

# ***ESCHERICHIA COLI*, ENTEROHEMORRHAGIC**

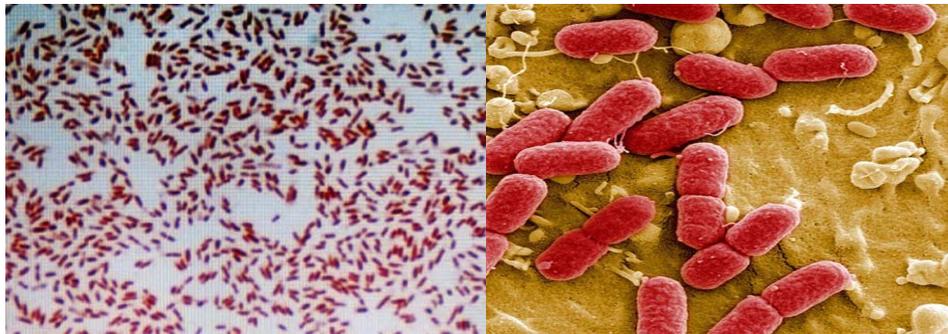
## **PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES**

### **INFECTIOUS AGENT**

**NAME:** *Escherichia coli*, enterohemorrhagic

**SYNONYM OR CROSS REFERENCE:** Enterohemorrhagic *Escherichia coli* (EHEC), Verotoxin producing *Escherichia coli* (VTEC), Shiga toxin producing *Escherichia coli* (STEC).

**CHARACTERISTICS:** Gram negative rod; motile, aerobic; produce Vero / Shiga toxins (VT/STx), 2 types, VT1/Stx1 and VT2/Stx2; serotyping to determine somatic and flagellar antigens.



*Escherichia coli*, gram-stained<sup>1)</sup>

*Escherichia coli* cells<sup>2)</sup>

### **HAZARD IDENTIFICATION**

**PATHOGENICITY:** Hemorrhagic colitis, intestinal disease accompanied by cramps and abdominal pain; initially watery, followed by bloody diarrhea; low grade fever; last about 8 days; 5-10% of hemorrhagic colitis victims may develop hemolytic uremic syndrome (HUS); affects all ages, higher death rates occur in elderly and young; can cause thrombocytopenic purpura (TTP) in elderly.

**EPIDEMIOLOGY:** Sporadic and in outbreaks of bloody diarrhea; associated with 15-30% of patients where no other pathogen has been identified; main EHEC serotype in North America from infections is *E. coli* O157:H7.

**HOST RANGE:** Humans; animals (O157:H7 - piglets, calves and cattle).

**INFECTIOUS DOSE:** Appears to have low infectious dose, may be similar to that of *Shigella* spp., 10 organisms by ingestion.

**MODE OF TRANSMISSION:** Ingestion of contaminated food (undercooked hamburger meat, unpasteurized milk); fecal-oral transmission; person-to-person transmission (extremely high).

**INCUBATION PERIOD:** 2-8 days (median of 3-4 days).

**COMMUNICABILITY:** Communicable for duration of fecal excretion (7-9 days); 3 weeks in one third of children.

# DISSEMINATION

**RESERVOIR:** Infected persons, animals (sheep, goats, pigs, poultry, calves, cattle).

**ZOONOSIS:** Yes - direct or indirect contact with infected animal and waste.

**VECTORS:** Birds may be a vector.

# STABILITY AND VIABILITY

**DRUG SUSCEPTIBILITY:** Sensitive to a wide spectrum of antibiotics.

**SUSCEPTIBILITY TO DISINFECTANTS:** Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, phenolics, glutaraldehyde, iodines, formaldehyde.

**PHYSICAL INACTIVATION:** Heat sensitive, inactivated by moist heat (121° C for at least 15 min) and dry heat (160-170° C for at least 1 hour).

**SURVIVAL OUTSIDE HOST:** Butter - up to 50 min; cream - 10 days; hamburger meat - survives well; does not survive long in slurry systems (inoculum of 10<sup>8</sup> cfu/mL became undetectable after 9 days); survives well in contaminated feces and soil, only small reduction in organism number over 2 months.

# FIRST AID / MEDICAL

**SURVEILLANCE:** Monitor for symptoms; confirm bacteriologically, DNA probe to detect Verotoxins VT1 and VT2.

**FIRST AID/TREATMENT:** Electrolyte fluid therapy; antibiotics may be administered in very severe cases.

**IMMUNIZATION:** None

**PROPHYLAXIS:** Not usually administered.

# LABORATORY HAZARDS

**LABORATORY-ACQUIRED INFECTIONS:** 4 reported cases of laboratory infections with *E. coli* since 1981.

**SOURCES/SPECIMENS:** Contaminated food (raw milk, hamburger, apple juice and water); feces.

**PRIMARY HAZARDS:** Ingestion.

**SPECIAL HAZARDS:** None

# EXPOSURE CONTROLS / PERSONAL PROTECTION

**RISK GROUP CLASSIFICATION:** Risk Group 2.

**CONTAINMENT REQUIREMENTS:** Biosafety level 2 practices, containment equipment and facilities for activities involving cultures and infected clinical materials.

**PROTECTIVE CLOTHING:** Laboratory coat; gloves when contact with infectious materials is unavoidable.

**OTHER PRECAUTIONS:** Good personal hygiene and frequent hand washing essential.

# HANDLING AND STORAGE

**SPIILLS:** Allow aerosols to settle; wearing protective clothing, gently cover spill with absorbent paper towel and apply 1% sodium hypochlorite, starting at perimeter and working towards the centre; allow sufficient contact time (30 min) before clean up.

**DISPOSAL:** Decontaminate before disposal; steam sterilization, chemical disinfection.

**STORAGE:** In sealed containers that are appropriately labeled.

# REFERENCE

Pathogen Safety Data Sheet (PSDS) for *Escherichia coli*, enterohemorrhagic has been modified from the ones produced by the Public Health Agency of Canada as educational and informational resources for laboratory personnel working with infectious substances.

- 1) Picture from Amazingnotes.com
- 2) Picture from Helmholtz Center for Research on Infectious Diseases/Getty Images