

Emerging Organic Contaminants (EOCs) and inorganic nutrients modelling in MAR wastewater column experiments

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A model to represent the reactive transport and degradation of nutrients and EOCs in a set of column experiments has been developed. The columns represent different MAR infiltration ponds scenarios where a reactive layer is set up to eliminate the EOCs and produce changes in the microbial ecosystem of the columns. The scenarios modelled were: 100% sand, 10% compost and 50% compost. From a geochemical point of view, the processes considered were aerobic degradation of organic matter, nitrification, denitrification, dissimilatory nitrate reduction to ammonium, and nutrient release from compost, coupled with the degradation of EOCs (by means of co-metabolism). From a kinetic point of view, the processes follow a Monod biomass model to define the model constants and parameters. The nutrients degradation implied changes in the EOCs degradation too. In addition, it was showed that the hydraulic properties of the column experiments changed during the experiment. Implying that there was a notable development of the biofilm reducing porosity while increasing the heterogeneity. It was concluded that a close relationship between barrier composition, flow properties, and degradation mechanics, was implied with the different reactive layer setup