

Constructed wetland performance and potential for microbial removal

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ABSTRACT

Wastewater treatment plants serving low flows require special attention in many countries, where a significant part of the total population lives in small agglomerations. This may be especially relevant in interior regions, where agglomerations are generally scattered and there is no economy of scale in centralised systems, thus suggesting local and decentralized solutions. Additionally, compliance with national laws regarding wastewater discharge is often the same for smaller plants as for large systems, especially when the receiving water bodies are bathing waters or the effluent is intended to be reused for agricultural purposes. In these cases, a very important quality standard of the final effluent is the level of concentrations of pathogenic microorganisms. Two horizontal subsurface flow constructed wetland treatment plants located in the Alentejo, in the south of Portugal, were monitored over an extended period for microbiological parameters, total suspended solids and transmittance. Removal efficiencies were observed to be consistent with values reported in the literature although an event of increasing flow, due to an annual summer festival nearby, led to a decrease of the effluent quality. During the monitoring campaigns microorganism concentrations in the effluent did not reach significant levels, but for some uses further disinfection might be required. The application of UV disinfection to an effluent from constructed wetlands was evaluated with reference to the characteristics of the wetland system itself. The effluent of Fataca WWTP was subject to a collimated beam test in order to evaluate the response of faecal coliforms and *Escherichia coli* to different doses of UV radiation. Additionally, the repair rate, a phenomenon originated by photo reactivation or dark repair and associated with further multiplication of non-inactivated bacteria by previous UV irradiation, was evaluated.

Keywords: Constructed wetlands; Microbial removal; Small agglomerations; Wastewater treatment

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