



United States Department of Agriculture - Agricultural Research Service  
**Food Safety Research Information Office**  
**FSRIO**

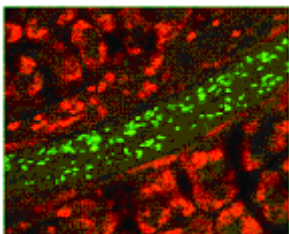
**FOOD SAFETY RESEARCH: A FOCUS ON**

# **E. coli O157:H7**

In the United States it is estimated that more than 73,000 infections and 61 deaths occur from E. coli O157:H7 each year. The O157:H7 serotype is a rare variety of E. coli that produces large quantities of one or more related potent toxins, causing severe damage to the lining of the intestine.

Since E.coli bacteria are present throughout the environment, there is always the potential to ingest the bacteria. Very young and elderly victims to E.coli O157:H7 can develop hemolytic uremic syndrome (HUS), characterized by renal failure and hemolytic anemia. In the elderly, HUS, fever, and neurologic symptoms, constitute thrombotic thrombocytopenic purpura (TTP). This illness can have a mortality rate in the elderly as high as 50 percent.

The potential damage of E.coli O157:H7 to humans has created a need to address several challenges from the farm-to-table, including educating consumers on cooking ground beef thoroughly, increasing the safety of ground beef through the use of irradiation, developing farm and slaughterhouse-based methods to decrease meat contamination, and identifying ways to prevent contamination of foods that are eaten raw.



*Fluorescent green E. coli invading cut leaf lettuce. Image by Marian Wachtel.*

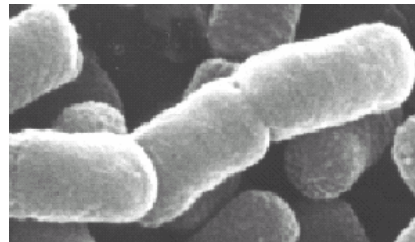
## **FSRIO Web site: A Resource for Food Safety Research Projects**

For E. coli-related research projects, search the Food Safety Research database at:

<http://fsrio.nal.usda.gov/quicksearch.php>

The ARS National Program 108 Food Safety Annual Report 2002 Section: Microbial Pathogens

[http://www.ars.usda.gov/research/programs/programs.htm?np\\_code=108&docid=1271#M](http://www.ars.usda.gov/research/programs/programs.htm?np_code=108&docid=1271#M)



*Escherichia coli O157:H7. Photo courtesy of Economic Affairs, Federal Veterinary Office, Switzerland.*

## **RESEARCH AREAS**

E. coli O157:H7 control methods in minimally processed fruits and vegetables and ruminants.

Survey retail markets and industry as reservoirs of pathogenic organisms for further investigation, regulation, and modification of production and handling.

Physical and chemical sanitation of fresh produce and sprout seeds to decrease risk.

Antimicrobial resistance patterns of antibiotic use of E. coli isolated from calves.

## **GENERAL FACTS**

- The bacterium E. coli belongs to the Family Enterobacteriaceae and was first isolated in 1885 by Theodor Escherich.
- In 1982, E. coli O157:H7 was identified by the Centers for Disease Control as an emerging foodborne pathogen.
- Infections are usually caused by consuming undercooked, contaminated ground beef, unpasteurized milk, and the surfaces of minimally processed fruits and vegetables.
- E. coli O157:H7 is also an emerging waterborne pathogen. In 1999 outbreaks were linked to contaminated water supplies and swimming areas in New York and Washington.
- Consumers can reduce the risk of infection by cooking ground beef thoroughly, drinking pasteurized milk, thoroughly washing fruits and vegetables, drinking disinfectant-treated municipal water, and avoiding swallowing lake or pool water while swimming.
- Organically-grown foods are equally susceptible to E. coli O157:H7 contamination.
- One hamburger pattie may contain the meat of several animals from four different countries. One contaminated carcass shredded for hamburger meat can pollute 8 tons of finished ground beef.

## ONLINE RESOURCES

**E. coli O157:H7 and Foodborne Illness  
Kansas State University Agricultural Experiment  
Station and Cooperative Extension Service.**

<http://www.oznet.ksu.edu/library/FNTR2/MF2138.PDF>

**E. coli O157:H7 in Drinking Water  
Environmental Protection Agency.**

<http://www.epa.gov/safewater/ecoli.html>

**E. coli: Unwelcome from Farm to Fork  
USDA. Agricultural Research Service.**

<http://www.ars.usda.gov/is/AR/archive/oct00/ecoli1000.pdf>

**Foodborne Illness Cost Calculator: STEC O157  
USDA. Economic Research Service.**

[http://www.ers.usda.gov/data/foodborneillness/ecoli\\_intro.asp](http://www.ers.usda.gov/data/foodborneillness/ecoli_intro.asp)

**Escherichia coli O157:H7  
CDC. Division of Bacterial and Mycotic Diseases.**

[http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm)

**Foodborne Pathogenic Microorganisms and  
Natural Toxins Handbook: Escherichia coli  
O157:H7**

**FDA. Center for Food Safety and Applied Nutrition.**

<http://vm.cfsan.fda.gov/~mow/chap15.html>

**Guidance for Minimizing the Risk of Escherichia  
coli O157:H7 and Salmonella in Beef Slaughter  
Operations**

**International HACCP Alliance.**

<http://haccpalliance.org/alliance/BeefSlaughterGuide.pdf>

**News and Information: Escherichia coli O157:H7  
USDA. Food Safety Inspection Service.**

[http://www.fsis.usda.gov/fact\\_sheets/E\\_coli/index.asp](http://www.fsis.usda.gov/fact_sheets/E_coli/index.asp)

**Bacteriological Analytical Manual Online, Chapter  
4: Enumeration of Escherichia coli and the  
Coliform Bacteria.**

**FDA. Center for Food Safety and Applied Nutrition.**

<http://www.cfsan.fda.gov/~ebam/bam-4.html>

**E. coli O157:H7 - A Potential Health Concern  
University of Florida Cooperative Extension  
Service.**

[http://edis.ifas.ufl.edu/BODY\\_SS197](http://edis.ifas.ufl.edu/BODY_SS197)



This fact sheet is one of several information products developed by the Food Safety Research Information Office (FSRIO) at the USDA's National Agricultural Library (NAL). Fact sheets on specific food safety research topics are available on the FSRIO web site at:

<http://fsrio.nal.usda.gov/topics.php>

FSRIO is a unique resource for the food safety research community. The program features a web site that serves as a gateway to research information and includes a database of federally-funded research projects. The database is available for researchers, policymakers, consumers and others to learn about research initiatives, and assist the government in assessing food safety research needs and priorities, thereby minimizing duplication of effort. FSRIO also provides a reference service at no charge.

Created by: Natasha Brown, Information Specialist  
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<http://www.nal.usda.gov>

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