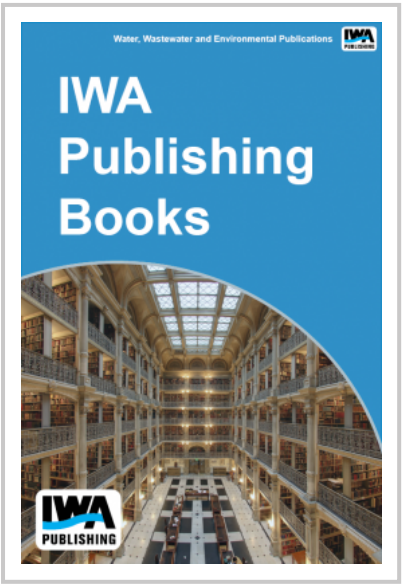
Performance Dynamics of Trace Organic Chemicals in Onsite Treatment Units and Systems



The purpose of this work is to improve our understanding regarding presence and attenuation of TOrC in onsite wastewater systems. A full-scale septic tank and sequencing batch membrane bioreactor (SBMBR) were used to provide water for the experiments conducted. Bench-scale soil columns were used to simulate the performance of soil absorption systems. Effluent from both STE and SBMBR were used in soil column experiments.

The objectives of this study were to investigate the fate and occurrence of trace organic contaminants (TOrC) in Onsite Wastewater Systems (OWS). The data collected over the course of this study highlighted the lack of detailed TOrC occurrence data for onsite systems. As such a more robust sampling campaign was completed to characterize the occurrence and standard deviation of TOrC occurrence in septic tank effluents (STE). These results were compared with the variability of TOrC occurrence in advanced above ground treatment effluent. The main objective of the study was to detail the role of the quantity and type of organic matter in infiltrating water on the attenuation of TOrC. The rate at which water is applied to the subsurface may be important in the performance of soil absorption systems.

The analytical methods and experimental approach used for this study are presented in Chapter 2.0. The occurrence of TOrC in septic tanks serving different unique sewersheds and above ground treatment steps are detailed in Chapter 3. Chapter 4 discusses the role of soil absorption systems on further treatment of TOrC in OWS, specifically the role of loading rate and the amount and type of organic carbon present in infiltrating water. Finally some conclusions and recommendations for future work are presented.

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