

A microfluidic device for rapid screening of *E. coli* O157:H7 based on IFAST and ATP bioluminescence assay for water analysis

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ABSTRACT:

We present a simple microfluidic system for rapid screening of *Escherichia coli* (*E. coli*) O157:H7 employing the specificity of immunomagnetic separation (IMS) via immiscible filtration assisted by surface tension (IFAST), and the sensitivity of the subsequent adenosine triphosphate (ATP) assay by the bioluminescence luciferin/luciferase reaction. The developed device was capable of detecting *E. coli* O157:H7 from just 6 colony forming units (CFU) in 1mL spiked buffer within 20min. When tested with wastewater discharged effluent samples, without pre-concentration, the device demonstrated the ability to detect 10^4 CFU per mL seeded; suggesting great potential for point-of-need microbiological water quality monitoring.