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It is no coincidence that the U.S. beef supply is the safest in the world as beef safety is the number priority of America's beef producers. Since 1993, beef producers in this country have invested more than \$22 million in beef safety research through the Beef Checkoff and the beef industry has collectively invested approximately \$400 million in beef safety research in the past decade.

The Beef Industry Food Safety Council (BIFSCO), an organization led by America's beef producers which includes representatives from each sector of the industry, organized the 2003 *E. coli* Summit to develop unified best practice documents that serve as a blueprint for making U.S. beef an even safer product. For the first time, the entire industry brought together its best resources and created shared documents that now function as the industry standard for food safety practices and procedures. These best practice documents are updated yearly and are available free of charge at www.bifSCO.org

In addition to the industry's efforts, all beef is subject to strict government oversight and USDA maintains strict guidelines for ensuring beef safety. Veterinary inspection of animals before slaughter, meat quality inspections and standardized testing of beef products are among the many ways our government helps ensure the safety of our beef. In addition, meat companies are required by federal law to create and institute Hazard Analysis and Critical Control Point (HACCP) plans on site to further protect the food supply.

The dedication of time and resources from pasture to plate, by every person in the beef production chain, is evident in the reduction of foodborne pathogens such as *E. coli* O157:H7. Between 2000 and 2005, the incidence of *E. coli* O157:H7 in ground beef has declined more than 80 percent, according to the U.S. Department of Agriculture (USDA).

Today, every step of the beef chain remains committed to fighting the battle against foodborne pathogens and that dedication extends to foodservice and consumers. The beef industry is focused on leading a collective effort based on prevention with an emphasis on information exchange at all levels.

Pathogenic Bacteria

Bacteria, including those that cause foodborne illness, are found naturally all around us. Safe food handling, cooking, serving, and storage practices are necessary to prevent bacteria from multiplying and causing foodborne illness. According to the Centers for Disease Control, the majority of foodborne illness could be prevented by improving food-handling practices, including properly cooking and storing food and practicing appropriate personal hygiene when handling food.

Pathogenic bacteria are responsible for the majority of foodborne illness in the U.S. In some cases, the illness results directly from eating foods contaminated with the bacteria (such as *Salmonella*) and the pathogen itself causes the symptoms. In other cases (such as with *Staphylococcal* food poisoning or *Botulism*), the pathogen releases a toxin into the food, which causes the illness.

Since the muscle tissue of healthy cattle is sterile, the primary way bacteria are introduced into food is during processing, handling and preparation. Practicing safe food handling and storage minimizes the risk of contracting foodborne illness.

To sanitize cutting boards, wash with hot soapy water and then wash again with a solution of 2 to 3 teaspoons household bleach diluted in 1 quart warm water. Rinse with plain, hot water.

Adequate cooking destroys most bacteria. Use the following USDA guidelines for food-safe internal beef cooking temperatures. *Use an instant-read thermometer to accurately determine doneness.*

- Beef Roasts & Steaks: At least 145°F (medium-rare)
- Ground Beef: At least 160°F (medium)

Storing cooked foods is also an important part of food safety. When cooked food will not be served immediately, it is essential to assure it is properly held or cooled as quickly as possible. The FDA Model Food Code recommends a two-stage cooling process. Cooked food must be cooled from 135°F to 70°F within two hours, then from 70°F to 41°F or lower in an additional four hours.

Food safety experts consider the temperature range between 40°F and 140°F to be the “*Danger Zone*” for prepared foods, since this is the temperature range at which bacterial growth occurs. Foods intended to be served cold (such as sliced roast beef for sandwiches) should be held under 40°F, while foods intended to be served hot (such as fully-cooked ground beef patties) should be held above 140°F. The rate of bacterial growth is directly related to temperature; for instance, some types of bacteria can double in number every 6 hours at 40°F, while at 50°F they can double every hour.

Beef cooked “very-rare” (around 130°F) poses a special problem for foodservice establishments, since customers occasionally request this degree of doneness. Beef roasts cooked to 130°F are likely to have higher microbial numbers than roasts cooked to 145°F, 155°F or 165°F. A combination of cooking to a 130°F internal temperature and then holding at below 140°F for an extended period could result in foodborne illness problems. Beef cuts cooked to this temperature upon a patron’s request should be served immediately and not held for later serving. Always follow recommended cooking methods to help ensure food safety.

Defrosting meats, poultry and seafood in the refrigerator slows bacterial growth. When the microwave oven is used for defrosting, the food should be cooked immediately since partial cooking may occur and can promote bacterial growth. *Never defrost meat at room temperature.*

Bacteria can spread from one food to another through “cross-contamination”. To decrease this risk:

- Keep raw meats, poultry and seafood and their juices separate from ready-to-eat foods, both in the refrigerator and during meal preparation.
- Don’t place cooked foods on the same plate that held raw meats, poultry or seafood.
- Use separate cutting boards and knives for raw animal products and ready-to-eat foods, such as fruits and vegetables.
- Always wash hands thoroughly in hot, soapy water *before* preparing or eating food and *after* handling raw meats, poultry and seafood.
- Clean all cooking utensils and countertops that have come in contact with raw meats, poultry and seafood with hot, soapy water immediately after use.
- To sanitize cutting boards, wash with hot soapy water and then wash again with a solution of 2 to 3 teaspoons household bleach diluted in 1 quart warm water. Rinse with plain, hot water.

