Title Fluorescence biosensor for a simple and rapid detection of *Escherichia coli* in fresh-cut fruits

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Abstract

Pathogenic microorganisms associated with fresh-cut produce can cause disease outbreaks, thereby demonstrating the need for quality and safety monitoring efforts to control risks associated with these products. We have developed a rapid *Escherichia coli* detection method for fresh cut fruit based on loop-mediated isothermal DNA amplification with fluorescence signal detection upon binding of the target DNA products with minor groove binder. Detection processes were divided into two steps. The first was an enrichment procedure that used fresh cut mango and papaya to enable DNA amplification without any sample pretreatment such as full step DNA extraction. The second was a specific DNA amplification of the *mal*B gene at 65°C isothermal temperature and DNA signal detection. DNA signals were measured using fluorescence visualization. The limit of detection for the method was 5 copies of *E. coli* DNA per 50 g of sample. No cross-reactivity was observed from samples contaminated with other bacteria. Detection could be completed within 4 hours of initial sampling, including the enrichment process, without the need of a thermo cycler. This method constitutes a basis for a rapid yet simple detection of pathogenic bacteria suitable for field application.