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MICROBIOLOGY**

Detection of *E. coli* O157 in Water and Food using the Integrating Waveguide Biosensor

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Background:

Water-borne and food-borne pathogens are major causes of illness. One of the most serious, in terms of morbidity and mortality, is enterohemorrhagic *E. coli* O157:H7, which has an infectious dose of as low as 1-700 CFU/gram of food. Consequently, detection remains a challenge because of requirement for extremely high sensitivity.

Method:

Creatv MicroTech is developing the Integrating Waveguide Biosensor for the detection of food-borne and water-borne *E. coli* O157. The biosensor provides a low limit of detection by reducing background noise, thus improving the signal-to-noise ratio. A sandwich immunoassay complex to the inner surface of a capillary tube is used to capture *E. coli* O157 as it flows through the tube, and detect using Cy-5 or quantum dot fluorescent dyes. The resultant fluorescence is transmitted to a photomultiplier or spectrometer apparatus located at the end of the capillary.

Results:

The absolute limit of detection for *E. coli* O157 is 10 captured cells using Cy5 or a single cell using quantum dots. The assay sensitivity, using static incubation and a 40 µl sample (capillary volume), is approximately 1×10^3 cells/ml for water and 1×10^4 cells/ml for apple juice and ground beef. The assay doesn't require complicated sample preparation or enrichment.

Conclusions:

The integrating Waveguide Biosensor has been successfully used for the detection of *E. coli* O157 at low levels in water and food.

Topic (Complete): P04 Isolation and Detection

Keyword (Complete): *E. coli* O157 ; immunoassay ; food safety

Membership and Grant Information (Complete):

ASM Member (or who has submitted an application) : Peixuan Zhu

Status: Complete