

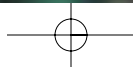
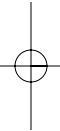
**F A C T S F O R B E E F P R O D U C E R S :**

# E. coli O157

*A Basic*

*Look at*

***E. coli O157***



### ***What is E. coli?***

*E. coli* (short for *Escherichia coli*) is the name for certain members of the bacterial family *Enterobacteriaceae*. The *E. coli* group, or species, literally has hundreds of members, or strains. Some strains live in animals' intestines, helping digestion, keeping harmful bacteria under control and producing and processing important vitamins. Humans need *E. coli* and other kinds of bacteria within the intestinal tract to remain healthy. In fact, *E. coli* represents approximately 0.1 percent of the total bacteria within an adult's intestines. Beneficial strains of *E. coli* aid in digestion of food and produce both Vitamin K and B-complex vitamins.

Unfortunately, some strains of *E. coli* could be considered the "black sheep" of the *E. coli* species. One such strain, *E. coli* O157, sometimes causes human illness when introduced into the human intestine.

### ***What is E. coli O157?***

*E. coli* O157 is a strain of *E. coli* that produces toxins (or poisons) that can damage the lining of the human intestine. Infection with *E. coli* O157 can magnify quickly in humans, particularly in children, seniors or people who may have weak immune systems. For these individuals, *E. coli* O157 can become life threatening by causing the kidneys to fail in a relatively short period of time.

### ***Where is E. coli O157 found?***

*E. coli* O157 has been found in sheep, cattle, horses, goats, elk, pigs, deer, opossums, raccoons, dogs, poultry, wild birds and houseflies. The bacteria can be found throughout our environment; anywhere animals (including pets) co-exist with humans.

Researchers find *E. coli* O157 throughout the beef industry as well. The organism has been found in young beef calves and older cows, in dairy calves, and in dairy cows. Cattle coming into the feedlot carry the organism, as do hides within processing facilities.

### ***How does E. coli O157 spread?***

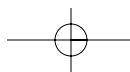
The truth is, *E. coli* O157 is very common in the environment, and it survives remarkably well. When an animal has *E. coli* O157 within its intestine, that animal typically "sheds" the organism through its feces. Since *E. coli* O157 can be found in many species but particularly cattle, anytime we eat something, drink something, or touch our hands to something that has been either a part of or anywhere near cattle, there is always the potential to consume *E. coli* O157. Once consumed, the bacterium then moves through the digestive tract and settles in the intestine and could lead to illness. Examples of ways humans might introduce *E. coli* O157 into their bodies include eating contaminated, uncooked meats like salami or ground beef, unpasteurized milk or fruit juice, or produce such as sprouts or lettuce that have been cross-contaminated. Other sources of exposure might be less obvious things like swimming in feces-contaminated water, or touching your mouth after playing on grass containing feces from infected geese.

### ***What's E. coli O157's link with the beef industry?***

Consumers may unintentionally consume *E. coli* O157 when eating ground beef, that has not been cooked to 160 degrees F. If a whole-muscle cut comes in contact with the *E. coli* strain O157, the bacteria will be found on the surface of the meat, not down inside the muscle fibers. There is then the potential that meat cut with a knife, or placed on a grinder in the processing plant, may have the bacterial cells carried down into the cut or grind on the knife blade or grinder mechanism. This is why it's always important to follow safe handling instructions:

- 1. Keep refrigerated or frozen. Thaw in the refrigerator or microwave.***
- 2. Keep raw meat and poultry separate from other foods.***
- 3. Wash working surfaces; cutting boards, utensils & hands after touching raw meat or poultry.***
- 4. Cook thoroughly to an internal temperature of 160 degrees F, using a meat thermometer.***
- 5. Keep foods hot.***
- 6. Refrigerate leftovers immediately or discard.***





Even though scientists aren't sure just how many of the *E. coli* O157 organisms it takes to make you sick, they know the number isn't very high. Especially susceptible to this infection are adults with compromised immune systems and children with immature immune systems. And, although *E. coli* O157 in foods can be completely destroyed by adequate cooking, the organism has potential to cause serious human illness—and that makes *E. coli* O157 reduction top-of-mind for today's beef industry.

