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Wastewater as a red flag in COVID-19 spread

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The genetic material of COVID-19 virus can be found in wastewater, suggesting that water sampling could give warning of an epidemic outbreak. Recent analysis carried out by Water Quality and Health Department (QAS) of the Italian National Institute of Health (ISS) examined 8 samples of wastewater collected from February 3 to 28 in Milan and from March 31 to April 2 in Rome.¹ The presence of RNA of the COVID-19 was confirmed in 2 of the samples collected in the sewage system in the western and central-eastern area of Milan. In Rome, positive results were found in all the samples from the eastern part of the city.¹

Although the integrated water cycle, which includes water purification and sewage, is certainly safe and controlled with respect to this virus and other pathogens as stated in a recent ISS report,² the presence of COVID-19 in wastewater suggests the possibility of using urban sewage systems as a non-invasive tool for early detection of virus spread.

In Paris, on April 19 traces of COVID-19 were found in the non-drinkable street-cleaning water. Time-course quantitative analysis RT-qPCR was performed in 23 raw and 8 treated wastewater samples from 3 major treatment plants, from 5 March to 7 April 2020.³ All raw wastewater samples proved positive for SARS-CoV2, as did 6 out of 8 samples from treated wastewater. The viral load of treated wastewater was 100 times less than the raw. Drinking water, separately treated, had no traces of the virus.³

A report from WHO suggests that human coronavirus survives only 2 days in dechlorinated tap water and in hospital wastewater at 20°C, and there is no evidence that coronaviruses have infected through drinking water.⁴ SARS-COV-2 is an enveloped virus with a fragile external membrane. Generally, enveloped viruses are less stable and more sensitive to oxidants, such as chlorine; this virus is likely to be inactivated significantly faster than viruses with known water-based transmission.⁴

Wastewater analysis could be effectively used to monitor virus spread and predict new epidemic outbreaks. Although viral RNA traces in wastewater themselves carry no risk for human health, this analysis could be a helpful tool in controlling the pandemic.

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