

Abstract

The thesis deals with analysis of the purification processes in hybrid constructed wetland (CW), combined horizontal subsurface flow filter bed and vertical subsurface flow filter bed, in the first year operating. Original CW, consisted of one horizontal subsurface filter bed, was built in 1994 at Kotenčice, Central Bohemia, division Přeborn. Despite of a relatively high efficiency of the CW, mechanical pretreatment didn't provide sufficient efficiency and the filtration beds suffered from severe clogging, therefore the whole system was rebuilt in 2011 – 2012. Reconstructed CW for 250 PE has been designed for treat sewage from a separate sewer system. A new type of hybrid constructed wetland consists of horizontal flow beds (911 m²) and vertical flow beds (300 m²), which are arranged in 4 parallel multi – stage fields. Pulse feeding has been tested in vertical flow filter beds and filtration material with high adsorption capacity has been tested as an alternative material. The filters are planted with *Phragmites australis*, *Phalaris Arundinacea*, *Iris pseudacorus*, *Iris sibirica*, *Glyceria maxima* and *Lythrum salicaria*. Purified water is drained to current recipient – Kotenčice stream. In the sampling period (2. 10. 2012 – 17. 12. 2013) physical – chemical parameters COD, BOD₅, suspended solids, total phosphorus, total nitrogen and ammoniac nitrogen were analysed. The average outlet values for the above-listed parameters were 55.2, 17.8, 7.4, 3.4, 33.7 and 24.2 mg/l. The purification parameters already meet the standards for constructed wetland onto 500 PE: 150, 40 and 50 mg/l for COD, BOD₅ and suspended solids, set by legislative of the Czech republic, despite the fact that constructed wetland is in adaptation stage. Improvement is going to be expected in the future.

Keywords: wastewater treatment, hybrid constructed wetland, clogging, pulse feeding, elimination of nutrients,