

Thermo Scientific *E. coli* Food Fact Sheet–U.S.

Key Words

Escherichia coli, Enterobacteriaceae, *E. coli* O157:H7, Shiga toxin

Goal

Provide an overview of the *Escherichia coli* organism, including incidence, infective dose and foods affected.

Description:

Escherichia coli are Gram-negative, facultative anaerobe, rod-shaped bacteria. *E. coli* are commonly found in the intestine of humans and warm-blooded animals. Many strains of *E. coli* are not pathogenic; however presence of *E. coli* in food is an indicator of fecal contamination. *E. coli* isolates are serologically differentiated based on three major surface antigens: O (somatic), H (flagella), and K (capsule) antigens. Diarrheagenic *E. coli* isolates are categorized into specific groups based on virulence properties, mechanisms of pathogenicity, clinical syndromes, and distinct O:H serotypes.

The most significant group based on severity of illness is enterohemorrhagic *E. coli* (EHEC) and includes *E. coli* O157:H7 strains. *E. coli* O157:H7 strains are unusually tolerant to acidic environments and can survive at pH values of 4-4.5.

Incidence:

In the United States, *E. coli* contaminated food causes approximately 1,000 reported disease outbreaks and an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths annually.

Infective Dose:

In affected ground beef patties associated with disease outbreak, 0.3 - 15 CFU/gram were detected suggesting an infectious dose of <100 cells.

The precise mechanism of pathogenicity is unclear. However, indications are that the organism causes disease by adhering to the host cell membrane and colonizing the large intestine where they produce one or more Shiga toxins.



Foods Affected:

Undercooked ground beef and unpasteurized milk are well-recognized sources of *E. coli* O157:H7 infection.

A variety of other foods have been identified as vehicles for transmission: roast beef, cooked meats, venison, jerky, salami, milk, yogurt, cheese, unpasteurized cider, orange juice, cantaloupe, handling potatoes, radish sprouts, alfalfa sprouts, fruit/vegetable salad (lettuce and spinach), and coleslaw.


References:

- Centers for Disease Control and Prevention. *Estimates of Foodborne Illness in the United States*. Available at: <http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>
- United States Food and Drug Administration. *Bacteriological Analytical Manual (BAM)*. Chapter 4. Enumeration of *Escherichia coli* and the Coliform Bacteria. Available at: <http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm064948.htm>
- United States Food and Drug Administration. *Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. Bad Bug Book. Available at: <http://www.fda.gov/downloads/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/UCM297627.pdf>
- Food Microbiology, Fundamentals and Frontiers, 2nd edition, Eds. M.P. Doyle, L.R. Beuchat and T.J. Montville, 2011, ASM Press, Washington DC.

Thermo Scientific E. coli testing products

See www.thermofisher.com/microbiology or the Thermo Scientific Remel and Oxoid microbiology product catalog for a complete listing.

	Description	Format	REF
Enrichment	EE Broth	500g	CM0317B
	EE Broth Mossel	10/pk, 100mL	R112280
	EC Broth, Reduced Bile Salts	500g	CM0990B
	Novobicin	10 vials	SR0181E
	Modified TSB with Novobiocin (8mg/L)	500g	R458632
	Tryptone Soya Broth, Modified	500g	CM0989B
Isolation	Brilliant Green Bile Broth 2%	20/pk tubes	R07022
	Brilliance E.coli/Coliforms Medium	500g	CM0956B
	MR-VP Broth	20/pk, 5mL tubes	R061436
	EC Broth	500g	CM0853B
	EC Medium	20/pk, 10mL tube	R07102
	EC Medium w/MUG	20/pk, 10mL tube	R07655
	MacConkey Agar	500g, 10/pk monoplate	R453802, R01550
	EMB Agar (Levine)	500g, 10/pk monoplate	R453402, R01400
	MacConkey Agar w/ Sorbitol, Cefixime, Tellurite (CT-SMAC)	10/pk monoplate	R110241
	MacConkey Agar w/ MUG	500g	R453842
	Sorbitol MacConkey Agar (w/BCIG)	500g	CM0981B
	MacConkey Sorbitol Agar	500g	R453852
	Lauryl Tryptose Broth Modified w/MUG, Tryptophan	500g	CM0967B
	Lauryl Tryptose Broth w/ MUG	500g	R453672
	Lauryl Tryptose Broth, 1X	20/pk, 10mL tube	R09447
	Lauryl Tryptose Broth, 2X	20/pk, 10mL tube	R09450
	Lauryl Tryptose Broth w/MUG, 2X	20/pk, 10mL tube	R09455
	Modified Lauryl Tryptose Broth w/MUG, Tryptophan	500g	CM0967B
	Tryptone Bile Agar	500g	CM0595B
	TBX Medium	500g	CM0945B
	EC Broth w/MUG	500g	CM0979B
	Cefixime Rhamnose Sorbitol MacConkey Agar Base	500g	CM1005B
	Violet Red Bile Agar w/MUG	500g	R455292
Identification	Dryspot™ E. coli O157	120 tests/kit	DR0120M
	Dryspot E. coli Seroscreen	60 tests/kit	DR0300M
	Escherichia coli O157 Latex Test	100 tests/kit	DR0620M
	Wellcolex® E. coli O157:H7 Kit	50 tests/kit	R30959601
	Micro-ID® Identification System	10 units/pk	R38145
	RapID™ ONE System	20 panels/kit	R8311006
	BactiCard	25 tests/kit	R21108
QC Organisms	Culti-Loops Escherichia coli serotype O157:H7 ATCC® 43888™*	5 loops/pk	R4601965
	Culti-Loops Escherichia coli ATCC® 25922™*	5 loops/pk	R4607050
	BactiDisk Escherichia coli ATCC® 25922™*	10 disks/vial	R19020
	Quanti-Cult Escherichia coli ATCC® 25922™*	10 tests/kit	R4737050

*  The ATCC Licensed Derivative Emblem, the ATCC Licensed Derivative word mark, and the ATCC catalog marks are trademarks of ATCC. Thermo Fisher Scientific is licensed to use these trademarks and to sell products derived from ATCC® cultures. Look for the ATCC Licensed Derivative® Emblem for products derived from ATCC® cultures.

thermofisher.com

© 2012 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.

Contact Information:

Ph: 1-800-255-6730
Fax: 1-800-621-8251

microbiology@thermofisher.com
www.thermofisher.com/microbiology

Thermo
SCIENTIFIC

Part of Thermo Fisher Scientific