



Assessment of groundwater contamination by chlorpyrifos using the PWC model in Valencia Region (Spain)

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Chlorpyrifos is commonly used as a pesticide to control weeds and prevent undesirable growth of algae, fungi and bacteria in many agricultural applications. Despite its highly negative effects on human health, environmental modeling of this kind of pesticide in the groundwater is not commonly done in real situations. Predicting the fate of pesticides released into the natural environment is necessary to anticipate and minimize adverse effects both at close and long distances from the contamination source. A number of models have been developed to predict the behavior, mobility, and persistence of pesticides. These models should account for key hydrological and agricultural processes, such as crop growth, pesticide application patterns, transformation processes and field management practices.

This work shows results obtained by the Pesticide Water Calculator (PWC) model to simulate the behavior of chlorpyrifos. PWC model is used as a standard pesticide simulation model in USA and in this work it has been used to simulate the fate and transport of chlorpyrifos in the unsaturated zone of the aquifer. The model uses a whole set of parameters to solve a modified version of the mass transport equation considering the combined effect of advection, dispersion and reactive transport processes. PWC is used to estimate the daily concentrations of chlorpyrifos in the Buñol-Cheste aquifer in Valencia Region (Spain).

A whole set of simulation scenarios have been designed to perform a parameter sensitivity analysis. Results of the PWC model obtained in this study represent a crucial first step towards the development of a pesticide risk assessment in Valencia Region. Results show that numerical simulation is a valid tool for the analysis and prediction of the fate and transport of pesticides in the groundwater.