Specific Detection of Viable *E.coli* O157:H7 Cells by Coupling Propidium Monoazide with Loop-Mediated Isothermal Amplification

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Abstract: Traditional molecular detection methods cannot distinguish *Escherichia coli* O157:H7 in viable or dead state. In this study, the loop-mediated isothermal amplification (LAMP) method combined with propidium monoazide (PMA) treatment was developed to selectively detect the viable *Escherichia coli* O157:H7, but not dead cells. Four primers, including outer primers and inner primers, were specially designed for recognizing six distinct sequences on the species-specific *rfbE* gene of *Escherichia coli* O157:H7 genome. PMA penetrated selectively through the compromised cell membranes and intercalated into DNA, amplification of DNA from dead cells was inhibited completely by 3.0 µg/mL PMA, whereas the DNA derived from viable cells was amplified remarkably within 1 h by PMA-LAMP. This study offers a novel molecular detection method to distinguish between the viable and dead cells.

Key words: *E.coli* O157:H7, propidium monoazide, rapid detection, viable cells.