

Rapid Detection of *E. coli* O157:H7 Contamination in Ground Beef Using CANARY™

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Background:

As many as 73,000 individuals are infected each year in the United States with *E. coli* O157:H7 as a result of eating contaminated food. Methods that enable simple, rapid detection of *E. coli* O157:H7 are of significant value because they offer the opportunity to increase the efficiency of food testing and decrease risk to the public. We have developed a novel biosensor-based system that allows for rapid, sensitive, real-time detection of pathogens in a variety of food matrixes. The sensor, based on the CANARY™ technology, allows for the detection of <250 CFU *E. coli* O157:H7 in food matrixes and requires only 5 minutes to perform. Our objective was to characterize the sensitivity of the CANARY™ assay in detecting *E. coli* O157:H7 in ground beef samples using a variety of common enrichment media.

Methods:

Ground beef samples (25g) obtained from a commercial outlet were placed in sterile sample bags and inoculated with low levels of *E. coli* O157:H7 (1-10cfu/sample). Samples were diluted in standard enrichment media, including modified EC and TSB in the presence or absence of selective agents, and agitated using a Stomacher device, then incubated at 37°C for various times. Samples were then processed and analyzed using the CANARY™ biosensor assay.

Results:

The CANARY™ biosensor assay enables the detection of as few as 220 CFU *E. coli* O157:H7 in enriched ground beef samples. As a result, samples contaminated with 1-10 CFU *E. coli* O157:H7 were identified after only 7 hours of incubation in common enrichment media.

Conclusion:

This study confirms that the CANARY™ biosensor assay is effective in the detection of low levels of pathogenic *E. coli* in ground beef samples. Enrichment can be efficiently performed in a number of commercially available media, and easy sample processing methods enable detection of pathogen in less than 10 minutes following enrichment. The combination of speed, sensitivity, and specificity offered by this assay system makes it an effective tool for routine screening of food samples.



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