

Horizontal subsurface flow constructed wetlands for mitigation of ametryn-contaminated water

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Abstract

The feasibility of using constructed wetlands (CWs) for the mitigation of pesticide runoff has been studied in the last decade. However, a lack of related data was verified when subsurface flow constructed wetlands (SSF CWs) are considered for this purpose. In the present work, SSF CWs were submitted to continuous ametryn addition and evaluated during an 11-week period, with the aim of determining the feasibility of these systems for mitigation of contaminated water. Ametryn was not added to one CW cell in order to provide a control for the experiments. Monitoring of treatment performance was executed by standard water quality parameters, ametryn chromatography quantification and macrophyte (*Typha latifolia* L.) nutritional and agronomic property analysis. Results indicated that 39% of the total initially added amount of ametryn was removed, transferred or transformed. Herbicide metabolism and mineralisation were carried out by chemical and biological mechanisms. No statistic differences were observed in nutritional contents found in the *T. latifolia* crops of the CWs after the experimental period. Moreover, the biomass production (one valuable source of renewable energy) was equal to 3.3 t·ha⁻¹ (dry matter) in wetland cells. It was concluded that constructed wetland systems are capable of mitigating water contaminated with ametryn, acting as buffer filters between the emission sources and the downstream superficial water bodies.

Keywords: ametryn, constructed wetlands, macrophyte, pesticides, runoff