produced in municipal wastewater treatment plant treating domestic sewage with approximately 40% share of wastewater from dairy and fish industry. In all cases, constructed wetlands provided an appropriate level of treatment and in addition the so-called ecosystem service.

Key words: constructed wetlands, industrial wastewater, organic matter, specific pollutants, wastewater treatment