Empowering Sewer Operations Teams with Rapid On-Site Contamination Monitoring

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The environmental management of sewage-related contamination in waterways remains a critical challenge, particularly during sewer-spill events or when ageing infrastructure fails. Traditional laboratory methods for detecting faecal indicator bacteria are often time-consuming and costly, delaying critical operational responses. This study presents the novel ZiP-P2 platform using the ZiP-Bactx-P2 assay for the rapid, field-deployable detection of human-specific *Bacteroides dorei* , a well-established proxy for sewage contamination for over 20 years.

The ZiP-P2 system delivers semi-quantitative results in under 20 minutes, with sensitivity comparable to PCR, all from a rugged, portable instrument suitable for remote field operations. This allows operational teams to conduct spatial and temporal sampling on site, rapidly guide source tracing and remediation decisions, and verify mitigation efficacy through digital reporting and geospatial mapping workflows.

Field trials demonstrated the platform's capacity to detect contamination events in near real time, drastically reducing turnaround from days to minutes. This capability significantly improves operational efficiency by enabling rapid, on-site decision-making, reducing reliance on laboratory testing and cutting associated costs by up to 90%. While laboratory testing still plays a role in regulatory confirmation, the ability to detect human-specific contamination quickly and at scale makes ZiP-P2 well suited for emergency sewer spill response, routine catchment risk assessments, and targeted investigations of failing infrastructure. Adoption of the ZiP-P2 system represents a significant step forward in water sector innovation, delivering actionable microbial data when and where it matters.