Pawełczyk, A. Removal of Nitrates from Industrial Wastewater by Reduction to Free Nitrogen. ***Ochrona Srodowiska*** **2008, Vol. 30, No. 4, pp. 45–48.**

Abstract: The focus of the study was the removal of nitrates(V) from the wastewater generated during production of organic nitrates and nitro-compounds. For this purpose, use was made of the method of reduction to free nitrogen. Reduction was conducted in two steps in a strongly acidic medium: to NO_2^- with the aid of iron (Fe^o), and to N_2 by using technical grade urea. A series of experiments made it possible to determine the type and yield of the reactions involved in the processes. In the batch process the removal of nitrates(V) ranged from 95.1 to 99.4% when the wastewater being treated came from the production of nitroesters. When the wastewater originated during production of nitrate isooctyl, the efficiency of removal varied between 80.2 and 93.4%. The results obtained make it clear that the extent of reduction in nitrates depended primarily on the quantity of iron in the reactor. In the continuous process conducted in the flow reactor the concentration of nitrates(V) in the effluent was by 98.5% lower than in the raw wastewater coming from the production of nitroesters. Upon analysis of the observations made in the course of the study, a full-scale system was proposed, which enables the removal of nitrates from any type of industrial wastewater, using easily available waste raw materials from the mechanical working of steel or cast-iron elements, as well as technical grade urea, as reducing agents.

Keywords: Nitro-compounds, nitrates, industrial wastewater, wastewater treatment, chemical reduction.