

TITLE: MONITORING THE PRESENCE OF SARS-COV-2 RNA IN WASTEWATER IN RIO DE JANEIRO

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ABSTRACT

In late 2019, the first cases of atypical viral pneumonia were identified in Wuhan, China, and it was considered a public health emergency of international concern by the WHO in January 2020. The ongoing global pandemic of the coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has become the first pandemic coronavirus. COVID -19 may present with clinical manifestations such as fever, dry cough, dyspnea, and less common symptoms such as nasal congestion, headache, sore throat, and diarrhea. The detection of viral RNA in the feces of symptomatic and asymptomatic individuals implies that SARS-CoV-2 can be excreted by feces and transported indirectly to aquatic environments and wastewater treatment plants. For this reason, scientists have focused on performing rapid and accurate detection of SARS-CoV-2 in the environmental and aqueous environment, notably in hospital wastewater, in order to understand its development and determine possible ways of its transmission. The study of excreted viruses is a very useful tool known as Wastewater Based Epidemiology (WBE), which has the potential to act as a complementary approach to current infectious disease epidemiological surveillance systems and an early warning system to identify new outbreaks. The objective of this study was to conduct monitoring of SARS-CoV-2 in wastewater in Rio de Janeiro. We collected 500 mL of affluent and effluent samples weekly from a hospital wastewater treatment plant (WTP) and another mixed sewage plant. The samples (n=42) was concentrated on electronegative membranes of porosity 0.45 µm and RNA was extracted using All Prep Power Viral DNA/RNA kit (Qiagen). The E gene was detected in 18 samples by RT-qPCR using the SARS-CoV-2 molecular kit (Biomanguinhos); 10 samples from the mixed WTP had Ct between 30 and 37, and 8 samples from the hospital WTP had Ct between 29 and 38. The detection of SARS-CoV-2 in wastewater can be used as a tool to monitor the prevalence and molecular epidemiology in a given community, helping to understand the spread of the virus among the population. In addition, we are able to predict possible outbreaks and contribute to actions that collaborate with the responses of the health system.

Keywords: Sars-CoV-2; Wastewater; Coronavírus

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