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Section A: Environmental Science

Research Article

Constructed Wetlands to Remove the SARS-CoV-2 (COVID-19 virus) from Septic Tank Effluents in LaGrange County, Indiana

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Abstract: People infected with SARS-CoV-2 (COVID-19) can shed the virus in their feces, even if they do not have symptoms. The virus can then be detected in sewage, enabling wastewater surveillance to capture presence of COVID-19 in local communities. The goal of this study was to describe if constructed wetlands could remove the SARS-CoV-2 (COVID-19) genome copies particles (GCP) from discharging effluents of onsite septic tank systems in LaGrange County, Indiana. Effluents grab samples were collected at the inlet and outlet from one gravity horizontal flow (GHFCW), and one recirculating vertical flow constructed wetland (RVFCW) over a five-month period in 2021. Concentration of COVID-19 genomes copies particles was determined by reverse transcription real-time quantitative polymerase chain reaction (RT-qPCR) based in two RNA (Ribonucleic acid) markers targeting the N1 and N2 nucleocapsid genes associated to the virus. The presence of markers N1 and N2 was detected in a greater concentration in the outlet of the septic tanks ahead of the inlet of both wetlands with results of 10^3 to 10^5 genome copies/L. The virus GCP exhibited low removal ($\leq 10^1$) for effluent passing through the RVFCW, where the