

E. coli 0157:H7 detection and virulence factor identification

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Technology description

Description

Researchers affiliated with the National Microbiology Laboratory (NML) in Winnipeg, Manitoba have developed a rapid, easy to perform, reliable, relatively inexpensive kit that can detect not only E. coli 0157:H7 but, of potentially greater significance, all of the known specific illness-causing E. coli virulence factors, even when they are not part of E. coli 0157:H7 but occur in other serotypes of E. coli (the so called non-O157:H7 isolates).

No other technology detects E. coli 0157:H7 and identifies so many E. coli virulence factors simultaneously.

The investment opportunity

The National Microbiology Laboratory E. coli 0157:H7 detection and virulence factor identification kit addresses the urgent need for a simple E. coli 0157:H7 test that can be used in clinical laboratories as well as in food and water inspection settings.

The NML kit's ease of use, detection sensitivity, and reliability makes widespread use of it at many levels of medical practice, medical research, veterinary practice, food production, food processing, and food and water inspection possible and practical. It has civilian and military applications and, potentially, a worldwide market.

The Challenge

Escherichia coli (E. coli) 0157:H7 is a bacterial pathogen that causes serious gastrointestinal illness, often referred to as "Hamburger disease".

Infection with E. coli 0157:H7 may cause bloody diarrhea, thrombotic thrombocytopenic purpura (TTP), neurologic sequelae, acute and chronic kidney disease, hemorrhagic colitis (HC), and hemolytic-uremic syndrome (HUS), a disease for which there is no effective treatment.

E. coli 0157:H7 can be transmitted in undercooked ground beef, unpasteurized apple juice, unpasteurized milk, salami, alfalfa sprouts, lettuce, and untreated drinking water and recreational water.

The Centers for Disease Control in Atlanta estimates 73,000 illnesses and 60 deaths a year in the United States are caused by *E. coli* O157:H7 infection.

Quick, reliable, inexpensive detection of *E. coli* O157:H7 in food, water, and human beings is vital to preventing and treating *E. coli* O157:H7 disease and establishing *E. coli* O157:H7 disease epidemiology.

Determining whether *E. coli* O157:H7 is the cause of an illness is critical because some treatments for illnesses with similar symptoms, if applied to *E. coli* O157:H7 disease, can cause kidney problems or sometimes-fatal hemolytic-uremic syndrome due to increased toxin release by the pathogen.

Identifying the specific illness-causing virulence factors present in *E. coli* strains such as *E. coli* O157:H7 is important for disease epidemiology determination. The source of an outbreak must be found to facilitate product recall. But, detection of *E. coli* O157:H7 and identification of specific illness-causing virulence factors in *E. coli* strains can be difficult because most detection methods are time-consuming and expensive, and are not able to identify virulence factor subtypes.

Institution

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