### ***What does *E. coli* O157 cost the beef industry?***

*E. coli* O157 infection endangers beef consumers. Each time an *E. coli* O157 outbreak occurs, some people get sick, and others lose trust and confidence in beef products. Research shows that product recalls following outbreaks have a negative effect on beef demand. Boneless beef prices decline an average of 2 to 2.5 percent in the five days following a recall. Agricultural Economist Ted Schroeder estimates from 1991 through 1999, beef recalls due to safety concerns cost the industry as much as \$1.6 billion in lost demand.

### ***E. coli* O157: Costs during the past 10 years (in millions of dollars)**

Impact on demand	\$1,584
Impact on boneless beef prices	\$ 172
Capital expenditure by top 10 packers	\$ 400
Increased operating costs for top 10 beef packers	\$ 250
Spending by next 20 beef packers	\$ 100
Recall costs incurred by packers	\$ 100
Government and industry research	\$ 65
<b>TOTAL</b>	<b>\$2,671</b>

*Courtesy of Steve Kay, editor and publisher of Cattle Buyers Weekly  
(www.cattlebuyersweekly.com)*

Producers absorb a sizable portion of this loss.

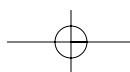
During the past decade, \$20 million in checkoff funds have been invested in beef safety research. In addition, the top 10 beef packing companies spent \$400 million on beef safety research. Those packers have also incurred an estimated \$250 million in increased operating costs due to changes at the processing plant to improve beef safety.

Steve Kay, Cattle Buyers Weekly, reports that government and industry have spent at least \$65 million since 1993 on *E. coli* O157 research. USDA's Agricultural Research Service spent \$49 million from 1993 until the end of fiscal year 2002 to research food safety.

The amount of money *E. coli* O157 costs the industry is staggering. New solutions to lower *E. coli* O157 will cut both costs and lost consumer opportunity dramatically. However the solutions must be easy to implement, economically feasible and readily available.

### ***Why is *E. coli* O157 difficult to control?***

*E. coli* O157 adapts and survives in many different environments. The organism can remain viable for months at a time in both feces and soil. It can survive and replicate in both standing and free-flowing water. Unlike many other bacteria, *E. coli* O157 can survive and replicate in both environments with oxygen and environments without oxygen. It can respond and adapt to differences in environmental chemicals, pH, and temperature in remarkable ways, making it an especially resilient organism.



### ***What has the beef industry been doing to control infection from *E. coli* O157 in meat?***

The *E. coli* outbreak on the west coast in 1993 led the beef industry to intensify beef safety research efforts by forming the Blue Ribbon Task Force. This Task Force immediately began identifying research needs and knowledge gaps with regard to *E. coli* O157. Based on the Task Force's recommendations, beef producers have invested more than \$20 million in beef safety research and development of methods to control, test for, and sample, *E. coli* O157. Beef producers take beef safety very seriously and continue to devote dollars to *E. coli* O157 research, using beef checkoff funds.

### ***Can beef producers reduce how much *E. coli* O157 is found in live beef cattle?***

Most of the research surrounding *E. coli* O157 pre-harvest has been conducted in feedlots, mainly because feeding comes right before harvesting in the beef production chain. Practices that help to reduce *E. coli* O157 at packing plants are in use—and recent research is beginning to show significant reductions in *E. coli* O157 at this level.

Feedlot methods to reduce *E. coli* are extremely important. However, while scientists have researched *E. coli* O157 for years, and can observe and describe many characteristics of *E. coli* O157, they have not found reliable management practices to predictably and effectively reduce *E. coli* O157 in production settings. No management tools have been found to impart a consistent decrease in *E. coli* O157 in live cattle. That's why discovery of on-farm strategies remain crucial, and at the top of the list for industry-identified research needs. Currently, one particular strain of beneficial bacteria when fed to feedlot cattle can significantly reduce shedding of *E. coli* O157. In addition, several promising on-farm intervention strategies are in the development phase and will be available to producers in the not-too-distant future. Many current and planned research projects focus on methods to reduce *E. coli* O157 on the ranch using new technologies or interventions, and results of these studies show promise for the future.

### ***Where can I find more information on current research about controlling *E. coli* O157 in live beef cattle?***

Another brochure, titled *E. coli* O157 *Solutions: The Pre-harvest Commitment* contains more information. Please call NCBA at 303-694-0305 to obtain a copy or visit the research section of [www.beef.org](http://www.beef.org).

For more information contact:



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