

Rapid monitoring of water sanitary quality to authorize bathing in harbor areas, based on low temperature amplification of bacterial DNA.

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Abstract: One of the recurring concerns among users of floating infrastructures is the sanitary safety of surrounding water, particularly for recreational activities such as bathing. Indeed, due accidental discharge of sewage from boats and the stagnation of water in harbors and docking areas, fecal contamination levels in such environments are frequently elevated. Standard water quality monitoring methods require several days for a reference laboratory to process and analyze samples, leading to delays in decision-making.

To address this limitation, a rapid, easy-to-use self-test has been developed to enable near-instantaneous assessment of water quality. This test is based on isothermal amplification of bacterial genetic material, allowing for the detection of coliform bacteria as an indicator of fecal contamination. The procedure involves collecting a 100 mL water sample, extracting DNA, and analyzing it using a portable device. Comparative studies against standard laboratory-based methods have demonstrated a strong correlation, confirming the test's reliability. Calibration has been performed using international bathing water quality standards as a reference.

The test provides a **qualitative Go/No-Go result** within approximately 45 minutes. A "**Go**" indicates that the water is safe for bathing, while a "**No-Go**" signals an unsafe contamination level. The simplicity of the procedure allows untrained personnel to conduct the test effectively, requiring only a brief tutorial. Sample preparation takes approximately 12–15 minutes, followed by a 30-minute detection phase.

This innovative tool represents a significant advancement in the rapid monitoring and management of water quality in harbors and floating infrastructures, ensuring the safety of potential bathers while facilitating real-time decision-making.

Keywords: *Safety; water quality; bathing*

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