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IIT-G develops device for rapid detection of cancer-causing heavy metals and other toxicants

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E-Eye device has been developed at a cost of approximately Rs 3,500, with a per-sample testing cost of around Rs 2



Researchers at the Indian Institute of Technology Guwahati (IIT-G) have developed an optical sensing device that can instantly detect a variety of toxicants in water and other biological samples.

Aligned with the Government of India's Jal Jeevan Mission, this innovation addresses a key challenge of ensuring safe drinking water. While the mission aims to provide tap water to every household, maintaining water quality remains a challenge due to different water sources, which may contain heavy metals and other disease-causing bacteria.

To address this challenge of water quality monitoring, the research team has developed a portable point-of-care testing device named E-Eye. Working as an electronic eye, it detects multiple toxicants on-site while maintaining high accuracy, and transmits the recorded data wirelessly to water treatment facilities.

E-eye works through a chemical reaction that produces a colored compound, in which color intensity highlights the concentration of the toxicants. Using basic optical principles, the device analyses the water and converts the sensor's output into digital data and displays the toxicant concentration.

Contrary to conventional laboratory based costly instruments, E-Eye is suitable for direct field deployment, where it can detect water toxicants right at the water source. During laboratory tests, the research team found that results shown by E-Eye are comparable to those of standard UV-Visible and Atomic Absorption spectrophotometers (AAS), while offering advanced digital integration functionality.

The E-Eye device has been developed at a cost of approximately Rs 3,500, with a per-sample testing cost of around Rs 2. The cost of the device can be reduced further through large-scale industrial production.

Other than water quality monitoring, the device is capable of analysing toxicants in environmental samples, biological samples, vegetables, food products, tea and herbal products, soil, and milk as well. The research team has tested more than 2700 samples with the developed device and recorded accurate results.

Supported by a research grant from the Ministry of Electronics and Information Technology (MeitY), the research team has established a startup, ENVIONIX Labs, to commercialise the developed technology. Additionally, the team also plans to collaborate with an industry partner to initiate technology transfer and bring this innovation from lab to land.