E. Coli

Escherichia coli (*E. coli*) is a group of bacteria and a natural environmental contaminant, which is found and transferred in numerous places including any place humans or animals live. There are hundreds of *E. coli* strains normally found in the intestines of warm-blooded animals and humans and most are harmless. However, one strain of *E. coli* is especially virulent and can cause illness in humans (especially small children and individuals with compromised immune systems). This strain, *E. coli* O157:H7, is found in the intestines of deer, pigs, sheep, birds and cattle.

America's beef producers dedicate time and resources to reducing the incidence of foodborne pathogens such as *E. coli* O157:H7, and have done so for years. One example of this dedication is the Beef Industry Food Safety Council's (BIFSCO) establishment of best practice documents, which include the most up to date scientific and technological information for each segment of the production chain. These documents, considered the industry standard, are updated yearly and are available free of charge at www.bifSCO.org.

All beef products are subject to strict government oversight, both at the producer and processing levels. The U.S. Department of Agriculture (USDA) sets a strict, low baseline for pathogens in food, and partners in the beef production chain have achieved sampling results well below the baseline requirements for the last six years. The combination of routine testing and a determination from the entire beef production chain has paid dividends and the decrease of foodborne pathogens such as *E. coli* O157:H7 has been measurable:

- Between 2000 and 2005, the incidence of *E. coli* O157:H7 in ground beef declined more than 80 percent, according to the U.S. Department of Agriculture.
- In 2005, just 0.173 percent of samples tested positive for *E. coli* O157:H7, the lowest level since 1999, according to USDA. Each year, the Centers for Disease Control and Prevention (CDC) tracks foodborne illnesses. In 2005, CDC reported that only 1.06 foodborne illnesses out of every 100,000 cases were associated with *E. coli* O157:H7.
- Recent figures indicate that the United States is on track to reach the government's Healthy People 2010 goal for *E. coli* O157:H7. Overall, the incidence of *E. coli* O157:H7 cases declined 29 percent since the baseline of 1996-1998.

Each partner in the beef production chain plays a role and has a responsibility for keeping beef safe. In addition to the work done by beef producers to produce a safe and wholesome product, packers, processors, retail and foodservice operators have an impact on providing safe beef products for consumers worldwide.

It is important to remember that sufficiently cooking beef products will kill bacteria such as *E. coli* O157:H7. When cooking beef, both in the foodservice kitchen and in home kitchens, it is important to take steps to ensure it remains a safe and wholesome product. It is essential to employ established best practices for storage, handling and preparation, such as cooking ground beef products to an internal temperature of 160°F and steaks, roasts and other whole muscle meat cuts to an internal temperature of at least 145°F, to ensure that any harmful bacteria are eliminated.

The most commonly reported cause of foodborne illness is Salmonella bacteria.

Salmonella

The most commonly reported cause of foodborne illness is *Salmonella* bacteria. According to USDA/ARS, there are 254 known *Salmonella* serotypes, but the top 25 account for 83.5 percent of the total incidence. The CDC estimates there are approximately 40,000 cases of salmonellosis reported in the United States every year. Because many milder cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater.

Salmonella bacteria cycle continuously through the environment via the intestines of animals and humans. *Salmonella* is most commonly found in raw or undercooked foods, such as eggs, poultry, meats, and unpasteurized milk and dairy products. Fruits, vegetables, yeast and chocolate have also been implicated in *Salmonella* outbreaks. Compared to poultry and other meats, fresh beef has a low incidence of *Salmonella* bacteria. In 2005, the USDA found that 16.3% of broiler chickens and 3.7% of pork samples tested positive for *Salmonella* while only 1.1% of ground beef samples tested positive.

Thorough cooking to 160°F will kill *Salmonella* organisms in ground beef. Steaks and roasts should be cooked to an internal temperature of at least 145°F. However, *Salmonella* can be spread to other foods through cross-contamination. This occurs when contaminated raw food touches a cooked food or surface used to prepare or serve cooked foods. For example, if tongs are used to put raw meats, poultry or seafood on a grill and are used again to remove or serve the cooked food without washing the tongs first, any harmful bacteria may be transferred from the tongs to the cooked food.

Listeria

Listeria monocytogenes is a foodborne bacterium that is commonly found in soil, water and the intestines of humans and animals. Animals can carry *Listeria* without appearing ill, but contaminated meat from these animals can further contaminate raw meats, poultry, seafood and unpasteurized dairy products. Vegetables can become contaminated via the soil or raw manure.

While pasteurization and heat destroy *Listeria*, poor manufacturing practices can cause contamination to occur in processed foods after processing. Foods that can become contaminated after processing include soft cheeses (such as bleu, feta, Brie), deli meats, hot dogs, seafood and meat pâtés.

Pregnant women, newborn children, the elderly, and those with weakened immune systems are the most susceptible to *Listeria* infections and should avoid these types of processed foods. Proper food handling and cooking significantly reduces problems with *Listeria* in foods.

International Food Safety Council

The Beef Checkoff is a Founding Sponsor of the National Restaurant Association Education Foundation's International Food Safety Council. For more information, visit www.nraef.org/ifsc

