BioSpect
the business of Bi
24 years of leveraging the business of Bio
www.biospectrumindia.co

IIT-G creates nanosensor for instant detection of cancer-causing water pollutants

01 September 2025 | News

Can detect mercury and harmful antibiotic contamination in less than 10 seconds



Scientists at the Indian Institute of Technology Guwahati (IIT-G) have developed a novel sensor from milk protein and thymine that can detect mercury and tetracycline antibiotics contamination in water.

With rapid urbanisation, industrial activities, and overuse of pharmaceuticals, water contamination is becoming a pressing issue, putting ecosystems and human health at risk worldwide.

Tetracyclines is a class of antibiotics commonly used for pneumonia and respiratory infections. If it is not disposed properly, it can easily enter the environment contaminating the water which can result in antibiotic resistance and other health hazards. Similarly, mercury, in its organic form, can cause cancer, neurological disorders, cardiovascular disease and other life-threatening conditions. Detecting these pollutants accurately and quickly is essential to protect both water quality and public health.

To address this challenge, the IIT Guwahati research team has created nanosensor, a sensor built from extremely small materials that are a few billionths of a meter in size. The developed sensor uses carbon dots that glow under ultraviolet light. In the presence of harmful substances such as Mercury or tetracyclines, the glow of these carbon dots dim, providing a quick and visible signal of contamination.

On a laboratory scale, the developed sensor has demonstrated accurate results with a measurable dimming of its glow within less than 10 seconds of meeting harmful contaminants. The sensor is extremely sensitive in mercury detection with just 5.3 nanomolar (1.7 parts per billion), which is below the safety standards set by the U.S. Environmental Protection Agency, and 10 – 13 nanomolar for Tetracycline antibiotics.

The research is currently at a laboratory stage. The findings are subject to further validation and the sensor is not ready for commercial application yet.