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IIT-M, UK researchers develop paper-based sensor to detect antimicrobial pollutants

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This sensor works on a â??see and tellâ?? mechanism that makes it logistically effective for wide implementation

Indian Institute of Technology Madras (IIT-M) and United Kingdom researchers have developed a paper-based sensor that can detect antimicrobial pollutants, which induce antimicrobial resistance in water bodies. This sensor works on a ‘see and tell’ mechanism that makes it logistically effective for wide implementation.

This research was first reported through a journal publication in Nature Scientific Reports and was acclaimed as one of the top 100 in chemistry.

This research was funded by Department of Science and Technology (DST), Government of India in bilateral collaboration with UK’s Natural Environment Research Council and Engineering and Physical Sciences Research Council (EPSRC) under the ‘Indo UK Water Quality Research Programme.’

In IIT Madras, this research was led by Prof S Pushpavanam, Institute Chair Professor, Department of Chemical Engineering, IIT Madras and Dr T Renganathan, Associate Professor, Department of Chemical Engineering, IIT Madras.

Prof Pushpavanam said, “Paper-based sensor offers an affordable platform for various point-of-care applications as they support fluid flow based on a wicking action and governed by capillary forces. This eliminates the requirement of a pump-to-flow liquids. We have come up with a novel method for the fabrication of paper- based devices using a commercial laser printer.”

The practical applications of these Sensors include:

- Environmental monitoring
- Food safety analysis
- Healthcare monitoring

Dr Renganathan said, “We have used these fabricated devices for the detection of antibiotics such as ciprofloxacin, biocides such as triclosan and heavy metals such as chromium, copper and lead. These devices can be used for antimicrobial resistance surveillance in water bodies.”

The novel strategy for low-cost fabrication of the robust Laser Printed-Microfluidic Paper-Based Analytical Sensors developed by IIT Madras will help to detect antimicrobials easily in the parts per million range. It will also help understand the relationship between AMR and AMR-triggering pollutants and assist policymakers in framing solutions to tackle grand societal AMR challenge.