



DATASHEET

Microbiological Hazard Series

Pathogen Name: *Escherichia.coli* 0157

Characteristics: *Escherichia coli* 0157 is gram negative, rod shaped, non-spore forming bacteria belonging to the family, Enterobacteriaceae. It is a harmful bacterium that is particularly dangerous because it has the ability to survive during refrigeration and freezing and has been shown to be tolerant of acid, salt and dry conditions. It can grow between temperature of 7-46°C and at a pH as low as 4.4.

Pathogenicity: *Escherichia coli* 0157 is commonly found in the lower intestine of warm-blooded organisms. It can produce a toxin (Shiga toxin) which can cause serious illness. It can affect all ages, however there have been higher mortality rates occur in the elderly and young.

Infectious Dose: The infective dose of *Escherichia.coli* 0157 is estimated to be very low, in the range of 10 to 100 cells.

Sources (Including High - Risk food groups): Ground meats, unpasteurised milk, unpasteurised fruit juice, lettuce, spinach and sprouts. Soil where fresh produce grows can become contaminated so root crops and leafy vegetables are a potential source. Also, a major source is animals and their environment, in particular cattle.

Waterborne transmission has been reported both from contaminated drinking water and from recreational waters. Person to person contact is also a mode of transmission through the oral-faecal route. An asymptomatic carrier state has been reported, where individuals show no clinical signs of disease but are capable of infecting others.

Onset Period: Usually begins 3-4 days after exposure but can range from 1-9 days.

Illness, Symptoms, and Complications: Bloody diarrhoea (haemorrhagic colitis), severe cramping, nausea and vomiting. In severe cases this may progress to life-threatening complications as (HUS) where red blood cells are destroyed causing kidney injury. This can result in the person requiring intensive care, kidney dialysis, and transfusions. It can also lead to Thrombotic thrombocytopenic purpura (TTP). About 3% -7% of the haemorrhagic colitis cases progress to HUS or TTP.

Controls to reduce the risk:

The control starts on the farm with the implementation of good agricultural practice which can help reduce the shedding of *Escherichia.coli* 0157 from animals such as cattle. Good agricultural practices are extremely important for the production of fresh fruits and vegetables, this can be done by protecting fields from animal faecal contamination and keeping harvest/storage equipment clean and dry.

The prevention also requires controls during manufacturing and preparation of foods such as preventing cross-contamination of foods and cooking food so that the core reaches at least 70°C for 2 minutes. Water supplied to food businesses, including private supplies, must meet potable water standards.

It is important to ensure correct personal hygiene procedures are in place such as confirming hands are thoroughly washed prior to handling food, and making sure there is control over food handlers who are returning to work after suffering from a food poisoning illness.

It is essential that staff designated for carrying out cleaning and disinfection procedures are adequately supervised, instructed and/or trained to ensure the procedures are carried out effectively every time. Consumers should be advised to cook food such as burgers thoroughly, avoid unpasteurised food products and to wash fruit and vegetables carefully before consumption.

EXAMPLE OUTBREAKS		
YEAR	LOCATION	DETAILS
2005	UK (Wales)	Cooked meat that was contaminated was supplied to schools and resulted in 157 illness, 21 hospitalisations and 1 death.
2016	UK	Mixed salad leaves became contaminated resulting in 105 confirmed illness and 2 deaths.
2017	US and Canada	Romaine lettuce became contaminated causing 66 illnesses and 2 deaths

SUMMARY TABLE	
Source	<ul style="list-style-type: none"> • Ground meats • Unpasteurised milk • Fresh produce • Water • Person to person
Growth Temperature	<ul style="list-style-type: none"> • 7-46°C
Growth pH range	<ul style="list-style-type: none"> • Low as 4.4
Onset period	<ul style="list-style-type: none"> • 3-4 days (Can range from 1-9)
At risk groups	<ul style="list-style-type: none"> • The very young • The elderly • Those with a weakened immune system
Illness, Symptoms, Complications	<ul style="list-style-type: none"> • Bloody diarrhoea (Hemorrhagic colitis) • Vomiting • Nausea • Can lead to HUS and TTP in severe cases
Controls	<ul style="list-style-type: none"> • Good agricultural practices • Prevent cross contamination • Use treated water • Heat treatment e.g cooking at 70°C for 2 minutes • Good personal hygiene practices • Gloves • Personal Protective Clothing
Published Risk Assessments	<ul style="list-style-type: none"> • FSIS: RISK ASSESSMENT OF <i>E. coli</i> O157:H7 IN GROUND BEEF https://www.fsis.usda.gov/OPHS/ecolrisk/home.htm?redirecthttp=true • WHO: Development of Practical Risk Management Strategies based on Microbiological Risk Assessment Outputs, Case study: <i>Escherichia coli</i> O157:H7 in fresh raw ground beef www.fao.org/3/a-au624e.pdf • NCBI: Quantitative Microbial Risk Assessment for <i>Escherichia coli</i> O157:H7 in Fresh-Cut Lettuce https://www.ncbi.nlm.nih.gov/pubmed/28221978

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