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Bengaluru researchers develop paper-based platform to detect antibiotic-resistant bacteria

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A paper-based platform developed by researchers at the Indian Institute of Science (IISc) and Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru could help quickly detect the presence of antibiotic-resistant, disease-causing bacteria.

Dr Uday Maitra, Professor at the Department of Organic Chemistry, IISc, and collaborators have developed a rapid diagnosis protocol that uses a luminescent paper-based platform to detect the presence of antibiotic-resistant bacteria.

The approach developed by the IISc and JNCASR team involves incorporating biphenyl-4-carboxylic acid (BCA) within a supramolecular hydrogel matrix containing terbium cholate (TbCh). This hydrogel normally emits green fluorescence when UV light is shined on it.

The next step was to find a way to make the technology inexpensive. Currently used diagnostics instruments are costly, which drives up the price for testing.

The team collaborated with a Chennai-based company called Adiuvo Diagnostics to design a customised, portable and miniature imaging device, named Illuminate Fluorescence Reader. Infusing the hydrogel in a sheet of paper as the medium reduced the cost significantly. The instrument is fitted with different LEDs that shine UV radiation as required. Green fluorescence from the enzyme is captured by a built-in camera, and a dedicated software app measures the intensity, which can help quantify the bacterial load.

The team from IISc tied up with Jayanta Haldar’s research group from JNCASR to check their approach on urine samples. As the next step, the researchers plan to tie up with hospitals to test this technology with samples from patients.