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A review on the contamination of SARS-CoV-2 in water bodies: Transmission route, virus recovery and recent biosensor detection techniques

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Abstract

The discovery of SARS-CoV-2 virus in the water bodies has been reported, and the risk of virus transmission to human via the water route due to poor wastewater management cannot be disregarded. The main source of the virus in water bodies is the sewage network systems which connects to the surface water. Wastewater-based epidemiology has been applied as an early surveillance tool to sense SARS-CoV-2 virus in the sewage network. This review discussed possible transmission routes of the SARS-CoV-2 virus and the challenges of the existing method in detecting the virus in wastewater. One significant challenge for the detection of the virus is that the high virus loading is diluted by the sheer volume of the wastewater. Hence, virus preconcentration from water samples prior to the application of virus assay is essential to accurately detect traceable virus loading. The preparation time, materials and conditions, virus type, recovery percentage, and various virus recovery techniques are comprehensively discussed in this review. The practicability of molecular methods such as Polymer-Chain-Reaction (PCR) for the detection of SARS-CoV-2 in wastewater will be revealed. The conventional virus detection techniques have several shortcomings and the potential of biosensors as an alternative is also considered. Biosensing techniques have also been proposed as an alternative to PCR and have reported detection limits of 10 pg/ μl . This review serves to guide the reader on the future designs and development of highly sensitive, robust and, cost effective SARS-CoV-2 lab-on-a-chip biosensors for use in complex wastewater. © 2022

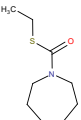
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Biosensor ; Coronavirus; Polymer-chain-reaction; SARS-CoV 2 ; Wastewater; Wastewater based epidemiology

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