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Nutrient removal in subsurface flow constructed wetlands for application in sensitive regions.

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Abstract

One of the most interesting sites for research on CWs in Germany has been established in Wiedersberg (Saxonia). The multi-stage concept with primary settling, vertical and horizontal flow reed bed followed by UV-disinfection and a special phosphorus filter bed, allows numerous ways of operation and investigations. Denitrification can be improved by recirculation through VF bed and sedimentation tank or by means of adding carbonaceous water from the primary stage to a second level within the VFB or directly to the following HF bed. In order to investigate the efficiency of P-elimination four kinds of natural sands containing different amounts of iron have been used. To maintain a long-term capacity for P-reduction an additional filter bed is filled with gravelly sand which had been used for the precipitation of iron from drinking water before. After saturating with P this filter medium can be exchanged easily. A result of more than one year of operation is the high performance rate for adsorption of phosphorus by enriched iron on drinking water filter sand. At a total loading rate of 350 g P/m3 filter medium 250 g P/m3 have been adsorbed. Design considerations can not be given yet. The median denitrification rate at VFB is 1.3 g N m(-2) d(-1) and at HFB is 0.25 g N m(-2) d(-1). The low denitrifcation rate of HFB might be due to a very high quota of wastewater dilution by storm- and ground-water of 100 to 200 percent. The investigations on this wastewater treatment plant will be continued until June 2001 and experiments with filter columns will be added.