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IIT-B makes sensor to detect COVID-19 in wastewater

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Scientists from the University of Strathclyde and the Indian Institute of Technology (IIT) Bombay took part in the initiative



Scientists from the University of Strathclyde, UK and the Indian Institute of Technology (IIT) Bombay have demonstrated a low-cost sensor that can detect fragments of the virus responsible for COVID-19 within the wastewater.

The technique, published in the journal *Sensors and Actuators B: Chemical*, could be used to enable widespread monitoring of COVID-19 prevalence in low- and middle-income countries which struggle to conduct mass human testing.

The sensor can be used with portable equipment that uses the standard Polymerase Chain Reaction (PCR) test to detect the SARS-CoV-2 virus, without the need for the expensive chemicals and lab infrastructure needed for real-time quantitative PCR tests.

The sensor was tested with wastewater collected from a sewage treatment plant in Mumbai spiked with SARS-Cov-2 Ribonucleic Acid (RNA).

The biosensor uses printed circuit board electrodes to detect fragments of SARS-CoV-2 nucleic acid which have combined with methylene blue – a readily available salt used as a medication and dye – which is added to the sample to produce a measurable electrochemical signal. The sensor was able to detect the genetic material at concentrations as low as 10 picograms per microlitre (pg/?l). The electrodes are reusable, easy to clean, do not undergo any changes that affect their capabilities and have a long shelf-life.

Dr Siddharth Tallur, Associate Professor in the Department of Electrical Engineering at IIT Bombay, said: “The method we have developed is not just applicable to SARS-CoV-2, it could be applied to any other virus so it’s very versatile. In the future, we’ll focus on optimising the assay further to increase accuracy and also integrate the assay with a portable platform to handle both PCR reaction and electrochemical measurement.”