



## Wastewater purification by an organic soil and plants

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The possibility of using an organic soil and plants as a method of waste water treatment under the conditions of the „Hajdów” experimental object were investigated. The aim of the present work was to investigate nitrate transformation in soil irrigated with communal wastewaters and estimation of a possibility of using organic soil and different plants for wastewater cleaning. The field experiments were performed on peat-moorsh and mineral-moorsh soils under *Salix* and grass-mixture crops, irrigated with 2nd stage purified wastewaters from “Hajdow” treatment plant in Lublin. Water retention curves, were determined in low and high pressure Richards’ chambers according the standard procedure in 4 replicates. For investigated soils also the saturated and unsaturated hydraulic conductivity for water potential range from -0.1 to -1470 kPa was determinates using a TDR (Time Domain Reflectometry) device and instantaneous profile method (IPM). For the irrigation of particular plants, the treated waste water was applied at suitable doses: Fields were irrigated with single dose (plot B) and double dose (plot C). Eluates of drainage waters were taken from the individual outlets. The concentration of N-NO<sub>3</sub><sup>-</sup> in drainage waters in the field with willow showed the highest concentrations of nitrates(V) in drainage waters after 3 hours from wastewater application. The dosage of wastewater had practically no greater influence on the concentration of N-NO<sub>3</sub><sup>-</sup> in drainage waters. The concentration of N-NO<sub>3</sub><sup>-</sup> in the drainage waters in the field with grass mixture showed its high mobility. After 3 hours from the moment of wastewater application their maximum concentration was observed, proportionally to the amount of wastewater applied. Investigated organic soil was proved to behave as a biological filter for the introduced nitrates. In each of the cases under discussion, the concentration of N- NO<sub>3</sub><sup>-</sup> in the drainage waters did not exceed 15 g N·m<sup>-3</sup>, which meets the requirements of the European Union.

**keywords:** nitrate, irrigation, hydro-botanical wastewater treatment, hydrophysical characteristics of soils