

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 TO_{RC} 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 (TO_{RC}) in Onsite Wastewater Systems (OWS). The data collected over the course of this study highlighted the lack of detailed TO_{RC} occurrence data for onsite systems. As such a more robust sampling campaign was completed to characterize the occurrence and standard deviation of TO_{RC} occurrence in septic tank effluents (STE). These results were compared with the variability of TO_{RC} 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 TO_{RC}. 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 TO_{RC} 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 TO_{RC} 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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