



UTSA Earth and Planetary Sciences Klesse College of Engineering (KCEID)

And

Institute of Water Research, Sustainability and Policy (IWRSP)

Seminar Presentation

By

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On

*Friday, February 3, 2023
4:00 P.M.*

“Assessing the Potential of Wastewater-Based Epidemiology to Monitor Trends of SARS CoV-2 Prevalence in Bexar County, Texas”

Abstract

Public health decisions to alleviate the COVID-19 spread have had to be made in near real-time. While clinical screening of individuals is an effective method for risk management, it is invasive and is both resource and labor-intensive method. In this regard, we conducted three different wastewater-based epidemiology (WBE) of SARS-CoV-2 related studies in Bexar County (Texas) to demonstrate its potential for more passive screening of larger populations and optimized the ideal testing strategy for effective monitoring of the virus in the sewershed area. The preliminary WBE study was carried out on wastewater collected from a Wastewater Treatment Plant (WWTP) in Bexar County during the initial stages of the COVID-19 outbreak (June- August 2020) and measured SARS-CoV-2 RNA through reverse transcription droplet digital PCR using the same N1 and N2 primer sets as employed in COVID-19 clinical testing. The results not only demonstrated the potential of WBE to monitor trends of the SARS-CoV-2 presence in the community but also provided an “early warning” signal of the COVID-19 outbreak. In the second WBE study, we standardized the virus concentration method (Adsorption–Extraction based method without any pre-treatment) for the efficient recovery of SARS-CoV-2 RNA from wastewater. This standardized virus concentration method significantly improved the SARS-CoV-2 recovery from wastewater collected from two WWTPs and captured the second peak of the COVID-19 outbreak (November 2020 to February 2021) in Bexar County. In the third WBE study, we identified the ideal sampling frequency required for effective monitoring of SARS-CoV-2 trends in the sewershed area and to provide a better correlation with clinical COVID-19 data. Furthermore, we also investigated the SARS-CoV-2 RNA removal performance in different treatment stages of a major WWTP in Bexar County and the results indicated a significant viral RNA removal in primary and secondary clarifiers and were undetectable in final effluents. Overall, the results provide a comprehensive understanding required for the application of WBE for SARS-Co-2 or other envelope virus monitoring in a sewershed area and improve public awareness and confidence in the potable reuse practice of effluents from WWTPs.

